SCHOOL VIOLENCE: INDIVIDUAL AND GROUP INFLUENCES

by

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Abstract

Weapon carrying at school has been explained by a number of theories, but two dominate the literature: being fearful and trying to protect oneself from harm (fear-victimization hypothesis) or displaying behaviour consistent with a deviant lifestyle (lifestyle theory). This study replicated previous research by investigating the relative and combined influence of individual level processes related to weapon carrying, as hypothesized by the fear-victimization hypothesis (i.e., fear of victimization and victimization experiences) and lifestyle theory (i.e., alcohol and drug use). This study extended previous research by also considering an ecological model of weapon carrying by examining school level processes that may impact student weapon-carrying. Data was obtained from students (N= 50,334) in grades 8-12 in 69 schools in Western Canada who completed the Safe Schools and Social Responsibility Survey. Multilevel modeling was used to evaluate both individual and school level variables that underlie the two major theories of weapon carrying among youth. Results at the individual level provided support for both the fear-victimization hypothesis and the lifestyle theory, suggesting multiple pathways to deviant behaviour. Support was also found for the hypothesis that some school-level variables, as reflected in the collective experiences of the student body, influenced the relationship between individual level processes (i.e., a students reported fear of victimization, victimization experiences, and substance use) and weapon carrying.
Preface

The current study is based on research conducted by Drs. Shelley Hymel and Terry Waterhouse on a project entitled, The Social Experiences of Secondary School Students in BC (see page 26 for a detailed discussion of the project). Approval for the secondary use of this data was obtained from the University of British Columbia’s Behavioural Research Ethics Board (certificate of approval # H10-00155).
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Chapter One: Introduction

News headlines across North America share the tragic events of school shootings across North America. As a society, we have had to make a choice about what our response will be to these violent incidents. Zero tolerance policies, police officers and/or other protective measures have become increasingly commonplace as schools struggle with the challenge of school violence (Bank, Woolard, Brown, Fonacaro, Luescher, Chinn, & Miller, 2007). School violence has been conceptualized as a multifaceted construct that involves both criminal and aggressive acts (Furlong & Morrison, 2000). It is an “umbrella term” that has been used to describe many constructs, including delinquent behaviour, crime in school, substance use, gang behaviour, victimization experiences, and weapon possession at school among others. Given this lack of clarity in the literature, a further explanation and exploration of the concept is needed.

Furlong and Morrison (2000) remind us that “school violence” must be broken down into two distinct parts: school and violence. School is a physical location where violence may occur. A school has roots in the community, and as a system, it may exacerbate problems experienced by individuals within it. Violence has been defined as physical harm, property damage and psychological harm (Benbenishty & Astor, 2005). In this study, school violence was operationalized as weapon carrying behaviour at school and school events. This study sought to understand both individual and school factors that influence an individual to bring weapons to school, and in doing so, come prepared to engage in school violence.

Although there are a number of different explanations offered as to why students engage in school violence, two dominate the literature: protecting oneself from harm due to fear of victimization and displaying behaviour consistent with a deviant lifestyle. This study focuses on these explanations, the protectionist model, or what has come to be known as the fear-victimization hypothesis, and the lifestyle theory. As shown in the review to follow, support for
these two theories has been mixed. Moreover, most the research has focused on the individual and has not considered the impact school-level variables may have on weapon carrying. The purpose of this study was to enhance knowledge about youth violence in Canada. Specifically, this study investigated individual level processes related to school violence, as hypothesized by the fear-victimization hypothesis and lifestyle theory (i.e., alcohol and drug use), and extended the research by considering school level process that may contribute to school violence.

**Theoretical models**

**Fear-victimization hypothesis.** The fear-victimization hypothesis (Wright, Rossi, & Daly, 1983) has been used to understand why adults own firearms. Previously known as the Fear and Loathing Hypothesis, this model posits that adults buy guns for protection, in response to their fear of crime and/or violence present in society. Several studies have tested this hypothesis with adults in a community context, yielding mixed results (e.g., Arthur, 1992; Smith & Uchida, 1988). Smith and Uchida (1988) completed structured interviews with a random sample ($N = 9,021$) of residents in three metropolitan areas. When adult residents reported an increase in their feelings of vulnerability to crime, or when they reported police services to be ineffective, the likelihood of weapon ownership for protection increased. Results also showed that those who reported having been victims of crime and those who perceived a greater risk of future crime were also more likely to purchase weapons for self-protection.

Arthur (1992) also examined the predictors of handgun ownership among adult African American crime victims and nonvictims. A positive relationship with age and size of home were significant predictors of gun ownership among victims and nonvictims of crime. An increase in self-reported criminal victimization, age and size of place and income were positively related to handgun ownership among adult African American males. In contrast to Smith and Uchida (1988)’s findings, Arthur (1992) found that fear of crime was not predictive of handgun
ownership among victims and nonvictims. These different results could be due to a number of factors (e.g., variations in methodology, see critique below for a further discussion). It may also be because of the wording used to ask about gun ownership. Arthur (1992) just asked about general gun ownership, whereas Smith and Uchida (1988) asked about gun ownership specifically for defensive purposes. Nevertheless, both studies focused their attention on adult respondents. The present study tested the idea that the fear-victimization hypothesis can be generalized to adolescents who are victimized by peers within a school context.

Victimization among youth in Canadian schools is common. For instance, Canada was ranked 11th out of 37 countries in terms of youth who reported experiencing victimization in their schools (Akiba, LeTendre, Baker, & Goesling, 2002) with over 30% of Canadian youth reported being victimized in schools. According to the fear-victimization hypothesis, students who have been victimized and/or who are fearful of victimization would be more likely to engage in weapon carrying at school and school events. Similar to the studies that were conducted with adults, researchers that have tested this hypothesis among adolescents within a school context have also shown mixed results. Some researchers have found support for the fear-victimization hypothesis (e.g., DuRant et al., 1997; May 1999), while others failed to demonstrate that fear and victimization were predictors of school violence (e.g., Bailey et al., 1997; Rountree, 2000; Wilcox et al., 2006).

In a survey of 7,886 adolescents (grades 10-12) from southern United States conducted by May (1999), 8.1% of youth reported carrying a gun to school one or more times. Carrying a weapon to school was more likely among male students, African American students (relative to Caucasian), older students and youth from single-parent homes or poorer families, who lived in neighbourhoods that were seen to be less civil, and/or who were in a gang. Combined, these variables accounted for only 16.2% of the variance in carrying weapons to school. Reported fear
of criminal victimization, when added to the model, accounted an additional 6.9% of the variability, after which race and gang membership were no longer significant predictors. Therefore, May concluded that those students who reported that they were fearful and who perceived their neighbourhoods as most disorderly were more likely to carry a gun to school, supporting the fear-victimization hypothesis.

In a survey of over 3,000 high school students (grades 9-12) in the United States, DuRant et al. (1997) assessed the relationship between weapon-carrying on school property and physical fighting, substance use, days not attending school due to fear, victimization at school (i.e., being threatened or injured with a weapon), same-sex sexual activity, and perception of academic achievement. More than 10% of students reported they carried a weapon (e.g., gun, knife or club) to school in the last 30 days. Regression results indicated that weapon-carrying at school was predicted by an increased frequency of fighting, greater alcohol use, and increased frequency of being threatened or injured with a weapon and being male. Together, these variables accounted for 21% of variance in student reports of weapon carrying. Further, results of multiple logistic regression analyses indicated that students who reported greater alcohol use were over seven times more likely to carry a weapon to school, as were students who perceived themselves to be low achievers. Students who were absent six or more days because of fear were over five times more likely to carry weapons to school compared to those who did not miss a day at school. DuRant et al. found these results correctly classified 91.83% of students who did or did not carry weapons to school. To highlight, being threatened or injured with a weapon (in other words, being victimized) was a significant predictor of weapon carrying, and students who were absent six or more days because of fear were more likely to carry a weapon to school, supporting the fear-victimization hypothesis.
In contrast, other studies (e.g., Bailey et al., 1997; Rountree, 2000; Wilcox et al., 2006) did not find support for the fear-victimization hypothesis. Bailey et al. aimed to identify predictors of weapon carrying at school among 1,503 U.S. students in grades 7 and 8. Results showed that 15% of students reported that they brought a weapon to school, a result consistent with previous U.S. studies (e.g., DuRant et al. 1997; May, 1999). It was discovered that being male, not living with both parents, not feeling close to parents, heavy drinking, being in a fight, and damaging school property were significantly related to weapon-carrying at school and accounted for 23% of the variance of weapon-carrying. The strongest risk factor for students carrying weapons to school was the perception that other students brought guns to school. Notably, being worried about personal safety at school was not significantly correlated with weapon carrying at school. These results led Bailey et al. to conclude that students who brought a gun to school were no more victimized or fearful of their safety compared to those students who did not bring weapons to school. In other words, they did not find support for the fear-victimization hypothesis.

In another study, Rountree (2000) tested the fear-victimization hypothesis in Kentucky among adolescents between 10 and 21 years old in three counties: Urban ($n = 1,460$), western ($n = 1,226$) and eastern ($n = 1,322$). Across each area, weapon carrying at school was a rare behaviour, with 4-5% of students reporting having brought a weapon to school; self-reported victimization and self-reported fear did not significantly predict weapon carrying. Instead, self-reported drug use was predictive of students carrying weapons to school. Drug dealing significantly predicted weapon-carrying behaviour in the western and eastern counties. As well, Rountree discovered that self-reported weapon carrying increased if the student perceived his or her best friend carried a weapon to school. Therefore, similar to Bailey et al.’s (1997) study,
these results were not considered support for the fear-victimization hypothesis. However, these results do highlight the important role of peers with regard to this aberrant behaviour.

Wilcox et al. (2006) surveyed 4,000 students from grades 7, 8, and 9 across 113 schools in Kentucky. Using a longitudinal, survey-based methodology, Wilcox and colleagues sought to understand whether student-reported levels of fear, perceived risk, and victimization experiences predict weapon-carrying behaviour among students. Extending the research further, Wilcox et al. wanted to understand if carrying a weapon to school reduced student reported levels of fear, perceived risk, and victimization experiences. Results revealed little association between student-reported level of fear in grade seven and school-based gun possession in grade eight. As well, a perceived level of risk at grade seven was negatively related to the frequency of gun possession at school in grade eight. Student-reported victimization in grade seven showed a non-significant relationship with grade eight gun possession at school. Finally, Wilcox et al. found that if students carried a gun in grade eight, their reported levels of fear, perceived level of risk and victimization increased in grade nine. These results were also replicated with non-gun related weapon possession. Ultimately, Wilcox et al. did not find evidence that supported the fear-victimization hypothesis and in fact found some evidence that contradicted the theory.

**Critique of the research.** Yun and Hwang (2011) point out that the conflicting results observed may be a function of the victimization measures used across studies. For instance, Yun and Hwang reasoned that, if being victimized motivates an adolescent to carry a weapon to school, the victimizing experience should have been serious enough to instil fear. Accordingly, Yun and Hwang argued that it is reasonable to assume that the effect of less serious victimization, perhaps property crime, would have less of an impact on the likelihood of a student carrying a weapon to school. Yun and Hwang further argued that some studies (e.g.,
Rountree, 2000) that failed to support the hypothesis combined both violent (e.g., threat) and non-violent (e.g., property damage) victimization.

Perhaps another reason for non-significant findings by Rountree (2000) and Wilcox et al. (2006) was the number of items used to measure the constructs. Rountree (2000) used single-item measures for variables related to the fear-victimization hypothesis. Victimization was categorized into two areas, each measured by a single item: Threatened (i.e., “… had been threatened or injured at school”) and property damage (i.e., “had clothing, books, or property stolen or damaged on school property”). Rountree also measured fear with a single item, “being afraid of some students at school”. Weapon possession was also measured using a single item. By using a single item to measure a construct the researcher may miss a lot of variance that could be accounted for, and may lead the researcher to false conclusions (Hox, 2010). Given these limitations, more research is needed using more extensive and psychometrically valid measures.

Even though Wilcox et al. (2006) wanted to extend the existing literature to see if carrying a weapon did reduce the fear of victimization among students, their study too was limited by their measures. The measure of victimization and level of fear was limited to property crimes, physical attack, or having a gun or other weapon pulled on them. In the bullying literature, students in high school report that verbal victimization is common (Wang, Iannotti, & Nansel, 2009). Therefore, it makes sense to include verbal victimization within the fear-victimization hypothesis in order to gain a more holistic understanding of the potential link between victimization and weapon carrying. The present study addressed this gap.

The criticism of previous studies (i.e., Wilcox et al., 2006; Rountree, 2000) for using single-item measures, however, spills over to those that have found some support for the fear-victimization hypothesis (i.e., DuRant et al., 1997). In an effort to improve on measurement in this area, May (1999) used multiple items in his measure, and also made use of a nationally
representative U.S. sample. Still, there are limitations to his study. The Fear Index that was used, although it showed adequate internal consistency, was not necessarily an accurate measure of fear of criminal victimization. In fact, it was a fear of specific spaces (e.g., “I am afraid to go to the restroom at school sometimes.” or “I am afraid of being in the study hall.”). There were two items in the scale that showed a fear of victimization (e.g., “I am afraid of getting beaten up.”), but it is impossible to discern whether the results obtained were due to fear of spaces or fear of victimization. To more accurately evaluate the fear-victimization hypotheses, the present study included items that related only to fear of being victimized.

It is also important to point out that most of the research that has demonstrated support for the fear-victimization hypotheses has been conducted in the southern United States (e.g., Kentucky, Florida and Mississippi). However, school violence does not stop at the US-Canadian border; it is also a problem in Canada (Akiba, et al., 2002; Akiba, 2008). Recent anecdotal reports of weapon carrying in Canada, specifically in British Columbia, have been reported in the media, so it is important to test this hypothesis using a Canadian sample of adolescent students in a school context, and this study seeks to do just that.

Finally, all of the research conducted to date has used regression-type models, ultimately explaining links between fear and weapon carrying at the individual level, which is important. However, equally important is the consideration of whether the same constructs and ideas hold true at the group level. Accordingly, this study extended previous research by considering school-level variables in the analysis.

**Lifestyle theory.** The fear-victimization hypothesis is but one way to examine the weapon-carrying behaviour among adolescents. However, this behaviour may be more complex than this one idea alone. It is possible there are a series of risk behaviours that influence an adolescent to carry a weapon to school and school events. Jessor (1991) considered risk
behaviour to refer to any behaviour that can compromise successful adolescent development and there is some empirical evidence to support the idea that adolescents who are involved in risky behaviour are more likely to own weapons or arm themselves at school (Dukarm, Byrd, Auinger, & Weitzman, 1996; Svensson & Pauwels, 2010).

Lifestyle theory (Hindelang et al., 1978) was primarily used to explain violent victimization. Specifically, Hindelang et al. argued that routines related to work, school or leisure activities might influence rates of victimization, with various lifestyle choices developing from demographically-based role expectations and structural constraints. Nofziger and Kurtz (2005) defined role expectations as cultural norms that are related to a person’s status and dictate the activities of a person. For instance, as children get older, they move away from the strict control of adults and spend more time in peer-based activities. Nofziger and Kurtz defined structural constraints as “the limitations on opportunities to choose between alternative lifestyles” (p. 6). For example, level of income limits where people live, activities they engage in and more. It is thought that these role expectations and structural constraints create a situation where individuals adapt to their situations, adopting a lifestyle that allows them to function within the limitations (structural constraints) that exist for them. A lifestyle that includes numerous deviant activities may increase the likelihood that the individual will be a victim of crime (Nofziger, 2006; Zhanga et al., 2001) or perpetrator, as discussed below.

Several studies have provided empirical support for this lifestyle theory (e.g., Nofziger, 2006; Svensson and Pauwels, 2010). In a sample of 4,023 adolescents in the U.S. (12 to 17 years of age), Nofziger (2006) investigated whether participation in a deviant lifestyle increased the risk of both direct and indirect victimization of youth at school. Over 19% of subjects in this sample reported being a victim of at least one violent act, including indirect violent victimization (16% of the sample, witnessed someone shoot someone, cut or stab someone with a knife, or
threaten someone with a weapon among other things), direct violent sexual assaults (1.3% of the sample), and direct physical assaults at school (4.2% of the sample). Nofziger found that participation in a deviant lifestyle (e.g., drug use, alcohol use and property crime and violent acts) significantly increased the risk of indirect victimization at school by 49%, and increased the odds of being the victim of violent sexual assault at school by 67%, and risk of physical assault at school by 31%.

Zhanga et al. (2001) also tested the lifestyle theory. He explored the relationship between deviant lifestyle participation and victimization and whether the neighbourhood influences the relationship. Zhanga and colleagues asked 625 male adolescents between 16 and 19 years of age to complete a survey exploring multiple influences on substance use and delinquency at two time points, 18 months apart. A cross-lagged synchronous model was created. Results showed that a deviant lifestyle (i.e., drinking, drug use, and delinquency) at the initial data collection (Time 1) was related to victimization at the second data collection point (Time 2), although there was no lagged effect of crime victimization at Time 1 to deviant lifestyle at Time 2. Results also showed that, for students who were from a low-level crime neighbourhood, deviant lifestyles had a weak effect on being victimized. This finding provides some support for the Lifestyle model.

As reviewed above, there is some empirical evidence to support the lifestyle theory, based on research conducted in the U.S. (Nofziger, 2006; Zhanga et al., 2001) and Columbia (Klevens et al., 2002) among other countries. However, this research really only focuses on a single outcome: Victimization. Perhaps the lifestyle and the structural constraints also predict criminal behaviour. Only a few studies (e.g., Notzer & Kurtz, 2005; Svensson & Pauwels, 2010) have examined this association.

Svensson and Pauwels (2010) surveyed 2,264 Belgian students and 898 Swedish students (12 to 17 years of age) in an effort to understand the links between an individual’s proclivity to
offend (i.e., a student’s morality and self control), as well as their lifestyle (i.e., delinquent friends, night spent in the city center, and frequency of alcohol use) and engagement in criminal behaviour (e.g., vandalism, shoplifting, fighting on school property shoplifting, theft behaviour, robbery, weapon use, etc.). They found that gender, immigrant background, individual propensity to offend based on morality and self control, and lifestyle risk (i.e., number of delinquent friends, nights spent in the city center, and frequency of alcohol use) explained 43-44% of one’s overall level of offending in Belgium and Sweden, respectively. The interaction between the propensity to offend and lifestyle risk accounted for an additional 5 to 9% of the variance in Belgium and Sweden, respectively. Thus, in both countries, the level of lifestyle risk had an effect on an individual’s offending behaviour across individuals with different levels of propensity to offend. Among the individuals with a high level of propensity to offend, those with a high level of lifestyle risk were more likely to have higher levels of offending compared to those with a low level of lifestyle risk. However, lifestyle risk levels were not related to frequency of offending among individuals who had a low level propensity to offend. Therefore, the authors concluded that the impact of lifestyle risk on offending behaviour depends on an individual’s level of propensity to offend. These results provide some support for the idea that lifestyle theory can also explain violent offending.

Notziger and Kurtz (2005) tested whether a lifestyle and routine activities approach can explain violence offending among youth. They surveyed 4,023 adolescents (12-17 years) from the United States. Using a logistic regression analysis, two models were created. The first model showed that the likelihood of violent offending was higher among boys and older adolescents and among minority youth, as compared to Caucasian youth. Overall, a violent lifestyle also significantly increased the likelihood of violent offending, consistent with the lifestyle theory. As well, being a victim increased the likelihood of offending by 366%, having violent friends
increased the likelihood of offending by 375%, and witnessing violence increased the likelihood of offending by 769%. To understand whether the type of victimization experienced (i.e., sexual, physical, or physically abusive punishment, friend violence, or witnessing violence) was related to violent offending, a second model was created. Here, older youth and males were at higher risk of offending, as were Hispanics and other minority students, as compared to white students. The only type of violent victimization that did not increase the likelihood of violent offending was sexual victimization, underscoring the need to consider different forms of victimization.

The studies conducted by Svensson and Pauwels (2010) and Notziger and Kurtz (2005) provided support for the idea that lifestyle and structural constraints may be positively related to criminal behaviour, consistent with the lifestyle theory. However, the way lifestyle was measured in the above studies did not include a comprehensive measure of a risk factor that has been empirically linked to violence: substance use (e.g., Bailey et al., 1997; DuRant, Kahn, Beckford, & Woods, 1997; DuRant, Krowchuk, Kreiter, Sinal, & Woods 1999; Malecki & Demaray, 2003). The Office of the Surgeon General (2001) suggests that the use of substances reflects antisocial attitudes and early involvement in a delinquent lifestyle that often comes to include violent behaviour in adolescence. Zhanga et al. (2001) argued excessive drinking, drug use, and committing delinquent acts were characteristics of a delinquent lifestyle. Zhanga et al. argued that much of the criminological literature shows that drug use, drinking, and delinquent offending are done by the same people and are different aspects of the same underlying factor, delinquent lifestyle. The present study explored substance use as an indicator of a deviant lifestyle.

Five studies have examined the links between reported substance use and weapon carrying at school (Bailey et al., 1997; Dukarm et al., 1996; Lowry et al., 1999; Malecki & Demaray, 2003; Simon et al., 1999). Bailey et al. (1997) found that, among other things, high
school students who reported drinking heavily were also more likely to report carrying weapons
to school. As well, Lowry et al. (1999) found that secondary students who reported using one or
more substances were almost six times more likely to have carried a weapon on school property.
Similarly, in a study of middle school students (grades 6 – 8), Malecki and Demaray (2003)
found that students who reported drinking at school or who reported using drugs or being high at
school were more likely to carry weapons to school.

Swahn and Donovan (2004) explored which psychosocial risk factors were more strongly
related to violent behaviour over time among a nationally representative U.S. sample of
adolescents \( n = 8,885 \) between 12 and 19 years of age. Participants were asked to complete a
90-minute initial interview and another interview one year later. The respondents for this study
were restricted to those who reported that they have had consumed alcohol more than twice in
their lives and had consumed alcohol within the past year. Almost 50% of adolescent drinkers
reported that they engaged in some form of violence (e.g., physical violence, threatening,
robbing, weapon use) in the past year. Males were more likely than females to engage in violent
behaviour. Using a cross-sectional and longitudinal multivariate logistic regression analysis,
Swahn and Donovan found that an increase in alcohol use, drug use and selling, exposure to
drugs, delinquency and poor school functioning all significantly increased the risk of engaging in
violence. Longitudinally, it was observed that student reports of high volume drinking, illicit
drug use, low grade point average, and suspension from school increased the risk of engaging in
violent behaviour a year later.

Using structured interviews, Resnick et al. (2004) sought to identify risk and protective
factors for violence perpetration among youth, assessing the influence of individual, family and
community-related variables over one year in a large sample of students \( N = 13,110 \) in grades 7
to 12. Religion and personal prayer as well as high grade point average at time 1 were found to
be significant protective factors against violent behaviour at time 2. In order, the strongest risk factors for violent behaviour among both boys and girls were a history of violent victimization, increased levels of emotional distress, and deviant school behaviours (i.e., weapon carrying to school, skipping school, learning challenges and repeating behaviours). At time 1, high levels of alcohol and marijuana use also significantly predicted violent behaviour at time 2, thus providing support for the lifestyle theory.

Simon et al. (1999) studied adolescents who reported carrying weapons to school and elsewhere. They explored whether involvement in substance use and/or exposure to school crime and violence would be risk factors for carrying weapons to school. Using a nationally representative U.S. sample of secondary students (N = 10,904), Simon et al. observed that 20% of adolescents reported carrying a weapon at least once, and 9.6% of students reported they carried a weapon on school grounds. Those students who carried weapons to school were more likely to be male and attending a school where more than 10% of students received subsidized lunches. Using a logistic regression analysis, results indicated that respondents who reported that they smoked cigarettes and/or consumed alcohol and/or marijuana on school grounds were just over three times more likely to report carrying weapons to school compared to those who did not report carrying a weapon. Those who reported being involved in a physical fight on and off school grounds were also more likely to report carrying a weapon to school compared to those who reported never carrying a weapon. As well, students who reported having been threatened or injured with a weapon were almost three times more likely to carry weapons at school compared to those who reported never carrying a weapon. Other variables did not increase the risk of carrying weapons at school, including having property stolen or damaged on school grounds, being offered, sold or given drugs at school, or missing school because of feeling unsafe.
Critique of the research. There are several strengths and limitations that should be recognized in the studies exploring the utility of the Lifestyle Theory of weapon-carrying behaviour. Although the theory was originally conceptualized to explain victimization, results of a few studies (Notzer & Kurtz, 2005; Svensson & Pauwels, 2010) have changed the emphasis from understanding victimization to explaining violent behaviour. The present study extended the evaluation of lifestyle theory to help understand weapon-carrying behaviour among adolescents in western Canada and in doing so addressed several of the limitations observed in previous research.

One limitation of many of the studies reviewed was that different violent behaviours were sometimes combined to yield a single composite index of violence. For instance, Swahn and Donovan (2004) combined physical violence and weapon-carrying behaviours, whereas other studies measured only physical violence (e.g., Svensson & Pauwels, 2010; Rudatsikira et al., 2008), and still other studies (e.g., Bailey, et al., 1997; Lowry et al., 1999; Malecki & Demaray, 2003; Simon et al., 1999;) measured only weapon carrying. By combining outcome variables, it becomes difficult to identify what risk factors are related to which type of violence. The present study focused on only one outcome: Weapon carrying at school and school events.

Similar to the construct of violence, Malecki and Demaray (2003) combined alcohol use, soft drugs (i.e., marijuana) and hard drugs (e.g., cocaine, methamphetamines, and steroids), making it difficult to understand which variable, drugs or alcohol or both, were predictive. Other studies (e.g., Dukarm et al., 1996; Resnick et al. 2004) have differentiated which substance was more likely to influence school violence. The present study followed the Dukarm et al. (1996) and Resnick et al. (2004) studies in attempting to understand the relative influence or predictive value of soft drugs, hard drugs and alcohol use on weapon carrying behaviour.
Some studies (e.g., Notziger, 2006; Notziger & Kurtz, 2005) have considered the role of peer influences in their measurement of substance use. However, generally these studies asked participants to rate the *perceived* frequency of substance use among their friends. Asking participants to rate the frequency of substance use of their friends may not be an accurate measure of peer behaviour, as the ratings could be inflated and/or mirror the rater’s behaviour. Consequently, it may inflate the overall influence the construct has on the outcome variable.

Unlike the studies mentioned above, the present study asked everyone in a student’s school about their own substance use habits, thereby avoiding the potential biases inherent in perceived substance use of other students. Extending the literature, the present study attempted to understand the link between the collective student body’s substance use habits and an individual’s level of school violence.

A final limitation in the literature is that most studies have used logistic regression analyses to explore the predictors of violence. This analysis does make conceptual sense as violent behaviour is a relatively rare event, and it allows researchers to understand those who have engaged in the behaviour infrequently and compare them to those who have never engaged in the behaviour. However, as demonstrated by the literature review so far, human behaviour is complex. As already demonstrated, contextual variables, like peer substance use, can be linked to an individual’s behaviour (Bronfenbrenner, 1977). However, using a regression analysis that takes into account contextual variables may lead the researcher to false conclusions, as discussed in greater detail below in the analysis section. Therefore, another analysis is needed to understand the influence contextual variables (i.e., peer influence) have on complex human behaviour. The present study utilized a different analysis that can do just that!
Sex differences

One of the most consistent findings in the school violence literature is that males are more likely to engage in and be victims of violence compared to females (e.g., Akiba, 2004; Alikasifoglu, Erginoz, Ercan, Yusel, Kaymak, & Iiter, 2004; Bailey, et al. 1997; Benbenishty & Astor, 2005; Dukarm et al., 1996; DuRant, Krowchuk, Kreiter, Sinal, & Woods, 1999; Ellickson & McGuigan, 2000; Furlong & Morrison, 2000; Kojo et al., 2003; May, 1999; Notziger & Kurtz, 2005; O’Keefe, 1997; Rudatsikira, Muula, & Siziya, 2008; Wilcox & Clayton, 2001). In fact, Akiba (2004) found that male students reported higher levels of fear of victimization than female students in 19 countries, including Canada. DuRant et al. (1999) reported that adolescent boys were seven times more likely to carry a weapon to school compared to girls. Given these sex differences, the present study explored sex differences in the pattern of associations observed.

Similarities across theories

The fear-victimization hypothesis and the lifestyle theory are seemingly different viewpoints for explaining weapon carrying in schools. However, one striking overlap between these two theories concerns the role played by victimization. According to the fear-victimization hypothesis, individuals who are victimized and more fearful might be more likely to arm themselves for protection (DuRant et al., 1997; May 1999). As demonstrated in the above review, fear of victimization and direct victimization has been positively associated with weapon carrying (DuRant et al., 1997). Incidentally, these results can also be seen as support of the victimization component in the more recent lifestyle theory framework. In the original lifestyle theory, victimization was established as a potential outcome to the routines and activities in which someone engages. More recent studies within the lifestyle theory framework (e.g., Notzer & Kurtz, 2005; Svensson & Pauwels, 2010) have considered victimization as a potential risk factor for adolescent violence. Indeed, as demonstrated in the preceding review, several studies
have shown that victimization is positively associated with violence (e.g., Notziger & Kurtz, 2005; Resnick et al., 2004). These results can also be seen as support of the victimization component of the fear-victimization hypothesis. Given the role that victimization plays in both theories, the present research emphasized victimization as an important variable within this study.

A second similarity between these theories concerns the impact that peers have on an individual. There is an inherent assumption that is not discussed in the fear-victimization hypothesis literature, that peers influence the level of fear of victimization. This assumption is used throughout the measurements, for instance “how fearful are you that someone is going to hurt or threaten you [emphasis added]”. Within the lifestyle theory, some authors (e.g., Notziger & Kurtz, 2005; Svensson & Pauwels, 2010; Nofziger, 2006) have included assessments of friends’ behaviours (e.g., alcohol and drug use) and its impact on victimization or violence. They found that a perceived substance use among friends positively increases school violence among individuals (e.g., Notziger, 2006; Notziger & Kurtz, 2005). Thus, as was the case with victimization, the influence of peers on students’ behaviour cannot be ignored. However, each of these studies does not go beyond analyzing the immediate or perceived peer group influence. In extending this research the present study considered peer influence more broadly. Specifically, this study examined the effect that the collective student body has on an individual behaviour.

School context influences on school violence

The studies reviewed above generally focus on individual characteristics and experiences as predictors of weapon carrying behaviour. However, this behaviour lends itself well to investigating the interaction between individuals nested within a social context, in this case, a school. As previously noted, a school is a system made up of a number of individuals, which may exacerbate problems people within the system face (Furlong & Morrison, 2000).
Unfortunately, school level context factors have not been a leading focus in the school violence literature (Benbenishty & Astor, 2005). The present study was designed to add to our understanding of the school level factors that may impact weapon-carrying behaviour.

**Ecological model.** One of the most influential models in the social psychology literature is Bronfenbrenner’s (1979) *ecological model*. His model was developed as a topologically nested arrangement of interconnected systems (Bronfenbrenner, 1977). The first level is a *microsystem* in which the individual and his/her immediate environmental settings (e.g., home) interact. A setting, as outlined by Bronfenbrenner, is a specific place where the individual is said to engage in particular activities and/or roles for a set amount of time. For instance, at home an adolescent may be a daughter or a son. At school that same adolescent is a student. The second level is the *mesosystem*. This level is made up of the reciprocal relation among major settings (e.g., family, school and peer groups) containing the individual. According to Bronfenbrenner (1977), “A mesosystem is a system of microsystems” (p. 515). Expanding the model further, Bronfenbrenner next conceptualizes the exosystem, which is an extension of the mesosystem. At this level the social structures (e.g., the government and the distribution of goods and services) do not directly influence an individual but influence the immediate setting in which an individual is situated. All of these levels are nested within the final level, the macrosystem, reflecting the influence of culture or subculture (e.g., economics, social, political systems) where the institutions in the micro-, meso-, and exco-systems are the manifestations of the macrosystem (Bronfenbrenner, 1977). The present study focused on the micro- and mesosystems.

Previous studies (e.g., Akiba, 2004; Rountree, 2000; Malecki & Demaray, 2003) have examined school violence primarily at the individual level (microsystem). However, individual predictor variables (mircosystem) are nested within a school context (mesosystem). To date, only one study (Wilcox & Clayton, 2001) has examined how individual level variables and school
level variables impact someone’s school violence behaviour. Understanding the interaction between these important levels is a significant advancement in the research, as scholars have only been partially able to examine this issue. The present study added to this research by examining variables at the microsystem, or individual level variables (e.g., student experience of fear, victimization, drug and alcohol use), and mesosystem (e.g., student body experiences of fear, victimization, drug and alcohol use).

**Peer influence.** Extending the research on the individual level processes involved in school violence, the present study examined how the school context influenced an individual’s weapon-carrying behaviour. Following social-ecological theory, one might find this behaviour is influenced by meso-level variables; for instance, an individual’s peers may have an impact on a student’s behaviour (Allen, Chango, Szwedo, Schad, & Marston, 2012; Dishion, Sparacklen, Andrews, & Patterson, 1996; Dijkstra, Gest, Lindenberg, Veenstra & Cillessen, 2012).

In a seminal study, Dishion et al. (1996) examined the interactions between non-delinquent and delinquent youth between 13 and 14 years of age. Using observation and survey-based methodology, Dishion et al. explored male students’ engagement in deviant behaviour and identified what they referred to as a deviancy or delinquency training process in which students’ discussions about rule-breaking behaviour (e.g., mooning the camera, drug use, stealing, vandalism, victimization of women or minorities, obscene gestures, getting into trouble at school) were reinforced through social processes (e.g., laughing peers). Dishion and his colleagues found that the deviancy training process was associated with increases in boys’ serious delinquency behavior over time. Specifically, comparing dyads of boys who were delinquent, non-delinquent or mixed (one delinquent and one non-delinquent), they found that males whose friends engaged in the deviancy training process showed escalated delinquent behaviour over two years compared to the groups that did not engage in the deviancy training.
process. Moreover, the effect was significant across delinquent and non-delinquent dyads. Thus, peer friendships can exacerbate delinquent behaviour and account for emerging delinquency where there was none prior.

More recently, Dijkstra et al. (2012) examined individual and peer level processes that influence weapon-carrying behaviour among male and female youth in the context of changing friendship patterns. Students \((N = 468)\) in grades 10 and 11 were asked to nominate their best friends, in order to define their peer networks, and were asked about friends’ weapon carrying behaviour (“in the past 30 days, how many times did they carry a weapon, such as a gun, knife, or club?”). Self-reports of aggression and victimization were also obtained, along with their perceptions of peer levels of aggression and victimization. Peer nominations were used to identify students who started fights, said mean things and teased others as well as students who would get hit, pushed, and kicked by others. Students who had friends who reportedly carried weapons and behaved aggressively were found to increase their weapon-carrying a year later. Dijkstra also found self-reported victimization generally decreased the likelihood of weapon carrying, in contrast to predictions of the fear-victimization hypothesis.

Allen et al. (2012) used a multi-method approach (i.e., observation, sociometric, and survey-based) to examine the effect of substance use of close friends on an individual’s behaviour. Substance use behaviour of a close friend was found to be a significant predictor of future substance use of an adolescent. Moreover, this peer influence was greater among those adolescents who did not have a lot of autonomy.

Ellickson and McGuigan (2000) examined the impact grade 7 environmental characteristics have on violence in grade 12. These authors found that students who attended middle schools with a high level of drug use among the student body, in combination of those
who moved from one elementary school to another, were more likely to engage in overall and relational violence (e.g., hitting or threatening to hit someone) in grade 12.

Results of the studies just reviewed underscore the importance of peers in influencing deviant behaviour, at both the individual and the school level. Extending this research, the present study considered the impact of the wider peer context, the student body, on individual’s aberrant behaviour, such as weapon carrying at school and school events.

Only one study to date, conducted by Wilcox and Clayton (2001), has examined the simultaneous effects of individual variables (i.e., sex, age, fear, victimization, delinquency, weapon socialization and school engagement) and school level variables (i.e., school structure, school capital and school deficits) in predicting weapon carrying. Among the 12,343 students surveyed in grades 6-12 from 21 schools in the U.S., 4% of students reported that they had carried a weapon to school. Results of a 2-level hierarchical level model indicated that an increase in level of problem behaviour, peers carrying weapons to school, being threatened at school, and having property stolen, among other things, increased the likelihood of a student carrying a gun to school. A student’s fear of victimization did not significantly affect an individual’s weapon carrying behaviour. In the second-level of analysis the only school level variable that was a significant predictor of weapon carrying was socioeconomic status, and almost all of the individual level variables were still significant, with the exception of gun ownership by parents. However, individual level variables accounted for most of the variance in weapon carrying, and school-level characteristics such as school deficits and capital, did not seem to impact weapon-carrying by students.

There are a number of limitations to this study. First, most of the constructs were based on single-item measures, which are notorious for increasing the error in measurement and may lead to non-significant results, as much of the variance is lost. As well, the school level variables
considered (i.e., school capital and school deficits) may have been too broad, amalgamating too many diverse measures and possibly masking the effect of some of the constructs. Finally, despite the large sample size, Wilcox and Clayton recognized that these findings are from a single urban community in Kentucky, leading to questions regarding generalization to other community contexts. This study will further explore both individual and school level variables and consider both the fear-victimization and lifestyle theory in an effort to understand weapon-carrying behaviour in a western Canadian context.

Conceptual model

Based on the preceding review of the literature, there is evidence to support both the fear-victimization hypothesis and the lifestyle theory of weapon carrying. It is clear that reported victimization experiences are an important consideration in both theories, and that both individual and environmental/contextual variables need to be considered in understanding the factors that contribute to weapon carrying. Thus, peer influence is also a critical consideration, not only at the dyadic level, but potentially at the environmental level as well, allowing us to consider the norms reflected in the patterns of behaviour of the entire student body. Thus, based on Bronfrenbrenner’s (1979) ecological model, a conceptual model was developed (see Figure 1) to further explore questions of how individual variables are interrelated, or nested, within a school context and their influence on student reports of weapon carrying at school and school events.

Specifically, the present model considers sex, level of fear and victimization experiences, and level of substance use (i.e., soft drug use, hard drug use, and alcohol use) as individual level variables that contribute to student reports of weapon carrying at school and school events. In addition, at the group level, this model depicts a nested arrangement of these individual variables within a school social context. Specifically, this study investigated what effect, if any, the peer
level indices, aggregated at the level of the school or entire student body, of drug and alcohol use, victimization experiences, and fear has on the relationship between individual level and weapon carrying at school and school events.

![Diagram](image)

**Student Body Level Characteristics**
- Student body’s Victimization experience
- Student body’s Fear of victimization
- Student body’s Substance use

**Individual Level Characteristics**
- Gender
- Victimization experience
- Fear of victimization
- Substance use

![Diagram](image)

**Student Report of Weapon Carrying**

Figure 1. Individual and student body variables related to weapon carrying by a student.

**Research question**

This study’s goal was to explore if individual and school level variables predicted individual level weapon-carrying behaviour, all while addressing the limitations and gaps identified within the existing literature. In particular, this study had two research questions,

1. What impact does an individual’s reported level of fear of victimization, reported victimization experiences (the fear-victimization hypothesis), and reported substance use (the lifestyle theory) have on weapon carrying at school?
2. What impact does the student body’s level of fear of victimization, student body’s level of victimization experiences (fear-victimization hypothesis) and student body’s level of substance use (lifestyle theory) have on the relationships between weapon carrying and student’s level of fear of victimization, victimization experiences, and substance use?

Hypothesis

Based on the literature cited above, it is expected that males will be more likely to be involved in weapon carrying (Akiba, 2004; Alikasifoglu et al., 2004; Bailey, et al. 1997; Benbenishty & Astor, 2005; Dukarm et al., 1996; DuRant, et al. 1999; Ellickson & McGuigan, 2000; Furlong & Morrison, 2000; Kojo et al., 2003; May, 1999; Notziger & Kurtz, 2005; O’Keefe, 1997; Rudatsikira, et al., 2008; Wilcox & Clayton, 2001). Results are also expected to provide support for the fear-victimization hypothesis, consistent with previous literature (e.g., DuRant et al. 1997; May 1999) as well as the lifestyle theory literature (e.g., Bailey et al., 1997; Dukarm et al., 1996; Lowry et al. 1999; Malecki & Demaray, 2003; Resnick et al., 2004; Simon et al., 1999; Svensson & Pauwels, 2010; Swahn & Donovan, 2004), with an increased fear of victimization, victimization experiences, and substance use at the individual level increasing the risk of a student engaging in weapon carrying at school and school events.

Just as Bronfenbrenner proposed, and as Allen et al. (2012), Dijkstra et al. (2012) and Dishion et al.’s (1996) and Ellickson and McGuigan (2000) found, peer influences are important and also impact an individual’s behaviour. Therefore, it was expected that a wider peer influence, or the norms and behaviours of the entire student body, would also significantly impact the relationship between fear of victimization, victimization experiences, and substance use and weapon carrying. Specifically, it was expected that an increased level of fear, victimization and substance use among the student body would increase the relationship between the individual level predictors and weapon carrying behaviour among a student.
Chapter Two: Method

In 2001 the Ministry of Education in western Canada established social responsibility as one of the four “foundational skills”, making it just as important as academic skills. This mandate also required schools to show a level of progress in each of these areas. To this end, one district undertook the development of an extensive survey in order to gather comprehensive data about student social experiences at the secondary level. Consequently the Safe School and Social Responsibility Survey (SSSRS) was created by a committee of teachers, principals, and counsellors from several secondary schools as well as outside consultants, Drs. Shelley Hymel (University of British Columbia) and Terry Waterhouse (University of Fraser Valley). A full copy of the survey can be found in Appendix A.

The data used in the present study was drawn from the 2008 SSSRS survey, which assessed broadly students’ perceptions of school safety and social responsibility. Specifically, the survey measured student experiences with discrimination, sexual harassment, bullying, student engagement in high-risk behaviours (e.g., drug and alcohol use), violent acts, aspects of school climate, and students’ sense of safety at school, among other things. Student responses to parts of this survey provide the data for the present study, and are described in greater detail below.

Participants

In 2008, a total of 50,334 students in grades 8-12 (24,751 males, 24,321 females; with an 81% participation rate) from 69 different schools in 15 British Columbia school districts completed the survey in a one-hour period during class time. Based on student self-reports, this was a racially diverse sample of Caucasian (36.2%), Asian (33.4%), South Asian (6.2%), Aboriginal (3.0%), African/Caribbean (2.1%), Middle Eastern (2.1%), Latin American (2.0%), Mixed (10.8%) students, with 4.2% of the sample indicating that they did not know their racial/ethnic background.
Procedure

Passive consent procedures were used, given that the study was completed by and for schools, with data coding overseen by Dr. Terry Waterhouse and initial analysis and school reports prepared under the supervision of Dr. Shelley Hymel. Parents and students could decline to participate by contacting the school. Students completed the survey anonymously in school, during class time, in January and February of 2008. Confidentiality and anonymity were assured for all respondents and students were not to put their names or any identifying information on the survey. Permission to use the data secondarily has been provided by the school districts and ethics approval was obtained from the University of British Columbia’s Behavioural Research Ethics Board.

Measures

Of interest for the present study were items evaluating student reports of school violence (i.e., weapon carrying), fear of victimization, victimization experiences, and frequency of drug and alcohol use.

School violence. School violence was measured by student reports of the frequency of weapon carrying and use at school and school events. This index was a composite of three items (e.g., “engaged in physical violence with a weapon”) assessed in two different contexts – at school and at school events – for a total of six items. Responses to each item were made on a three-point, Likert scale: Never (1), Once or a few times (2), or Every week or more (3). Responses to all six items were summed to yield an overall weapon use score, with higher scores reflecting more engagement in weapon carrying. Internal consistency for this subscale was strong (α = 0.95).

Victimization. Peer victimization was assessed using five subscales in the present study, tapping student experiences with being bullied, being sexually harassed verbally or physically,
being discriminated against as a function of race or sexual orientation. Each subscale is described in greater detail below.

First, the frequency of student-reported victimization experiences from peer bullying was measured using a composite of four items: “How often have you had experiences with _____ - had this done to me” at school and school events within the school year?: (1) physical bullying (i.e., hitting, shoving, kicking), (2) verbal bullying (i.e., name calling, teasing, threats, put downs), (3) social bullying (i.e., exclusion, rumours, gossip, humiliation), and (4) cyberbullying (i.e., using a computer or text messages to exclude, threaten or humiliate) Responses to each of the four items were made on a four-point Likert scale: Never (1), Once or a few times (2), About once a month (3), and Every week or more (4). Student responses to each of the four items were then totalled to yield an overall victimization score, with higher scores reflecting more frequent student-reported peer victimization through bullying. Internal consistency for the victimization composite was strong ($\alpha = 0.81$) for this composite.

Sexual Harassment was measured using two different indices. The first index was made up of seven items measuring physical sexual harassment, “How often have you had experience with _____ - had this done to me” (e.g., touching, kissing, grabbing or pinching someone in a sexual way when it’s unwanted). Responses to each of the seven items were made on a four-point, Likert scale: Never (1), Once or a few times (2), Almost once a month (3), and Every week or more (4). This self reported behaviour data was summed for an overall physical sexual harassment score, with higher scores indicating a greater frequency of being physically sexually harassed. The internal consistency was strong ($\alpha = 0.92$) for this composite.

The second sexual harassment index was made up of four items measuring verbal sexual harassment, “How often have you had experience with _____ - had this done to me” (e.g., making unwelcome or crude comments about someone’s body or their sexual behaviour). Responses to
these items were made on a four-point, Likert scale: Never (1), Once or a few times (2), Almost once a month (3), and Every week or more (4). Responses to all four items were added together to create an overall verbal sexual harassment score, with higher scores indicating a greater frequency of being sexually harassed verbally. The internal consistency was strong ($\alpha = 0.79$) for this composite.

Student self-reported victimization experiences related to discrimination was measured using two different indices. The first index was made up of five items measuring racial discrimination, “How often have you had experience with ___ - had this done to me” (e.g., calling someone racist names). Students rated the frequency with which they had experienced these behaviours on a four point, Likert scale: Never (1), Once or a few times (2), About once a month (3) and Every week or more (4). Responses across all five items were totalled for an overall racial discrimination score, with higher scores indicating a greater frequency of reported experiences of racial discrimination. The internal consistency was strong ($\alpha = 0.90$) for this composite.

The second discrimination index was created as a composite of nine items measuring sexual orientation discrimination, “How often have you had experience with ___ - had this done to me” (e.g., treating someone’s sexual orientation as inferior (straight, gay, bisexual)). Participants rated the frequency with which they experienced these behaviours on a four-point, Likert scale: Never (1), Once or a few times (2), About once a month (3) and Every week or more (4). Responses to all nine items were summed for an overall sexual orientation discrimination score, with higher scores indicating a greater frequency of reported experiences of sexual orientation discrimination. The internal consistency was strong ($\alpha = 0.95$) for this composite.

**Fear of victimization.** A student’s level of fear of victimization was measured using a composite of 10 items. Specifically, students were asked to rate how often they were worried or
afraid of various victimization experiences happening to them (e.g., “How often are you worried or afraid that you will… be attacked or threatened with a weapon, …have rumours or gossip spread about you, or …be forced to engage in sexual acts by other students?”). Responses to these 10 items were made on a five-point, Likert scale: Never (1), Hardly ever (2), Some of the time (3), Most of the time (4), and Always (5). Student responses to all 10 items were summed to compute an overall fear score, with higher scores reflecting greater fear of victimization. Internal consistency was strong ($\alpha = 0.89$) for this composite.

**Substance use.** Substance use was assessed with three different composite indices, each based on student reports of the frequency with which they used a variety of different substances. The first index measured the frequency with which individual students used soft drugs (i.e., marijuana and cigarettes) at school and school events. Students were asked, “How often have you used marijuana?” and “How often have you smoked cigarettes?” in two different contexts - at school at school events for a total of four times. Responses were made on a three-point Likert scale: Never (1), Once or a few times (2), and Every week or more (3). Student responses to the four items were totalled to yield an overall soft drug use score, with higher scores reflecting more frequent soft drug use. The internal consistency was strong ($\alpha = 0.90$) for this subscale.

The second index measured the frequency with which individuals consumed hard drugs. This index was made up of 12 items, tapping use of heroin, crystal meth, cocaine, hallucinogens [i.e., LSD, acid, ecstasy], inhalants [e.g., glue, gas, aerosol], and prescription drugs (e.g., “How often have you used prescription pills that were not prescribed by a doctor?”). Respondents rated their frequency of use at school and then rated their frequency of use at school events. Responses were made on a three-point, Likert scale: Never (1), Once or a few times (2), and Every week or more (3). Responses to all 12 items were added together to create an overall hard drug use score,
with higher scores indicating more frequent hard drug use. The internal consistency was strong (\(\alpha = 0.98\)) for this subscale.

The third substance use index measured the frequency with which students consumed alcohol at school and school events. This index was made up of six items: “How often have you… consumed alcohol, consumed more than 5 alcoholic beverages at one time, and been under the influence of alcohol?” Respondents were asked to rate the frequency of use at school and then rated the frequency of use at school events. Responses were made on a three-point, Likert scale: Never (1), Once or a few times (2), and Every week or more (3). Student responses were summed for an overall alcohol use score, with higher scores reflecting the frequent alcohol consumption. The internal consistency was strong (\(\alpha = 0.95\)) for this subscale.
Chapter Three: Analysis

**Multilevel modeling**

After a review of the extant literature, it was clear there are multiple variables that may be predictive of weapon carrying. It is hypothesized that some variables may be directly related to an individual’s behaviour (variables at the microsystem) and other variables may be indirectly related to an individual’s behaviour (variables at the mesosystem). Given so much of what is studied is multileveled in nature, it makes conceptual sense to use an analytic technique that is also multileveled. Therefore, in order to analyze the data for this study, the analysis needs to take into account individual level variables as well as the individual nested within a school context.

Multilevel Modeling is a statistical technique that takes nesting into consideration (Hox, 2010). Prior to conducting data analysis involving multilevel modeling, the data were standardized using z scores and screened according to the checklist by Dedrick et al. (2009) for missing data, outliers, assumptions of normality, linearity and heteroscedasticity at Level 1 and Level 2.

Among the 50,334 adolescents who participated in the Safe Schools and Social Responsibility Survey, 11.1% (n = 5,298) of students indicated they had carried a weapon to school. This result suggests that this behaviour was infrequent and was consistent with the literature presented above. Of those who reported carrying a weapon to school, 73.5% (n = 3,892) indicated they were male students. Table 1 shows the sample size, the minimum score, maximum score, average, and standard deviation of those who answered questions for each measure.
Table 1
Descriptive statistics

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<td>47994</td>
<td>1</td>
<td>28</td>
<td>8.85</td>
<td>3.83</td>
</tr>
<tr>
<td>Verbal Sexual Harassment</td>
<td>48211</td>
<td>1</td>
<td>16</td>
<td>5.38</td>
<td>2.32</td>
</tr>
<tr>
<td>Racial Discrimination</td>
<td>47396</td>
<td>1</td>
<td>20</td>
<td>6.36</td>
<td>2.87</td>
</tr>
<tr>
<td>Sexual Orientation Discrimination</td>
<td>47306</td>
<td>1</td>
<td>36</td>
<td>10.44</td>
<td>4.41</td>
</tr>
<tr>
<td>Hard Drugs</td>
<td>46398</td>
<td>1</td>
<td>56</td>
<td>15.15</td>
<td>6.38</td>
</tr>
<tr>
<td>Alcohol Use</td>
<td>46576</td>
<td>1</td>
<td>24</td>
<td>7.1</td>
<td>3.33</td>
</tr>
<tr>
<td>Soft Drugs</td>
<td>46472</td>
<td>1</td>
<td>16</td>
<td>4.94</td>
<td>2.60</td>
</tr>
<tr>
<td>Total Sample</td>
<td>50,334</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Missing data.** A missing value analysis was conducted on the Level 1 independent and outcome variables. Table 2 shows the sample size and percentage of missing data for each variable. Out of 50,334 adolescents surveyed fewer than 3% of students had missing data for the weapon carrying variable. For each of the predictor variables used in this study between 0.4% and 7.82% had missing data. Little’s (1988) Missing Completely At Random test under the Estimation Method in SPSS was used to test if the missing data was missing completely at random. The results suggested that the missing data was not completely random, as shown by a significant MCAR test \( \chi^2(138432) = 348239.74, p < .0001 \). Multilevel modeling is able to compensate for data that is not missing completely at random (Field, 2009), as was the case for this study. Maximum Likelihood estimates are a common method in dealing with missing data. Dedrick et al. (2009) recommended the use of Restricted Maximum Likelihood for large sample sizes to create estimates for missing values, and this was the approach taken in the present study.
Table 2
Missing data for each variable measured

<table>
<thead>
<tr>
<th>Variable</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Weapon Use</td>
<td>1498</td>
<td>2.98</td>
</tr>
<tr>
<td>2. Fear of Victimization</td>
<td>203</td>
<td>0.40</td>
</tr>
<tr>
<td>3. Victimization from Bullying</td>
<td>1592</td>
<td>3.16</td>
</tr>
<tr>
<td>4. Physical Sexual Harassment</td>
<td>2340</td>
<td>4.65</td>
</tr>
<tr>
<td>5. Verbal Sexual Harassment</td>
<td>2123</td>
<td>4.22</td>
</tr>
<tr>
<td>6. Racial Discrimination</td>
<td>3028</td>
<td>6.02</td>
</tr>
<tr>
<td>7. Sexual Orientation Discrimination</td>
<td>2938</td>
<td>5.84</td>
</tr>
<tr>
<td>8. Hard Drugs</td>
<td>3936</td>
<td>7.82</td>
</tr>
<tr>
<td>9. Alcohol Use</td>
<td>3758</td>
<td>7.47</td>
</tr>
<tr>
<td>10. Soft Drugs</td>
<td>3862</td>
<td>7.67</td>
</tr>
<tr>
<td><strong>Total sampled (N)</strong></td>
<td>50334</td>
<td>100</td>
</tr>
</tbody>
</table>

**Outliers.** Data was screened for outliers through the use of histograms, boxplots and frequency values. The weapon-carrying variable was screened through the use of z scores. The data was negatively skewed, indicating that most students did not bring weapons to school. All the outliers that were found in the data were within the range of possible scores for the respective scales. These outliers did influence the skewness of the variables. However, the extreme cases of weapon carrying, fear, victimization, alcohol and drug use are of particular interest within this research, given the hypothesis that an increased levels of fear, victimization experiences and alcohol and drug use would increase a student’s likelihood of carrying a weapon. Therefore, it was decided to include these outliers in the analysis.

**Assumptions.** Just as in a regression analysis, the assumptions for multilevel modeling were explored. However, unlike a regression model where the assumption of independence among the variables is needed, multilevel modeling assumes the variables from level 1 and level 2 are not independent of one another. The assumptions that were considered before performing a multilevel model analysis were the assumptions of normality, linearity and heteroscedasticity.
(Hox, 2012). Inspection of the observed data and the residuals are two ways to investigate normality, linearity and homoscedasticity.

Normality was evaluated for the observed frequency data and the residuals of the weapon carrying at school. The frequency of weapon carrying at school, \( D(48836) = 0.478, p < 0.001, \) was significantly non-normal. Indicators of skewness revealed that responses to weapon carrying were positively skewed (\( z = 415.18 \)) and leptokurtic (\( z = 1010.68 \)), which meant most students endorsed items indicated that they did not carry weapons. The distributions of the residuals were also examined. The residuals also showed a nonnormal and leptokurtic distribution. In fact, 88.6% of the student surveyed reported they never brought a weapon to school or school events.

Fields (2009) suggests that no strict normality criteria should be applied to very large sample sizes, as was the case for this study. Instead, he recommended examining the shape of the distributions visually. Through the use of box plots, histograms, P-P plots and Q-Q plots a non-normal and leptokurtic distribution was observed. This pattern was also observed for all the transformations performed (i.e., square root, logarithmic, inverse, reflective square root, reflective logarithmic, and reflective inverse) on the outcome variable. Just as in previous research (e.g., Wilcox & Clayton, 2001), it was decided to dichotomize the weapon carrying variable. As a result, a specific type of multilevel analysis needed to be conducted: Hierarchical Generalized Linear Models (HGLM).

HGLM is a statistical technique that allows researchers to test binomial outcome variables using mixed effect logistic regression while still accounting for a nested data structure. This analysis relaxes the assumptions that were to be evaluated. According to Hox (2010), there are several defining features of HGLM; the first being the fact that the outcome variable is dichotomous. Second, HGLM allows researchers to examine individuals nested within a group, in this case, students nested within schools. This multilevel structure is analyzed using a
multilevel logistic regression equation. See Appendix B for the equation used in this study. Finally, HGLM make use of a *link function* that links the expected values of the outcome variable to the predicted values. The logit link function was used in this study. This makes it possible to analyze data that has non-normal error distribution, as in the case for this study.

**Hierarchical generalized linear models**

**Preliminary analysis.** A series of correlational analysis was completed to explore the relationship among the individual level variables related to the fear-victimization hypothesis and the lifestyle theory to the outcome variable, weapon carrying. As shown in Table 3, all measures were significantly correlated in the expected direction. There was a significant but weak correlation between being male and weapon carrying. Moderate correlations were observed between variables related to the fear-victimization hypothesis (i.e., fear of victimization, and various self-reported victimization experiences) and deviant lifestyle theory (i.e., frequency of hard drug use, alcohol use and soft drug use) with weapon carrying. This suggests a student’s self-report of being fearful of victimization, victimization or engage in substance use are positively related to weapon use at school and school events.

Table 3 shows significant but weak associations between the frequency of soft drug use and fear of victimization ($r = 0.229$, $p < 0.01$), soft drug and victimization from bullying ($r = 0.297$, $p < 0.01$). Strong positive correlations are seen between the different forms of victimization. Strong positive correlations were observed between the different substance use variables. This is evidence of multicollinearity. Subsequently, grand mean centering was completed as recommended by Dedrick et al. (2009) and Enders and Tofighi (2007)

Table 4 shows correlations among the collective student body experiences of variables related to the fear-victimization hypothesis and lifestyle theory to the outcome variable weapon carrying. As seen in Table 4 all the correlations were positively related in the expected direction.
Table 3
Pearson product correlations between weapon use and individual level variables related to the fear-victimization hypothesis and lifestyle theory

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Weapon Use</td>
<td>1</td>
<td></td>
<td></td>
<td>2. Gender</td>
<td>-.165**</td>
<td>1</td>
<td></td>
<td>3. Fear of Victimization</td>
<td>.323**</td>
<td>-.013**</td>
<td>1</td>
</tr>
<tr>
<td>4. Victimization from Bullying</td>
<td>.328**</td>
<td>-.027**</td>
<td>.491**</td>
<td>1</td>
<td></td>
<td>5. Physical Sexual Harassment</td>
<td>.386**</td>
<td>.062**</td>
<td>.422**</td>
<td>.543**</td>
<td>1</td>
</tr>
<tr>
<td>6. Verbal Sexual Harassment</td>
<td>.362**</td>
<td>-.141**</td>
<td>.439**</td>
<td>.607**</td>
<td>.653**</td>
<td>1</td>
<td></td>
<td>7. Racial Discrimination</td>
<td>.349**</td>
<td>-.131**</td>
<td>.410**</td>
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<tr>
<td>8. Sexual Orientation Discrimination</td>
<td>.418**</td>
<td>-.130**</td>
<td>.444**</td>
<td>.510**</td>
<td>.606**</td>
<td>.632**</td>
<td>.778**</td>
<td>1</td>
<td></td>
<td>9. Hard Drugs</td>
<td>.467**</td>
</tr>
<tr>
<td>10. Alcohol Use</td>
<td>.473**</td>
<td>-.090**</td>
<td>.392**</td>
<td>.318**</td>
<td>.463**</td>
<td>.370**</td>
<td>.375**</td>
<td>.461**</td>
<td>.704**</td>
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<tr>
<td>11. Soft Drugs</td>
<td>.450**</td>
<td>-.077**</td>
<td>.299**</td>
<td>.297**</td>
<td>.427**</td>
<td>.334**</td>
<td>.324**</td>
<td>.396**</td>
<td>.656**</td>
<td>.672**</td>
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</tbody>
</table>

**p<0.01 level (2-tailed).
Table 4
Pearson product correlations between weapon use and school level variables related to the fear-victimization hypothesis and lifestyle theory

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Weapon Use</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. School Level Fear</td>
<td>.049**</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. School level Victimization from Bullying</td>
<td>.079**</td>
<td>.306**</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. School Level Physical Sexual Harassment</td>
<td>.078**</td>
<td>.258**</td>
<td>.922**</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. School Level Verbal Sexual Harassment</td>
<td>.082**</td>
<td>.469**</td>
<td>.881**</td>
<td>.876**</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. School Level Racial Discrimination</td>
<td>.041**</td>
<td>.686**</td>
<td>.225**</td>
<td>.220**</td>
<td>.395**</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. School Level Sexual Orientation Discrimination</td>
<td>.087**</td>
<td>.662**</td>
<td>.711**</td>
<td>.732**</td>
<td>.810**</td>
<td>.689**</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. School Level Hard Drugs Use</td>
<td>.082**</td>
<td>.474**</td>
<td>.615**</td>
<td>.695**</td>
<td>.701**</td>
<td>.414**</td>
<td>.814**</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. School Level Alcohol Use</td>
<td>.068**</td>
<td>.182**</td>
<td>.598**</td>
<td>.709**</td>
<td>.593**</td>
<td>.231**</td>
<td>.663**</td>
<td>.849**</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>10. School Level Soft Drug Use</td>
<td>.082**</td>
<td>.072**</td>
<td>.658**</td>
<td>.749**</td>
<td>.615**</td>
<td>.126**</td>
<td>.585**</td>
<td>.749**</td>
<td>.808**</td>
<td>1</td>
</tr>
</tbody>
</table>

**p<0.01 level (2-tailed).
Although significant, weak correlations were observed for all school level variables and student reported weapon carrying. Moderate to strong correlations were observed between the collective student body reported experiences of victimization. As well, moderate to strong correlations were also observed between the collective student body reported experiences of substance use. Strong to moderate correlations were also observed between student body substance use and various student body reported victimization experiences.

**Relating HGLM to research questions and expected results.**

In this study, understanding what increases the risk of someone engaging in school violence and weapon carrying was the objective. The variables used in this model were empirically driven. Of interest was understanding if an individual’s level of fear of victimization, an individual’s level of victimization experiences (fear-victimization hypothesis), and an individual’s level of substance use (lifestyle theory) are related to an individual’s weapon carrying behaviour. Extending the research further, this study explored whether the student body’s level of fear of victimization, victimization experiences (fear-victimization hypothesis) and substance use (lifestyle theory) moderated the relationships between individual level predictor variables and weapon carrying. To evaluate gender effects in these analyses male students were coded as 1 and female students were coded as 2. This means that male students are compared to female students. Also, all variables were centered and standardized.

**Level 1: Individual effects.** In order to understand if the individual’s reported experiences impact an individual’s weapon carrying behaviour, multiple 2-level HGLM analyses were conducted. The variables related to the fear-victimization hypothesis and the lifestyle theory were entered into level 1 of the HGLM, as shown in Table 5.

In model 2, all the individual level regression coefficients were significant and in the expected direction. Consistent with previous literature, female students were less likely to engage
in weapon carrying than male students ($\beta = -1.00, p < 0.001$); the odds of a male student carrying weapons to school and school events was 0.37 compared to female students. In other words, the odds of carrying a weapon to school and school events was predicted to increase by 2.7 times for male students compared to female students.

Results also revealed that the likelihood of an adolescent reporting carrying a weapon to school and/or school events was positively related to fear of victimization and various victimization experiences. In other words, the higher the level of fear of victimization ($\beta = 0.16, p < 0.01$) and the greater the frequency of self reported victimization experiences (e.g., bullying ($\beta = 0.25, p < 0.01$), physical sexual harassment ($\beta = 0.21, p < 0.01$), verbal sexual harassment ($\beta = 0.06, p < 0.01$), racial discrimination ($\beta = 0.08, p < 0.05$) and sexual orientation discrimination ($\beta = 0.06, p < 0.05$), the more likely that an adolescent would bring a weapon to school and

<table>
<thead>
<tr>
<th>Variables</th>
<th>Model 1</th>
<th></th>
<th></th>
<th>Model 2</th>
<th></th>
<th></th>
</tr>
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<tbody>
<tr>
<td>Random Effects Level 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept ($\beta_{00}$)</td>
<td>-1.91**</td>
<td>0.05</td>
<td>0.15</td>
<td>-2.47**</td>
<td>0.03</td>
<td>0.08</td>
</tr>
<tr>
<td>Gender ($\beta_{1j}$)</td>
<td>-1.00**</td>
<td>0.03</td>
<td>0.37</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fear of Victimization ($\beta_{2j}$)</td>
<td>0.16**</td>
<td>0.01</td>
<td>1.17</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Victimization from Bullying ($\beta_{3j}$)</td>
<td>0.25**</td>
<td>0.02</td>
<td>1.28</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physical Sexual Harassment ($\beta_{4j}$)</td>
<td>0.21**</td>
<td>0.02</td>
<td>1.23</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Verbal Sexual Harassment ($\beta_{5j}$)</td>
<td>0.06**</td>
<td>0.01</td>
<td>1.06</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Racial Discrimination ($\beta_{6j}$)</td>
<td>0.08*</td>
<td>0.02</td>
<td>1.09</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sexual Orientation Discrimination ($\beta_{7j}$)</td>
<td>0.06**</td>
<td>0.02</td>
<td>1.06</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hard Drugs ($\beta_{8j}$)</td>
<td>0.02</td>
<td>0.02</td>
<td>1.02</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alcohol Use ($\beta_{9j}$)</td>
<td>0.32**</td>
<td>0.02</td>
<td>1.38</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Soft Drugs ($\beta_{10j}$)</td>
<td>0.40**</td>
<td>0.02</td>
<td>1.49</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* $p < 0.5$ level  
** $p < 0.01$ level  
NOTE: The scores used in this analysis were based on standardized scores
school events. In fact, the odds of weapon carrying at school and school events was predicted to increase by a factor of 1.17 times per unit increase in the self-reported level of fear of victimization. As well, the odds of weapon carrying at school and school events was predicted to increase by 1.28 times the more frequently a student reported being a victim of peer bullying. The odds ratio for physical sexual harassment was 1.23, indicating that odds of weapon carrying was likely to increase by 1.23 times the more frequently a student was victimized by physical sexual harassment. Weapon carrying at school and school events was predicted to increase by 1.06 times the more frequently a student reported being a victim of verbal sexual harassment, or a victim of sexual orientation discrimination. Finally, the odds of weapon carrying at school and school events was predicted to increase by 1.09 times the more frequently a student reported being a victim of racial discrimination.

Only two variables related to the lifestyle theory were significantly related to weapon carrying behaviour at school and school events. As observed in the data, an increased level of student-reported alcohol use ($\beta = 0.32, p < 0.01$) and soft drug use ($\beta = 0.40, p < 0.01$) at school and school events significantly predicted weapon carrying behaviour at school and school events. The odds of carrying a weapon to school and school events was predicted to increase by 1.38 times the more frequently adolescents reported drinking at school and school events. Similarly, the odds of weapon carrying at school was predicted to increase by 1.49 times the more frequently a student reported using soft drugs at school and school events. The only variable that did not significantly predict weapon carrying at school and school events was a student self-reports of hard drug use at school and school events ($\beta = 0.02, p >0.05$). Thus, similar to findings reported in previous literature, an increased level of fear of victimization and victimization experiences (DuRant et al. 1997; May 1999) and an increased level of substance use (Bailey et al., 1997; Dukarm et al., 1996; Lowry et al. 1999; Malecki & Demaray, 2003; Resnick et al.,
increased the risk of an individual carrying weapons to school and school events.

Table 6 shows the variance component for each level 1 predictor variable across schools, allowing the researcher to identify the variables used as either random or fixed. A random effect is when the individual level predictors vary across groups, in this case schools. If the variance component of an individual predictor is statistically significant it indicates that the variability is different across schools and is then treated as a random effect. In Table 6, variables that showed a significant variance component indicates there is variability across schools (e.g., the

Table 6
Variance of the individual variables across schools

<table>
<thead>
<tr>
<th>Random Effect</th>
<th>SD</th>
<th>Variance Component</th>
<th>d.f.</th>
<th>$\chi^2$</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTRCPT1, $u_0$</td>
<td>0.29</td>
<td>0.08</td>
<td>73.00</td>
<td>215.72**</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Gender slope, $u_1$</td>
<td>0.17</td>
<td>0.03</td>
<td>73.00</td>
<td>64.75</td>
<td>&gt;0.500</td>
</tr>
<tr>
<td>Fear of Victimization slope, $u_2$</td>
<td>0.08</td>
<td>0.01</td>
<td>73.00</td>
<td>92.78*</td>
<td>0.059</td>
</tr>
<tr>
<td>Victimization from Bullying slope, $u_3$</td>
<td>0.12</td>
<td>0.01</td>
<td>73.00</td>
<td>104.22**</td>
<td>0.01</td>
</tr>
<tr>
<td>Physical Sexual Harassment slope, $u_4$</td>
<td>0.16</td>
<td>0.02</td>
<td>73.00</td>
<td>105.07**</td>
<td>0.008</td>
</tr>
<tr>
<td>Verbal Sexual Harassment slope, $u_5$</td>
<td>0.06</td>
<td>0.00</td>
<td>73.00</td>
<td>50.04</td>
<td>&gt;0.500</td>
</tr>
<tr>
<td>Racial Discrimination slope, $u_6$</td>
<td>0.12</td>
<td>0.02</td>
<td>73.00</td>
<td>83.05</td>
<td>0.197</td>
</tr>
<tr>
<td>Sexual Orientation Discrimination slope, $u_7$</td>
<td>0.15</td>
<td>0.02</td>
<td>73.00</td>
<td>109.49**</td>
<td>0.004</td>
</tr>
<tr>
<td>Hard Drug Use slope, $u_8$</td>
<td>0.13</td>
<td>0.02</td>
<td>73.00</td>
<td>108.60**</td>
<td>0.005</td>
</tr>
<tr>
<td>Alcohol Use slope, $u_9$</td>
<td>0.17</td>
<td>0.03</td>
<td>73.00</td>
<td>131.90**</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Soft Drug slope, $u_{10}$</td>
<td>0.11</td>
<td>0.01</td>
<td>73.00</td>
<td>101.62**</td>
<td>0.015</td>
</tr>
</tbody>
</table>

*p < 0.5 level

** p < 0.01 level

NOTE: The scores used in this analysis were based on standardized scores

relationship between peer victimization through bullying and weapon carrying varied significantly across schools, $\chi^2(73) = 104.22, p < 0.01)$. These variables were then entered as random effects in level 2 of the analysis.
A fixed effect is when the individual level predictors do not vary across groups, in this case schools. If the variance component of an individual predictor is not statistically significant it indicates there is no variability across schools and is then treated as a fixed effect. In Table 6, those variables that were not significant (i.e., gender ($\chi^2(73) = 64.75, p > 0.05$) verbal sexual harassment ($\chi^2(73) = 50.04, p > 0.05$), and racial discrimination ($\chi^2(73) = 83.05, p > 0.05$)) mean that the variance component across schools was minimal suggesting comparability across schools. In other words, the relationship between sex and weapon carrying, verbal sexual harassment and weapon carrying, and racial discrimination and weapon carrying did not vary across schools. Accordingly, these variables became fixed effects in level 2 of the analysis.

Given that this analysis contains both random and fixed effects, the model that is analyzed in this study is a mixed effects model.

**Level 2: Student body experiences.** In order to get the student body’s experiences of fear of victimization, victimization experiences, and substance use, the variables at level 1 were aggregated across students within a given school. The aggregated variables that are theoretically related to the fear-victimization hypothesis and lifestyle theory were entered into level 2 of the analysis. To reiterate, as Bronfenbrenner proposed and as Dijkstra et al. (2012) and Dishion et al. (1996) found, peer influences are important and may impact an individual’s behaviour. A number of different models were run using HLM 7 software. Appendix C shows the original model with all the variables entered as potential moderators. Based on correlations observed in the present study (Table 4), the variation in individual variables across schools (Table 6), model trimming was performed. Table 7 summarizes the final model that shows the best moderating effects that the school level variables had on the relationship between individual level variables and weapon carrying among youth.
<table>
<thead>
<tr>
<th>Variables</th>
<th>$\gamma$</th>
<th>SE</th>
<th>$t$</th>
<th>$p$</th>
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<td>-0.20</td>
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<td>0.02</td>
<td>4.30</td>
<td>&lt;0.001***</td>
<td>1.10</td>
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</tbody>
</table>
Only the collective fear of victimization, victimization from bullying, physical sexual harassment, alcohol use, and soft drug and alcohol use were entered in the final model. As seen in the original results (see Appendix C), verbal sexual harassment ($\gamma_{04} = 0.29, p > 0.05$), racial discrimination ($\gamma_{05} = -0.14, p > 0.05$), sexual orientation discrimination ($\gamma_{06} = 0.15, p > 0.05$) were not significant predictors of weapon carrying. Hard drug use was not entered into the analysis as it was not a significant predictor at the individual level. Therefore, these were excluded from further analysis. Although the collective student body’s fear of victimization was not a significant predictor ($\gamma_{01} = -0.01, p > 0.05$), and it would make sense to delete this variable from further analyses, this was not done because fear of victimization was considered a theory-driven variable, critical to an evaluation of the fear-victimization hypothesis. Thus, it was included in the analysis.

As already summarized above (see Table 5), fear of victimization and weapon carrying were positively related ($\beta_{2j} = 0.16, p < 0.01$) and the odds ratio of weapon carrying was predicted
to increase by 1.17 times per unit increase in self-reported level of fear of victimization. As shown in Table 7, this relationship was moderated by the student body’s level of fear of victimization ($\gamma_{21} = -0.04, p < 0.05$), victimization from bullying ($\gamma_{22} = 0.11, p < 0.05$) and physical sexual harassment ($\gamma_{23} = -0.11, p < 0.05$). Therefore, the relationship (i.e., the slope in logit unit) between an individual’s fear of victimization and weapon carrying was predicted to decrease by -0.04 per unit increase in the school’s level of fear of victimization. The relationship (i.e., the slope in logit unit) between an individual’s fear of victimization and weapon carrying was also expected to decrease by -0.11 per unit increase in the frequency of physical sexual harassment. The relationship (i.e., the slope in logit unit) between an individual’s fear of victimization and weapon carrying was expected to increase by 0.11 per unit increase in the frequency of victimized from bullying. In other words, variables related to the fear-victimization hypothesis at the school level were important in moderating the relationship between an individual’s level of fear of victimization and weapon carrying at school and school events. This could be considered as support to the fear-victimization hypothesis.

Victimization from bullying was also positively related to weapon carrying (see Table 5) ($\beta_{3j} = 0.25, p < 0.01$). Thus, as respondents reported higher level of victimization from bullying the odds of carrying a weapon to school increased by 1.28 times. The relationship (i.e., the slope in logit unit) between reported victimization from bullying and weapon carrying was moderated by the student body experiences of soft drug use ($\gamma_{35} = 0.12, p < 0.001$). In other words, the relationship between victimization from bullying and weapon carrying was expected to increase by 0.12 per unit increase in the frequency of soft drug use by the collective student body. Thus, the collective student body soft drug use, or the student body’s lifestyle, moderates the relationship between an individual’s victimization from bullying and weapon carrying.
A positive and significant relationship was also observed between physical sexual harassment and weapon carrying at school and school events ($\beta_{ij} = 0.21, p < 0.01$) (see Table 5), with an odds ratio of 1.23. That is, as students report more frequent physical sexual harassment, they are 1.23 times more likely to carry a weapon to school and school events. None of the student body experiences measured in this study significantly moderated the relationship between physical sexual harassment and weapon carrying at school and school events.

There was also a positive and significant relationship between verbal sexual harassment and weapon carrying ($\beta_{ij} = 0.06, p < 0.01$) (see Table 5). The odds of weapon carrying at school and school events was predicted to increase by 1.06 times the more frequently a student reports experiencing verbal sexual harassment. Based on the results of the error of variance analysis (Table 6), variability in verbal sexual harassment did not differ significantly across schools, $\chi^2 (73) = 50.04, p > 0.05$. Therefore, this variable was entered as a fixed effect in level 2 of analysis. This fixed effect was found to be statistically significant ($\gamma_{50} = 0.08, p < 0.001$). The verbal sexual harassment fixed effect describes the entire sample measured. The conditional means across schools do vary. In this case, the relationship between an individual’s verbal sexual harassment and weapon carrying was moderated by the overall student body experiences of verbal sexual harassment.

Similarly, a positive and significant relationship was observed between reported racial discrimination and weapon carrying ($\beta_{ij} = 0.08, p < 0.05$). The odds of weapon carrying at school and school events was predicted to increase by 1.03 times the more frequently a student reports experiencing racial discrimination. Based on results of the error of variance analysis (Table 6), reported racial discrimination did not differ significantly across schools, $\chi^2 (73) = 83.05, p > 0.05$. Therefore, this variable was entered as a fixed effect in level 2 of analysis and was found to be statistically significant ($\gamma_{50} = 0.05, p < 0.05$). The racial discrimination fixed effect describes
the entire sample measured. This suggests that means across schools do vary. In this case the relationship between an individual’s reported racial discrimination experiences and weapon carrying was moderated by student body experiences of racial discrimination.

A positive and significant relationship was found between individual’s reported sexual orientation discrimination and weapon carrying ($\beta_{7j} = 0.06, p < 0.01$). As a student reported a higher level of sexual orientation discrimination, the odds of weapon carrying increased by 1.06 times. None of the student body experiences measured moderated the relationship between an individuals sexual orientation discrimination experiences and weapon carrying behaviour.

An individual’s report of hard drug use did not significantly predict an individual’s weapon carrying behaviour ($\beta_{8j} = 0.02, p > 0.05$). This was entered as a fixed effect in the level two analysis. Results indicated that the collective student body experience of hard drug use was significantly predictive of weapon carrying ($\gamma_{80} = 0.09, p <0.001$); therefore, the conditional means for each school do vary. As observed there is a positive relationship between overall student body experiences of hard drug use and weapon carrying by a student. This is evidence to support the idea that as the overall student body reported an increased level of hard drug use at school and school events there was more likelihood of individuals carrying weapons to school.

A positive and significant relationship between alcohol use at school and school events and weapon carrying behaviour was also observed ($\beta_{9j} = 0.32, p < 0.01$), recording an odds ratio of 1.38. Thus, as respondents reported a higher level of alcohol use at school and school events, the odds of carrying a weapon to school increased by 1.10 times. The relationship (i.e., the slope in logit unit) between an individual’s reported alcohol use and weapon carrying was moderated only by the collective student body reports of soft drug use ($\gamma_{95} = 0.03, p < 0.05$). Thus, the relationship (i.e., the slope in logit unit) between an individual’s reported alcohol use and
weapon carrying is expected to increase by 0.03 per unit increase in the frequency of soft drug use by the collective student body.

Finally, there was a significant and positive relationship between soft drug use and weapon carrying ($\beta_{10} = 0.15, p < 0.01$), recording an odds ratio of 1.17. Thus, as students reported more frequent use of soft drugs the odds of weapon carrying at school and school events increased by 1.17 times. None of the school level variables significantly moderated the relationship between an individual’s soft drug use and weapon carrying.
Chapter Four: Discussion

This study confirmed the hypothesis that weapon carrying cannot be solely explained by one theory alone. This is a complex behaviour that requires a complex level of understanding. This particular study incorporated three different theories in order to understand weapon carrying behaviour at school and school events: the fear-victimization hypothesis, lifestyle theory, and the ecological model. The results of this study generally support the findings of previous studies that tested these theories separately.

First, in regard to individual level effects, this study supports previous work in several respects. First, male students were more likely than female students to carry weapons to school and school events, a finding that has been reported in multiple studies (Akiba, 2004; Alikasifoglu et al., 2004; Bailey, et al. 1997; Benbenishty & Astor, 2005; Dukarm et al., 1996; DuRant, et al. 1999; Ellickson & McGuigan, 2000; Furlong & Morrison, 2000; Kojo et al., 2003; May, 1999; Notziger & Kurtz, 2005; O’Keefe, 1997; Rudatsikira, et al., 2008; Wilcox & Clayton, 2001).

Consistent with the fear-victimization hypothesis literature, results of this study showed that the more fearful youth are of being victimized, the greater the likelihood they would carry a weapon to school and school events. This was true across multiple forms of victimization experiences (i.e., victimization from bullying, verbal sexual harassment, physical sexual harassment, racial discrimination, or sexual orientation discrimination), which is also consistent with previous fear-victimization research (e.g., DuRant et al., 1997; May 1999).

As well, just as expected, students who reported an increased frequency of soft drug use (i.e., marijuana and cigarettes) at school and school events were more likely to report carrying a weapon to school. Similar results were observed for those who drank alcohol at school and school events. These findings are consistent with previous research on lifestyle theory (Bailey et al., 1997; Dukarm et al., 1996; Lowry et al., 1999; Malecki & Demaray, 2003; Simon et al.,
1999). Contrary to what was expected this study found little substantive evidence that an individual’s use of hard drugs at school and school events predicted weapon carrying behaviour. However, there was evidence to support that as the overall student body reported an increased level of hard drug use at school and school events there was more likelihood of individuals carrying weapons to school.

**Combining theories to explain weapon carrying behaviour**

As explained by the fear-victimization hypothesis those students who are victimized and fearful of victimization might bring a weapon to school for protection. However, another explanation offered by May (1999) is that those adolescents who engage in delinquent behaviours (i.e., drug and alcohol use at school) are also fearful of other delinquent peers who are also engaging in such behaviour. Perhaps those who are drinking at school and school events or using soft drugs are putting themselves in situations that require a level of protection. By becoming high or intoxicated, student’s reasoning abilities are diminished and therefore may be more prone to being victimized.

The idea here may be that students who are engaging in a form of deviancy may be putting themselves in situations where they may be more likely to be victimized (lifestyle theory). As a result, these adolescents could become more fearful. They may have been victimized in the past and are therefore are scared that this is going to happen again (fear-victimization). In response, they carry weapons for protection (lifestyle theory and fear-victimization hypothesis). Unfortunately, in this study the intent of weapon carrying was not evaluated. Future research, using a longitudinal study and structural equation modeling may be appropriate to confirm this idea.

**Student body influence.** A major aim of this study was to examine the effects that the collective student body experiences of fear, victimization, and substance use have on the
relationship between an individual’s weapon carrying behaviour and their level of fear, victimization and substance use. Results of this study showed that the collective student body level of fear has little effect on the relationship between individual level predictors of weapon carrying. The collective student body of fear did moderate the relationship between an individual’s level of fear of victimization and weapon carrying. As well, the collective student body experiences of victimization were not moderators between individual level predictors and weapon carrying. However, victimization was a moderator between fear of victimization and weapon carrying. The collective student body’s frequency of soft drug use was also a moderator for a number of different relationships. Although there was a nonsignificant relationship between students who report hard drug use and weapon carrying there was a significant and positive relationship between overall student body experiences of hard drug use and weapon carrying.

Adolescents do not stay in the same class all day. Instead, they are exposed to different peers within a school but generally who are in the same grade. As this study found, there was a limited effect that the wider student body experience had on the relationship between individual level variables and weapon carrying. It might be that the student body experience does still influence a peers level of behaviour, but only if there is a closer relationship to the individual student. For instance, perhaps a grade 9 student is not influenced by the school’s behaviour because they only know other grade 9 students. Perhaps, if the second level of analysis was completed by grade the results might be different. Future research may benefit from considering a student’s closer peer network of grade mates or social groups and how that influences an individual’s decision to carry a weapon to school. It is possible that peer network analysis and Multilevel Modeling analysis be combined to further understand the relationship between variables related to the fear-victimization hypothesis and lifestyle theory.
Limitations

Despite the potentially useful findings of this study, there are several limitations that should be considered when interpreting these results. First, the measure of weapon carrying ultimately combines multiple weapons into a single group and makes it hard for us to specify the type of weapon used in these delinquent acts. As well, weapon carrying in this study, the measure of violence, did not specify who the aggressor is or who the victim is (e.g., “This school year, how often have you engaged in physical violence with a weapon?”). Instead, all we know is that some type of weapon was used for violence against someone else. This is important to know, as there could be different explanations as to why someone engages in weapon carrying behaviour. Nevertheless, this study is an important first step in understanding the influences of school violence.

In addition, the present study lacked the full range of explanatory variables despite the comprehensiveness of this study. More variables could be included in future studies, including such things as friend suicide attempts (Resnick et al. 2004), history of arrests (DuRant et al., 1997), and/or mental health challenges (Swahn & Donovan, 2004). As well, the author of this study acknowledges that schools are nested within a community context and student interaction is not only within schools. Although schools are often a reflection of the community that they serve (Furlong & Morrison, 2000), including variables that directly assess community context would be an important consideration in future research.

Hierarchical Generalized Linear Models was the appropriate analysis for the present study, although some of the variables used in this study did not vary across schools (i.e., verbal sexual harassment, racial discrimination and gender) despite the large sample size. At the time the data was collected, the provincial government had just made social responsibility part of the curriculum. It is possible that the lack of variability among these variables may be a reflection of
the schools’ response to this mandate. Future research may want to consider a more diverse sent of schools.

Another limitation to this study was the use of aggregated variables. Raudenbush and Bryk (1992) warned researchers that up to 80 – 90% individual variability may be lost with the use of aggregated statistical methodologies. This may be part of the explanation as to why so many school level variables seemed to have little effect.

As well, results of the present study were based on perceptions of adolescents who live in western Canada and this may limit their generalizability. However, given the large and ethnically diverse sample and the consistency of findings relative to previous studies in other countries, the present study results certainly speak to the generality of findings regarding the fear-victimization and lifestyle hypotheses and school violence.

Scientists have identified a number of risk and protective factors that impact violent behaviour. The data used in this study was from 2008. Therefore, it is important to recognize that this may not reflect current patterns of behaviour. Still, the present results are consistent with those findings reported in the late 90’s (e.g., Bailey et al., 1997; DuRant et al., 1997; May 1999), suggesting similar processes may be in operation over recent decades, and that the variables studied are still important today and could influence rates of weapon carrying in 2015. Replication using more current data would be welcomed.

**Implications**

There are many potential implications of the results of this study. First, it may advance our understanding of school violence. Currently, the use of multilevel modeling in school violence research is rare. This study may allow researchers to understand how some context level variables potentially influence school violence. Second, this research may offer insights for administrators and policy makers as to the possible influences on school violence. Teachers,
administrators, security staff, and police may be remiss if they ignore the potential idea that the student body plays an important role in school violence. Third, this study offers a more comprehensive understanding of school violence behaviour by using three different theories as a lens. The studies that have been cited above are limited as they use one theory to explain the behaviour. Using a multitheoretical approach allows researchers to use variables from different models to examine the phenomena of school violence, an idea that was emphasized in Wilcox and Clayton’s (2001) work.

**Future research**

As seen in the literature review, the lifestyle theory and fear-victimization hypothesis were developed in the late 70’s and early 80’s. Researchers have evaluated these ideas up until the late 90’s. In the United States and Canada, weapon carrying among youth and school shootings are still happening and grab the attention of local, national and international news agencies. However, there has been little attention on this topic by academics since the late 90’s especially in Canada. Moreover, as noted above, studies have primarily been conducted in the southern United States. Results of the present study demonstrate that the same processes are relevant within the Canadian context.. It is strongly advised that more studies be conducted to try to understand if other risk factors are involved in school violence within Canada and other countries.

There are a number of areas that this research project can expand to. Participation in problem behaviours is not solely attributable to individual characteristics. Rather, it could be part of a membership in a deviant peer group that endorses such behaviours (Stueve, O’Donnell, & Link, 2001). Therefore, future research may want to amalgamate the idea of network analysis and multilevel modeling to further understand this exceedingly complex behaviour. Just as Furlong and Morrison (2000) reminded us, schools and students are part of a community. Future
research may also want to consider community variables in order to further understand school violence. Finally, understanding influences on weapon carrying is one thing, but understanding how to curb such behaviour is important as well. Future research benefit from consideration of how to mediate the potential relationships between fear, victimization, substance use (deviant lifestyle) and school violence.

This study confirmed the idea that school violence is a complex phenomenon, with different pathways to weapon carrying and violent crime among youth. It is possible that for any given individual both the fear-victimization hypothesis and lifestyle theory may hold true. For instance, if a student has been victimized in the past and is scared they will be hurt again, they may self-medicate by using soft drugs or alcohol or they might bring a weapon to school for protection. Alternatively, if a youth is consuming soft drugs or alcohol at school and school events as part of a rebellious or deviant lifestyle, they may be putting themselves at greater risk for victimization while intoxicated. In turn, they may become fearful of further victimization and consider bringing a weapon to school and school events for self-protection. In order to explore these different pathways to weapon carrying behaviour and their interaction, longitudinal studies are clearly needed, perhaps of a qualitative nature, at least initially.
Chapter Five: Conclusion

The goal of this study was to understand what influences an individual to bring a weapon to school. The results of this study confirm that this is a complex behaviour that cannot be explained by one theory alone. The fear-victimization hypothesis, lifestyle theory, and the ecological model were all used in this study. The fear-victimization hypothesis and lifestyle theory were confirmed to be important considerations at the individual level. At the school level, peer influences were confirmed as another important consideration. In order to curb weapon-carrying behaviour, we needed to have a comprehensive understanding of this behaviour and what influences a teenager to bring a weapon to school. Right now, some schools have opted for use of metal detectors, visibly present police officers roaming the halls, and/or zero tolerance policies. However, it has become clear that this is a complex behaviour and a complex behaviour will require a complex solution.
References


Appendix A: Safe School and Social Responsibility Survey

PLEASE DO NOT WRITE ON THIS BOOKLET
Survey Booklet

Safe School and Social Responsibility
Survey for Secondary Students

Answer Form

SECTION A

1. What is the first letter of your mother’s first name? □
2. What is the last name of the year you were born? □
3. What is the last letter of your last name? □
4. What is the third letter of the month you were born? □
5. How many older brothers and sisters do you have? □
6. What are the first five letters in the name of your school? □
7. What grade are you in? □ 8 □ 9 □ 10 □ 11 □ 12
8. What is your gender? □ Male □ Female
9. What is your race or ethnic background? □ Black □ Asian □ Hispanic □ Native American □ Other □
10. How long have you lived in Canada? □ less than 2 years □ 2-4 years □ more than 4 years
11. Is English the main language spoken at your home? □ Yes □ No
12. What is the postal code at your house? □

FROM THIS POINT ON PLEASE READ QUESTIONS IN SURVEY BOOKLET AND ANSWER QUESTIONS BELOW:

13. How well do you do in your school work? □ A □ B □ C □ D □
14. How well are you liked by other students? □ A □ B □ C □ D □
15. What do you consider your sexual orientation to be? □ 1 □ 2 □ 3 □ 4
16. At school, your friends are... □ 1 □ 2 □ 3 □
17. What is the highest level of education that you would like to complete? □ 1 □ 2 □ 3 □ 4 □ 5 □ 6 □ 7 □ 8 □ 9

Mark one. □ 1 □ 2 □ 3 □ 4 □ 5 □ 6 □ 7 □ 8 □ 9

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INTRODUCTION
This survey is designed to provide important information about student experiences with personal safety and social responsibility. This survey also provides an opportunity for students' voices to be heard and students' experiences considered.

The information provided by you is very valuable for your school and the school district. This information can assist your school district in planning to support students' success. Your participation in this survey is voluntary and your answers are confidential and anonymous, which means that your information will be kept private and your name will not be associated with any of your responses. This is not an exam and there are no right or wrong answers to the questions, although it is important that you answer the questions as honestly as possible.

PRIVACY CODE INFORMATION
Over the next few years, the school district may ask you to complete this survey again in order for comparisons to be made between previous and future responses. To ensure your privacy and confidentiality, we are asking you to create your own "privacy code" (Questions 1 - 5), which is a personal identity number unique to you. If you complete this survey again in the future, we will ask that you re-create your "privacy code". This information will never be provided back to the school. If you are not comfortable providing this information do not answer Questions 1 - 5.
INSTRUCTIONS
1. DO NOT write your name on this survey.
2. Please use a blue or black pen. No pencils are allowed.
3. Please answer each question by completely filling in the appropriate circle on the Answer Form (see diagram on the Answer Form).
4. Do not talk until ALL students have completed the survey.
5. Make sure you answer according to the instructions for each section.
6. If you are not comfortable answering a question or if you don't know what it means, just leave it blank.
7. If you prefer not to complete the survey please turn it face down on the desk.
8. When you have completed the survey please turn it face down on the desk.
9. When all students have completed the survey, the teacher will collect them all and seal them in an envelope.
10. If you make a mistake put an"x" through the incorrect answer and fill in the circle for the correct answer.

TO BEGIN THE SURVEY:
Please turn the page and begin the survey now. Beginning with question 13, all questions are in this booklet.
Please answer Questions 1 - 5 on the Answer Form.

6. What are the first five letters of the name of your school?

7. What grade are you in?

8. What is your gender?

9. What is your racial/ethnic background? Choose ONE only.
   A. My racial/ethnic background is mixed.
   B. Aboriginal (First Nations, Non-Status Indian, Inuit, Metis)
   C. African/Caribbean (Black)
   D. Asian (Cambodian, Chinese, Japanese, Korean, Taiwanese, Thai, Vietnamese, Filipino)
   E. South Asian (East-Indian, Indo-Canadian, Pakistani)
   F. Caucasian (White, European, Russian)
   G. Latin American (Mexican, Portuguese, South American, Spanish)
   H. Middle Eastern (Arabic, Iranian, Kuwaiti, Perisan, Turkish, Israeli, Palestinian)
   I. I don't know my racial/ethnic background.

10. How long have you lived in Canada?

11. Is English the main language spoken in your home?

12. This question has been removed from survey.

13. How well do you do in your school work?
   A. When you were in elementary school
   B. In this school

14. How well are you liked by other students?
   A. When you were in elementary school
   B. In this school
15. What do you consider your sexual orientation to be?
   1. Straight
   2. Bisexual
   3. Gay, lesbian (homosexual)
   4. I am not sure

16. At school, your friends are…
   1. all from the same racial/ethnic background as you.
   2. mostly from the same racial/ethnic background as you.
   3. mostly from a different racial/ethnic background from you.
   4. from all different racial/ethnic backgrounds.

17. What is the highest level of education that you would like to complete? Choose one.
   1. Not finish high school
   2. High school graduation
   3. Training/apprenticeship program (like carpentry, computer training, legal assistant)
   4. Some college/university classes
   5. College diploma
   6. University/bachelor degree (undergraduate)
   7. Masters degree
   8. Professional degree (like lawyer, nurse, architect)
   9. Doctoral degree

From this point on all questions are only in this booklet. Please answer on the Answer Form.
Please answer all questions on the ANSWER FORM.

SECTION B

These questions ask how you feel about things - about yourself and about school, **this school year**.

Please answer **Question 18** on the Answer Form using the following scale:

|----------------------|-------------|--------------|----------|-------------------|

18 a. I do lots of important things.

   b. In general I like being the way I am.

   c. Overall, I have a lot to be proud of.

   d. I can do things as well as most other people.

   e. Other people think I am a good person.

   f. A lot of things about me are good.

   g. I am as good as most other people.

   h. When I do something, I do it well.

The next questions ask about feeling safe. Safe means feeling comfortable, relaxed and not worried that something bad could happen to you.

Please answer **Question 19** on the Answer Form using the following scale:

|----------|----------------|---------------------|---------------------|----------|

19 a. I feel safe at school.

   b. I feel safe at school activities and events (dances, field trips, clubs, sporting events).

   c. I feel safe on my way to and from school.

   d. I feel safe in my neighbourhood or community.
Much publicity has been given to the serious problems that teens face these days. Based on your experiences at school or school events, this school year, please indicate how often the following things happen to you.

Please answer Question 20 on the Answer Form using the following scale:

20. How often are you worried or afraid that you will…
   a. be physically attacked or hurt by a student or group of students?
   b. be attacked or threatened with a weapon?
   c. be talked into doing things you are not comfortable with by other students?
   d. have rumours or gossip spread about you?
   e. be forced to engage in sexual acts by other students?
   f. be verbally harassed or embarrassed at school?
   g. be made fun of or left out because of your culture or race?
   h. be made fun of or left out because of your physical appearance or a physical disability?
   i. be made fun of or left out because of how well or poorly you do in school?
   j. be made fun of or left out because of your sexual orientation (straight, gay, bisexual)?

Please answer Question 21 on the Answer Form using the following scale:

21. How often have you…
   a. been suspended from school?
   b. skipped a class?
   c. skipped all day?
Please answer all questions on the ANSWER FORM

These questions ask how you feel about things – about yourself and about school, this school year.

Please answer Questions 22 - 47 on the Answer Form using the following scale:

|----------------------|------------|--------------|----------|------------------|

22. The adults in my school treat students fairly.
23. My ideas and opinions are important to at least one adult in my school.
24. I can get extra help from adults at my school if I need it.
25. I can get extra help from my family if I need it.
26. My school provides opportunities for me to get involved in community activities.
27. My feelings are recognized by at least one adult at my school.
28. I feel awkward and out of place at my school.
29. I like school.
30. I liked elementary school.
31. I feel like I belong at my school.
32. Other students at my school accept me as I am.
33. When I have a problem, there are students who will help me.
34. Students at my school really care about each other.

Please answer Questions 35 - 47 in the next column on the Answer Form.

35. Adults in my school respect me.
36. Adults in my family respect me.
37. Students in my school are just looking out for themselves.
38. Adults in my school really care about students.
39. Students at my school work together to solve problems.
40. There is an adult in my school that I can go to for support or advice or talk to about my problems and worries.
41. There is an adult in my family that I can go to for support or advice or talk to about my problems and worries.
42. In my school, students have a say in deciding what goes on.
43. Students treat teachers and adults at school with respect.
44. I know what my school’s code of conduct says.
45. The adults at my school have talked to us about the school code of conduct.
46. Adults at my school do a good job of responding to bullying and harassment.
47. Adults at my school do a good job of responding to physical violence (punching, kicking, weapons).
SECTION C

Please answer all questions on the ANSWER FORM

These questions ask about a variety of risky activities youth are believed to be involved in.

PLEASE READ THESE NEW DIRECTIONS...
Now we would like to ask you about your experiences with alcohol and drugs. For each item please tell us about your experiences:

<table>
<thead>
<tr>
<th>At School</th>
<th>At School Events (like dances, sports, trips)</th>
<th>In the Community (outside of school)</th>
</tr>
</thead>
</table>

Be sure to mark one response in each column using the following scale for each column:

<table>
<thead>
<tr>
<th>1. Never</th>
<th>2. Once or a few times</th>
<th>3. About once per month</th>
<th>4. Every week or more</th>
</tr>
</thead>
</table>

48. How often have you:
   a. consumed alcohol?
   b. consumed more than 5 alcoholic beverages at one time?
   c. been under the influence of alcohol?
49. a. smoked cigarettes?
   b. used marijuana?
   c. used ecstasy?
   d. used hallucinogens (LSD, acid)?
   e. used inhalants (glue, gas, aerosol)?
   f. used prescription pills not prescribed by a doctor?
   g. used crystal meth?
   h. used cocaine?
   i. used heroin?
   j. been “high” because you used any of the drugs listed above?

k. Which **three** of the following substances do you believe are **most harmful** to people who use them?
   1. cigarettes  2. alcohol  3. marijuana  4. ecstasy  5. hallucinogens
   6. inhalants  7. prescriptions pills (not from doctor)  8. crystal meth  9. cocaine  10. heroin
Thanks….You will now go back to using the same procedure as earlier in the survey.

Please answer Question 50 on the Answer Form using the following scale:

<table>
<thead>
<tr>
<th>1. Never</th>
<th>2. Once or a few times</th>
<th>3. About once per month</th>
<th>4. Every week or more</th>
</tr>
</thead>
</table>

50. For each statement below, indicate how often you have experienced these problems because of drinking or using drugs.

☐ I have not used alcohol or drugs. Go to question 51.

  a. I got in trouble at school.
  b. I got in trouble at home.
  c. I got poor school marks.
  d. I had a fight with someone.
  e. I lost friends.
  f. I got in trouble with the police.
  g. I had problems with my girlfriend/boyfriend.
  h. I lost interest in my usual activities.

Now we would like to ask you about your experiences with violence and weapons. For each item please tell us about your experiences:

Be sure to mark one response in each column using the following scale for each column.

<table>
<thead>
<tr>
<th>1. Never</th>
<th>2. Once or a few times</th>
<th>3. About once per month</th>
<th>4. Every week or more</th>
</tr>
</thead>
</table>

This school year, how often have you…

51. engaged in physical violence by pushing, slapping or hitting?
52. threatened someone with physical violence?
53. carried a weapon?
54. threatened someone with a weapon?
55. engaged in physical violence with a weapon?
56. stolen something or purposely damaged property (including graffiti)?
### IMPORTANT DEFINITION

Bullying and harassment happens when a person who has more power or some advantage (bigger, more status, etc.) tries to bother, hurt, make fun of or attack another person (it’s not an accident), and does so repeatedly. Sometimes several students will bully or harass another student or group of students.

Now we would like to ask you about your experiences with bullying and harassment at school and school events, this school year. For each item please tell us about:

<table>
<thead>
<tr>
<th>When it has been DONE TO ME</th>
<th>When it has been DONE TO OTHERS by me</th>
</tr>
</thead>
</table>

Be sure to mark one response in each column using the following scale for each column.

<table>
<thead>
<tr>
<th>1. Never</th>
<th>2. Once or a few times</th>
<th>3. About once a month</th>
<th>4. Every week or more</th>
</tr>
</thead>
</table>

57. How often have you had experience with…

a. bullying and harassment?

*Students can bully and harass others in different ways. How often have you had experience with…*

b. physical bullying (hitting, shoving, kicking)?

c. verbal bullying (name calling, teasing, threats, putdowns)?

d. social bullying (exclusion, rumours, gossip, humiliation)?

e. cyberbullying at school (using computer or text messages to exclude, threaten or humiliate)?

f. cyberbullying outside of school (using computer or text messages to exclude, threaten or humiliate)?

g. cyberbullying that caused problems at school (using computer or text messages to exclude, threaten or humiliate)?
Please answer all questions on the ANSWER FORM

SECTION D

IMPORTANT DEFINITION
Sexual harassment is unwelcome and unwanted behavior about sex and gender that interferes with your life and makes you feel uncomfortable, even if the people doing the harassing were only joking. These questions are NOT asking about behaviors you like or want (for example, when you want someone to kiss you or when you flirt with a girlfriend or boyfriend).

Now we would like to ask you about your experiences with sexual harassment at school and school events, this school year. For each item please tell us about:

<table>
<thead>
<tr>
<th>When it has been</th>
<th>When it has been</th>
</tr>
</thead>
<tbody>
<tr>
<td>DONE TO ME</td>
<td>DONE TO OTHERS by me</td>
</tr>
</tbody>
</table>

Be sure to mark one response in each column using the following scale for each column.

1. Never  2. Once or a few times  3. About once per month  4. Every week or more

58. How often have you had experience with…
   a. saying someone did not seem masculine or feminine enough?
   b. calling someone gay, fag, lesbian, or something similar?
   c. spreading sexual rumours or notes, writing sexual graffiti?
   d. making unwelcome or crude comments about someone’s body or their sexual behavior?
   e. yelling something sexual or whistling/howling as someone walks by?
   f. making someone uncomfortable by making sexual gestures or staring at someone in a sexual way?
   g. making someone uncomfortable by using hurtful sexual language?
   h. standing too close or brushing against someone in a sexual way when it is not wanted?
   i. touching, kissing, grabbing or pinching someone in a sexual way when it’s not wanted?
   j. persuading or bribing someone to do something sexual (other than kissing) when it is not wanted?
   k. forcing or threatening someone to do something sexual (other than kissing) when it is not wanted?
   l. **Girls only**: pressure from other girls to engage in sexual activities with others?
    **Boys only**: pressure from other boys to engage in sexual activities with others?
**SECTION D**

Please answer all questions on the **ANSWER FORM**

---

**IMPORTANT DEFINITION**

*Discrimination is when people are seen as having different value and/or treated unfairly because of their racial or ethnic background, culture, the colour of their skin, sexual orientation, or other differences.*

---

**Now we would like to ask you about your experiences with discrimination at school and school events, this school year.** For each item please tell us about:

<table>
<thead>
<tr>
<th>When it has been DONE TO ME</th>
<th>When it has been DONE TO OTHERS by me</th>
</tr>
</thead>
</table>

Be sure to mark one response in each column using the following scale for each column.

<table>
<thead>
<tr>
<th>1. Never</th>
<th>2. Once or a few times</th>
<th>3. About once per month</th>
<th>4. Every week or more</th>
</tr>
</thead>
</table>

59. How often have you had experience with…

a. saying negative things or teasing about someone’s culture or race?
b. saying negative things or teasing about someone’s sexual orientation (straight, gay, bisexual)?
c. making someone feel bad about their culture or race?
d. making someone feel bad about their sexual orientation (straight, gay, bisexual)?
e. calling someone racist names?
f. telling jokes about someone’s race or culture?
g. telling jokes about someone’s sexual orientation (straight, gay, bisexual)?
h. using swear words when mentioning a race or cultural group?
i. using swear words when mentioning gays or lesbians?
j. telling others that certain racial or cultural groups are dangerous?
k. telling others that people of a certain sexual orientation (straight, gay, bisexual) are dangerous?
l. treating someone’s racial or ethnic group as inferior?
m. treating someone’s sexual orientation as inferior (straight, gay, bisexual)?
n. excluding someone because of culture or race?
o. excluding someone because of sexual orientation (straight, gay, bisexual)?
The following questions ask what actions you have taken when you have been picked on, bullied, discriminated against, harassed or attacked at school and school events, this school year.

☐ I have not been picked on, discriminated against, bullied, harassed or attacked.  
   Go to question 62.

Please answer **Question 60** on the Answer Form using the following scales:


60. **When you have been** picked on, discriminated against, bullied, harassed or attacked, how often have you . . .

   a. told the person(s) to stop?
   b. talked to the person(s) about it?
   c. walked away?
   d. ignored or avoided the person(s)?
   e. did something to distract the person(s)?
   f. stayed home from school?
   g. got your friends to get back at the person(s)?
   h. fought back physically?
   i. found a new friend or group of friends?
   j. talked to an adult at home?
   k. talked to another teen/youth about it?
   l. reported it to an adult at school?
   m. got your friends to help you solve the problem?
   n. talked to the person's friend(s) about it
   o. did nothing?

61. Which one of the **above** actions was MOST effective in stopping the person(s) from picking on, discriminating against, bullying, or harassing you? Choose only one.
The following questions ask what actions you have taken when you have seen others being picked on, bullied, discriminated against, harassed or attacked at school and school events, this school year.

☐ I have not seen others being picked on, discriminated against, bullied, harassed or attacked. Go to question 64.

Please answer Question 62 on the Answer Form using the following scales:

|----------|---------------|---------------------|-------------------|----------|

62. **When you have seen others** being picked on, discriminated against, bullied, harassed or attacked, how often have you…

a. told the person(s) doing the bullying to stop?

b. talked to the person(s) doing the bullying?

c. talked to the bullying person's friends about it?

d. walked away?

e. ignored or avoided the person(s) who bullied?

f. did something to distract the person(s) who bullied?

g. helped the person being hurt to get away?

h. talked afterwards to the person who was hurt?

i. got your friends to help solve the problem?

j. got your friends to get back at the other person(s)?

k. stayed home from school?

l. talked to an adult at home?

m. talked to another teen/youth about it?

n. reported it to an adult at school?

o. talked about it with an adult at school?

p. did nothing?

63. Which one of the above actions was MOST effective in stopping the person(s) from picking on, discriminating against, bullying, or harassing others? Choose only one.
The students and adults at a school are part of a community. The students and adults interact with each other in many ways inside and outside the classroom. Adults in your school include teachers, office staff or any other person regularly working in your school.

Please answer Question 64 - 66 on the Answer Form using the following scales:

|----------|----------------|--------------------|--------------------|----------|

For each statement below, indicate how you feel or what you think based on your experiences at school, this school year.

64. **Adults** at my school are accepting of all individuals…
   a. regardless of their race, ethnicity or culture.
   b. regardless of their sexual orientation (straight, gay, bisexual).
   c. regardless of their physical or mental disability.
   d. regardless of their academic ability.

65. **Students** at my school are accepting of all individuals…
   a. regardless of their race, ethnicity or culture.
   b. regardless of their sexual orientation (straight, gay, bisexual).
   c. regardless of their physical or mental disability.
   d. regardless of their academic ability.

Please answer Question 66 using the scale at the top of the page.

66. At my school this year…
   a. adults talk positively about diversity (the ways people are different from each other – race, sexual orientation or ability).
   b. students talk positively about diversity (the ways people are different from each other – race, sexual orientation or ability).
   c. adults speak out against stereotyping (unfairly judging) others.
   d. students speak out against stereotyping (unfairly judging) others.
   e. we learn about people of various cultures, races, and ethnicities.
   f. we learn about people of various sexual orientations (straight, gay, bisexual).
   g. we learn about bullying and harassment.
The following statements describe ways in which you may have helped your school and/or community become a better place. For each of the following questions please choose ONE response that is MOST true about you.

67. With regard to **contributing positively to your school**, which statement below is most true about you? Pick one only.
   1. I do not contribute to my school.
   2. I try to contribute to the school community when asked.
   3. I volunteer in activities that contribute to my school community.
   4. I have organized many activities that contribute to my school community.

68. With regard to **solving problems** with other people at school, which statement is most true about you? Pick one only.
   1. I have a hard time solving problems peacefully.
   2. I consider other people’s feelings but it is difficult.
   3. I try to understand the other person’s perspective and calmly solve problems.
   4. I logically determine which is the best strategy for solving problems and I use it.

69. With regard to **valuing diversity and defending human rights**, which statement is most true about you? Pick one only.
   1. I ignore people who are different from me.
   2. I respect other people but I don’t think about human rights or diversity.
   3. I have been involved in activities in my school or community that show support for human rights.
   4. I am committed and involved in supporting diversity and defending human rights even if it is not the popular thing to do.

70. With regard to **exercising democratic rights and responsibilities**, which statement is most true about you? Pick one only.
   1. I don’t think it really matters.
   2. I am interested in my democratic rights and responsibilities but I have not done much about it.
   3. I am interested in taking action to make my community a better place.
   4. I know what I want to do to make the world a better place.
You’re almost finished!

71. Indicate how often you are involved in each of these school or community-related events. Answer for this school year.

Please answer Question 71 on the Answer Form using the following scale:

<table>
<thead>
<tr>
<th>1. Never</th>
<th>2. Once or twice</th>
<th>3. Once a month</th>
<th>4. About once a week</th>
<th>5. More than once a week</th>
</tr>
</thead>
</table>

How often have you…

a. participated in a school club or group?
b. participated in a community club or organization?
c. attended a religious service or activity?
d. attended a school dance?
e. participated in drama, art or music activities at school?
f. played on a school sports team?
g. participated in physical activities other than a school sports team?
h. mentored or tutored other students?
i. participated in a group to make school a better place?
j. participated in a group to make your community a better place?
k. led or organized an activity at your school?
l. led or organized an activity in your community?

Thank you very much for your help.

Safe Schools & Social Responsibility Survey for Secondary Students
Appendix B: Multilevel Model Analyzed

Level-1 Model

\[
\text{Prob}(WEAPUSE_{ij}=1|\beta_j) = \phi_{ij} \\
\log[\phi_{ij}/(1-\phi_{ij})] = \eta_{ij} \\
\eta_{ij} = \beta_{0j} + \beta_{1j}*(GENDER_{ij}) + \beta_{2j}*(ZFEAR_{ij}) + \beta_{3j}*(ZVICBULL_{ij}) + \beta_{4j}*(ZPHYSEXH_{ij}) + \beta_{5j}*(ZVERBALS_{ij}) + \beta_{6j}*(ZRACEDIS_{ij}) + \beta_{7j}*(ZSEXORID_{ij}) + \beta_{8j}*(ZHARDDRU_{ij}) + \beta_{9j}*(ZALCOHOL_{ij}) + \beta_{10j}*(ZSOFTDRU_{ij})
\]

Level-2 Model

\[
\beta_{0j} = \gamma_{00} + \gamma_{01}*(ZFEAR_j) + \gamma_{02}*(ZSBULLY_j) + \gamma_{03}*(ZPHYSEX_j) + \gamma_{04}*(ZALCOHO_j) + \gamma_{05}*(ZSSOFTDR_j) + u_{0j} \\
\beta_{1j} = \gamma_{10} \\
\beta_{2j} = \gamma_{20} + \gamma_{21}*(ZFEAR_j) + \gamma_{22}*(ZSBULLY_j) + \gamma_{23}*(ZPHYSEX_j) + \gamma_{24}*(ZALCOHO_j) + \gamma_{25}*(ZSSOFTDR_j) + u_{2j} \\
\beta_{3j} = \gamma_{30} + \gamma_{31}*(ZFEAR_j) + \gamma_{32}*(ZSBULLY_j) + \gamma_{33}*(ZPHYSEX_j) + \gamma_{34}*(ZALCOHO_j) + \gamma_{35}*(ZSSOFTDR_j) + u_{3j} \\
\beta_{4j} = \gamma_{40} + \gamma_{41}*(ZFEAR_j) + \gamma_{42}*(ZSBULLY_j) + \gamma_{43}*(ZPHYSEX_j) + \gamma_{44}*(ZALCOHO_j) + \gamma_{45}*(ZSSOFTDR_j) + u_{4j} \\
\beta_{5j} = \gamma_{50} \\
\beta_{6j} = \gamma_{60} \\
\beta_{7j} = \gamma_{70} + \gamma_{71}*(ZFEAR_j) + \gamma_{72}*(ZSBULLY_j) + \gamma_{73}*(ZPHYSEX_j) + \gamma_{74}*(ZALCOHO_j) + \gamma_{75}*(ZSSOFTDR_j) + u_{7j} \\
\beta_{8j} = \gamma_{80} \\
\beta_{9j} = \gamma_{90} + \gamma_{91}*(ZFEAR_j) + \gamma_{92}*(ZSBULLY_j) + \gamma_{93}*(ZPHYSEX_j) + \gamma_{94}*(ZALCOHO_j) + \gamma_{95}*(ZSSOFTDR_j) + u_{9j} \\
\beta_{10j} = \gamma_{100} + \gamma_{101}*(ZFEAR_j) + \gamma_{102}*(ZSBULLY_j) + \gamma_{103}*(ZPHYSEX_j) + \gamma_{104}*(ZALCOHO_j) + \gamma_{105}*(ZSSOFTDR_j) + u_{10j}
\]

ZFEAR ZVICBULL ZPHYSEXH ZVERBALS ZRACEDIS ZSEXORID ZHARDDRU ZALCOHOL ZSOFTDRU have been centered around the grand mean.

ZSFEAR ZSBULLY ZPHYSEX ZALCOHO ZSSOFTDR have been centered around the grand mean.

Level-1 variance = 1/[\phi_{ij}(1-\phi_{ij})]
## Appendix C: Full Analysis

### Table 8

School level variables moderating the relationship between level 1 variables and weapon carrying among students

<table>
<thead>
<tr>
<th>Random and Fixed Effects</th>
<th>$\gamma$</th>
<th>SE</th>
<th>$t$</th>
<th>$p$</th>
<th>OR$^1$</th>
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<tr>
<td>For Intercept 1, $\beta_0$</td>
<td></td>
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<td>0.94</td>
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<td>0.24</td>
<td>2.13</td>
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<tr>
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<td>-2.22</td>
<td>0.03</td>
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<tr>
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<tr>
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<td>0.03</td>
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<td>-0.73</td>
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</table>
Table 8 continued

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<th>SE</th>
<th>(t)</th>
<th>(p)</th>
<th>OR$^1$</th>
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<td>0.97</td>
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<td>For Hard Drug Use slope, (\beta_8)</td>
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Table 8 continued

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<th>t</th>
<th>p</th>
<th>OR$^1$</th>
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<td>School Alcohol Use, $\gamma_{108}$</td>
<td>-0.02</td>
<td>0.02</td>
<td>-0.86</td>
<td>0.39</td>
<td>0.98</td>
</tr>
<tr>
<td>School Soft Drug Use, $\gamma_{109}$</td>
<td>-0.03</td>
<td>0.02</td>
<td>-1.98</td>
<td>0.05</td>
<td>0.97</td>
</tr>
</tbody>
</table>

*p < 0.05  
**p < 0.01  
***p < 0.001