Neighborhood crime, relative deprivation, and school violence in Canadian adolescents

Anthony Napoletano, Department of Psychiatry, McGill University, Montreal

March 2015

A thesis submitted to McGill University in partial fulfillment of the requirements of the degree of MSc. Psychiatry

Table of Contents

Abstract

Objective: Bullying and physical fighting are two very serious forms of school violence that concern adolescents, parents, teachers, and school administrators in Canada and around the world. The current thesis investigates whether the social contextual indicators of relative deprivation and social disorganization are associated with adolescent involvement in bullying and physical fighting.

Method: Data from the 2009/10 Health Behaviour in School Aged Children (HBSC) study, which surveyed a nationally representative sample (n=26,078) of Canadian students in grades 6 to 10 were merged with geographically-derived data on neighborhood crime surrounding HBSC schools (n=436). The contributions of individual-level relative deprivation and neighborhood-level social disorganization to school violence in adolescents were analyzed using hierarchical linear modeling (HLM) statistical methods.

Results: Using aggregated, school-level data, bivariate correlations showed a positive relationship between mean relative deprivation and social disorganization. Results from multilevel logistic regression analyses showed that every 1.0 *SD* increase in relative deprivation related to victimization (OR 1.16, CI 1.08-1.25), perpetration (OR 1.12, CI 1.02-1.22), and physical fighting (OR 1.17, CI 1.07-1.27), after differences in absolute affluence, gender, and age were held constant. Neighborhood effects of social disorganization, and the cross-level interaction between relative deprivation and social disorganization however, did not increase the likelihood of school violence among adolescents.

***Conclusions*:** These findings provide valuable insight into how socioeconomic inequalities create harmful environments that may influence bullying and physical fighting behaviors among adolescents. Moreover, results suggest the need for policy intervention strategies to extend

beyond the classroom to broader neighborhood-levels to help reduce socioeconomic differences in affluence and neighborhood crime.

Résumé

Objectif: L'intimidation et les bagarres physiques sont deux formes de violence à l'école qui concerne les adolescents, les parents, les enseignants et les administrateurs scolaires au Canada ainsi que dans le monde. Cette thèse cherche à savoir si les indicateurs sociaux contextuels de la privation relative et la désorganisation sociale sont associés à l'implication des adolescents dans l'intimidation et les bagarres physiques.

Méthode: Les données de cette étude viennent de l'enquête «Health Behaviour in School Aged Children (HBSC)». Cette enquête a interrogé un échantillon d'étudiants canadiens (n = 26 078) de la 6ème et 10ème année. Les données ont été fusionnées avec les données sur la criminalité entourant les quartiers d'écoles HBSC (n = 436). Les contributions à la violence scolaire par la privation relative au niveau individuel, et la désorganisation sociale au niveau du quartier, ont été analysées en utilisant la modélisation linéaire hiérarchique.

Résultats: En utilisant les données agrégées au niveau de l'école, les corrélations bivariées ont démontrés une relation positive entre la privation relative et la désorganisation sociale. Les résultats de la régression logistique multi niveaux ont démontrés que chaque augmentation de 1,0 SD dans la privation relative est liée à la victimisation (OR 1.16, CI 1.08-1.25), la perpétration (OR 1.12, CI 1.02-1.22), et les combats physiques (OR 1.17, CI 1.07-1.27), après les différences dans l'abondance absolue, le sexe, et l'âge ont été maintenus constants. Les effets de la désorganisation sociale, et l'interaction entre la privation relative et la désorganisation sociale toutefois, n'ont pas augmenté le risque de violence à l'école chez les adolescents.

Conclusions: *Ces résultats fournissent de précieux renseignements sur la façon* dont les inégalités socioéconomiques peuvent créer des environnements nocifs qui peuvent influencer les comportements d'intimidation et de combat physique chez les adolescents. En outre, les résultats

suggèrent la nécessité d'intervention stratégique politique sociale qui dépasse la salle de classe pour aider à réduire les différences socioéconomiques dans la richesse ainsi que la criminalité dans les quartiers écoliers.

Acknowledgements

I would like to express my gratitude to my master's supervisor, Dr. Frank Elgar; you have been a tremendous mentor for me. I would like to thank you for encouraging my research, your helpful comments, suggestions, and engagement throughout the learning process of this master's. Your advice on research as well as on my personal growth as a research scientist and career has been invaluable. I would also like to thank my thesis committee, Dr. David W. Rothwell, for serving as my external examiner. I am grateful for the constructive feedback provided by yourself and for sharing your time to review and help improve this master's thesis.

I would like to thank the HBSC, which is a World Health Organization collaborative study across 43 North American and European countries. The international Coordinator of the 2009/10 study is Candace Currie, St. Andrews University, Scotland. Also, the Canadian HBSC affiliated members and principal investigators: John Freeman, William Pickett; and National Coordinator, Matthew King. This research was also funded by a grant from the Social Sciences and Humanities Research Council of Canada.

I would also like to thank my parents, Mich and Rocco, and my brother and sister-in-law, Joseph and Amanda. I am grateful for the support they provided me throughout my graduate studies, from far and close.

Finally, and most importantly, I would like to thank my wife to be and best friend, Stephanie, who also endured and survived the experience of graduate school. She provided me with unending encouragement and support. Her patience and unwavering love were undeniably the backbone I needed throughout this journey.

Introduction

Ecological Challenge of Studying Individual- and Neighborhood-Level Factors that Explain Risk for School Bullying and Physical Fighting

Youth violence, including physical fighting and school bullying are considered some of the most serious and challenging public health problems worldwide (Krug, Mercy, Dahlberg, & Zwi, 2002; Nansel et al., 2001). Determinants of youth violence and school bullying have been explored at all levels of the ecological model of health (Hong & Espelage, 2012). By using the social-ecological framework, researchers investigate adolescent attitudes and behaviors believed to be influenced by a variety of contextual systems, including families, peers, schools, and communities (Bronfenbrenner, 1979). Although previous studies have shown that multiple ecological contexts influence adolescent behaviours (Elliott et al., 1996), identifying the specific mechanisms through which individual and neighborhood factors shape youth violence is essential, as the portion of overall variance explained from each ecological level may differ when exploring individual-level adolescent outcomes.

While less proximal ecological factors such as neighborhood poverty provide information on the socioeconomic position, or the vulnerability of a group of individuals, they do not permit inferences to be made at the individual-level (Robinson, 1950). Neighborhood-level risk factors that influence violence and bullying in schools may be vulnerable to the ecological fallacy, and a cautious interpretation of their associations to bullying and violence are required. Therefore, an obstacle for ecological research is that neighborhood determinants affect adolescent behaviours in schools above the effect of individual-level factors. The current thesis attempts to overcome this challenge by theoretically and empirically examining potential explanatory contextual influences of bullying and physical fighting at individual and neighborhood ecological levels. Taken together, relative deprivation and social disorganization perspectives will simultaneously

assess socioeconomic inequalities in bullying and physical fighting among school-aged adolescents.

The Social and Psychological Consequences of Bullying and Physical Fighting

A commonly applied definition of bullying was developed by Olweus (1993, 1994) and comprises three important elements: 1) aggressive behaviors that have hostile intent 2) these behaviors are repeated over time, and 3) involve a power differential favoring the aggressor. This definition of bullying excludes cases where two children of similar physical and psychological strength are fighting one another. Bullying may occur in a variety of settings including schools, after-school programs, and in youths' neighborhoods (Gladden, Vivolo-Kantor, Hamburger, & Lumpkin, 2014). However, bullying is distinct from physical fighting and the prevalence for both forms of violence vary by country, age, and gender (Craig et al., 2009; Pickett et al., 2013). One survey of adolescents across 40 countries indicated that 10.7% of the sample bullied others at least twice, and 12.6% of the sample had been victimized at least twice in the previous two months (Craig et al., 2009). Another study assessed physical fighting across 30 countries and specified that prevalence rates varied from 5.3% to 16.0% by country. Nevertheless, prevalence of fighting declined between 2002 and 2010 in 19 (63%) of the 30 countries (Pickett et al., 2013). The consequences of these forms of violence may be felt by a number of constituents across the ecological model including individuals, families, schools, and societies.

The social and psychological impacts of bullying and physical fighting have been well documented in the literature. Cross-sectional studies investigating bullying involvement have found that it related to peer rejection (Björkqvist et al., 2001; Schwartz, 2000), hyperactivity and other externalizing problems (Boulton & Smith, 1994), internalizing problems such as depression and suicide ideation (Bauman, Toomey, & Walker, 2013; Brunstein, Marrocco,

Kleinman, Schonfeld, & Gould, 2007), and physical health problems such as headaches, sleep disturbances, and abdominal pain (Fekkes, Pijpers, & Verloove-Vanhorick, 2004). There is evidence from longitudinal studies that bullying involvement contributes to the maintenance and development of these symptoms over time (Klomek et al., 2008; Marrocco et al., 2013; Reijntjes, Kamphuis, Prinzie, & Telch, 2010; Rigby, 1999). Further, school bullying has been related to concurrent and subsequent psychiatric symptoms (Kumpulainen & Räsänen, 2000), and with health and behavioral problems that impede normal development over time (Boulton, Smith, & Cowie, 2010).

Other cross-sectional studies examining physical fighting among adolescents have linked it to an increase for the risk of injury (Molcho, Harel, & Dina, 2004; Rudatsikira, Muula, & Siziya, 2008) and to delinquent behaviors such as substance use (Molcho, et al., 2004). Involvement in fighting during this developmental stage has also been related with risky behaviors and conduct disorders (Waschbusch & Elgar, 2007). Additionally, physical fighting among youth has been associated with poor social relationships with family and peers (Pickett, Iannotti, Simons-Morton, & Dostaler, 2009), lower life satisfaction, and worse perceptions of school environments (Harel, 1999; Walsh et al., 2013). A number of longitudinal studies have shown that adolescent aggression manifested through fighting is predictive of frequent fighting after the age of 18, as well as future spousal or partner abuse, and conviction for violent criminal offenses (Farrington, 1994; Magnusson, Stattin, & Duné, 1983; Stattin & Magnusson, 1989). Given the associated harms of bullying and physical fighting in adolescents, research has also sought to identify contextual determinants for policy application purposes. Social contextual determinants may be examined at the individual- or neighborhood-level and include mechanisms such as socioeconomic wealth, living in disadvantaged neighborhoods, and economic inequality.

The Role of Contextual Processes in Predicting School Violence in Adolescents

Prior studies that have examined socioenvironmental contextual influences on adolescent behaviors have shown that involvement in violence has varied by context, and as a function of race, age, and gender (Chauhan, Reppucci, & Turkheimer, 2009; Chauhan & Reppucci, 2009; Chung, & Steinberg, 2006). Using a longitudinal research design, Chauhan and Reppucci (2009) found that neighborhood disadvantage predicted witnessing violence and decreased reading achievement among adolescent females from a juvenile correctional center. Further, exposure to violence and antisocial behavior was moderated by race, for which witnessing violence was a stronger predictor of antisocial behavior for black females (Chauhan & Reppucci, 2009). According to a study by Chauhan et al. (2009), black American females were also more likely to reside in disadvantaged neighborhoods, which in turn, was associated with greater criminal recidivism. Consistent with previous findings about community effects being transmitted to youth, Brody et al. (2001) found that youth living in disadvantaged communities were more involved in relationships with deviant peers, juvenile crime, and violence. However, neighborhood disadvantage does not necessarily contribute to high levels youth crime and violence. Other contextual indicators of socioeconomic status (SES) and economic position in society must be considered.

Inconsistent findings have emerged from a number of studies examining the contextual effects of poverty and SES on school bullying and youth violence. Socioeconomic markers such as parental education or parental occupation had no relation to school bullying and violence in some studies, (Lind & Maxwell, 1996; Mellor, 1999; Olweus, 1994; Sourander, Helstelä, Helenius, & Piha, 2000), whereas others found health-related behaviors and health outcomes to be more problematic in lower SES groups (Chen, 2004; Chen, Matthews, & Boyce, 2002). When

investigating the issue from an inequality framework, findings from Due et al. (2009), and from Elgar, Craig, Boyce, Morgan, and Vella-Zarb (2009), indicated positive associations between national income inequality to school bullying and victimization. Rather than focusing on the effects of absolute poverty, this research focused instead on how the distribution of income within a given area or setting may influence school bullying. Accordingly, they contributed to the growing body of inequality literature and provided evidence that bullying is one of the many harmful outcomes of income inequality.

Associated Impacts of Income Inequality and the Income Inequality Hypothesis

The pervasive increase of income inequality (i.e., the extent to which income is distributed in an uneven manner among a population) in many of the Organization for Economic Co-operation and Development (OECD) countries including Canada, the United States, and the United Kingdom, is an indicator of economic and social stratification (Wilkinson & Pickett, 2009). Income inequality often compromises the fundamental building blocks of social connectedness as it has been shown to reduce trust and social capital (Gold, Kennedy, Connell, & Kawachi, 2002; Kawachi & Kennedy, 2002; Wilkinson, 2005). Moreover, the health and social problems related to widening gaps of income between rich and poor range from morbidity, earlier mortalities, obesity, increased teenage birth rates, mental health symptoms including alcohol and substance use, homicides, burglaries, assaults, hostility, and racism (Fajnzylber, Lederman, & Loayza, 2002; Hsieh & Pugh, 1993; Pickett, Mookherjee, & Wilkinson, 2005; Wilkinson & Pickett, 2006; 2007; 2009). These negative health and social problems that emerge as a result of income inequality are not limited to adults, and have also been shown to affect adolescent health.

Income inequality has been presented as an ecological correlate to adolescent mental health

difficulties, which contributes to a decrease in life satisfaction and well-being (Elgar et al., 2013; Pickett & Wilkinson, 2008). Notably, the widening gap between rich and poor has been examined on a global scale and at various ecological levels, for which positive associations to the victimization and perpetration of school bullying have been identified (Chaux, Molano, & Podlesky, 2009; Due et al., 2009; Elgar et al., 2009; Elgar et al., 2013). However, a study by Pickett and colleagues (2013) did not find any significant associations between income inequality and frequent physical fighting. The inescapable problem of inequality in wealth within rich and developed North American and European countries presents an enormous challenge to the health of its current and future youth, and reflects a potential calamity to youth violence.

It is important to note that income inequality is different from income poverty, which has also been widely accepted as a risk factor for premature mortality and increased morbidity (Marmot, 2002). On average, health typically follows a 'gradient effect', where those with higher SES have better health outcomes. The gradient effect is commonly observed across all levels of SES, such that health is better on the level above and poorer on the level below (Adler et al., 1994; Marmot, 2002). The 'absolute income hypothesis', which primarily identifies with the *materialist theory,* suggests that the effects of income on health are a result of having access to tangible resources (i.e., shelter, clothing and food). Conversely, the relative income hypothesis, which primarily identifies with the *psychosocial theory,* suggests that the effects of income on health are mediated through symbolic resources (i.e., status, prestige, and control). The *psychosocial theory* relates more closely to income inequality, and posits that raising an individual's income relative to their reference group could improve health because it elevates class status, and at the same time, expands access to a broader range of goods and services (Kawachi, Subramanian, & Almeida-Filho, 2002). However, directly comparing or studying

these hypotheses is problematic as it is difficult to disentangle the compositional effects of absolute income or absolute poverty from the contextual effects of income inequality. Moreover, teasing apart material from psychosocial processes may cause problems of colinearity and measurement error. Despite empirical evidence that demonstrates how both absolute income and relative income independently predict hazards to health, this thesis centers on the contextual effects of income inequality on adolescent health and behavior.

Researchers Wilkinson and Pickett (2009) conceptualized the *income inequality hypothesis*, which is the idea that the size of the gap between rich and poor, and not absolute poverty per se, is a stronger predictor of ill health and social problems. The mechanism that drives the relationship between economic position and health is based on a psychosocial school of thought that suggests feeling poor in comparison to others elicits psychological stress, which in turn, contributes to an erosion of social resources and non-adaptive coping strategies or behaviors (Wilkinson, 1996; Wilkinson & Pickett, 2009). The more unequal is the societal distribution of income, the greater the social distance between top and bottom in society, and the more undesirable social comparisons are made. "Where income differences are bigger, social distances are bigger and social stratification more important (Wilkinson & Pickett, 2009, p. 29)."

Relative Deprivation: The Pathway Between Income Inequality and Youth Violence

A plausible mechanism that underlies the postulated link between income inequality and worse health and social problems is relative deprivation. The *relative deprivation hypothesis* (Runciman, 1966) focuses on individual's emotions elicited from social comparisons due to societal inequalities. Runciman's (1966) theory of relative deprivation suggests that individuals are more inclined to make social comparisons to those who are better off, while ignoring others who are worse off. This thesis operationalizes relative deprivation according to a study by

Wagstaff and van Doorslaer (2000), who define it as the difference between an individual's income and the income of individuals in their reference group.

The theoretical and empirical representation of relative deprivation is intricately different, though not mutually exclusive from that of the income inequality hypothesis. Income inequality characterizes the property of a group and measures the overall variation in income within that group (Kawachi, Subramanian, & Almeida-Filho, 2002). On the other hand, relative deprivation is a characteristic of individuals and measures the individual's income or resources in comparison to others in that group (Adjaye-Gbewonyo & Kawachi, 2012). Regardless of the actual living conditions for individuals across all strata of society, relative deprivation is based on economic position in comparison to more affluent others, and therefore is sensitive to both individuals' socioeconomic position, and the distribution of affluence in their social reference group (Eibner & Evans, 2005). Whereas Wilkinson and Pickett (2009) and other researchers (Adjaye-Gbewonyo & Kawachi, 2012) have suggested that relative deprivation is a central path in the links between income inequality and a raft of health and social problems, very few studies have directly tested this hypothesis using individual data on relative deprivation.

Inequality and Neighborhood Social Disorganization

Greater social stratification intensifies competition for resources and produces conditions that increase the likelihood that less affluent individuals narrow the gap of material or non-material goods between them and more affluent members of society (Merton, 1968). Consequently, relatively deprived individuals may be fully determined to prosper in the social hierarchy by legal or illegal means (Kawachi, Kennedy, & Wilkinson, 1999; Merton, 1968). An earlier study by Shaw and McKay (1942) used spatial mapping to examine crime rates in urban and residential Chicago neighborhoods and discovered that crime rates were not evenly

dispersed. Higher crime rates were likely a function of neighborhood characteristics (i.e., social and economic structure), and not necessarily a function of the individuals within those neighborhoods. Shaw and McKay did not suggest a direct relationship between economic deprivation and crime; however, neighborhoods characterized with higher levels of deprivation also had higher rates of population turnover and tended to be settled by newly arrived immigrants (Shaw and McKay, 1942). This raised the question of whether processes such as social mobility, cycles of deprivation, and class structures interacted between individuals, their neighborhoods, and wider communities. This thesis will explore the idea that relative deprivation is associated with neighborhood social disorganization, and then demonstrate that adolescent violence in schools such as bullying and fighting are both strongly related to these individual and societal measures.

Therefore, Runciman's (1969) theory of relative deprivation and Shaw and McKay's (1969) *theory of social disorganization* offer two plausible explanations for why levels of inequality, deprivation and poverty, relate to youth violence in schools including bullying and physical fighting.

Researchers Shaw and McKay (1969) proposed the theory of social disorganization, which is a complimentary theoretical framework linking crime to social structures. The theory centers on the importance of social cohesion as a dynamic force in preventing crime. Social disorganization theory contends that a community's contextual environment influences individuals' risk for involvement in deviant or aggressive behaviors. Moreover, individuals' perceptions of their environments are also influenced by community contextual variables (Elliott et al., 1996; Shaw & McKay, 1969). Shaw and McKay identify environmental contextual factors such as concentration of poverty, residential mobility, ethnic heterogeneity, and low collective

efficacy, to diminish the effectiveness of informal social control and undermine the willingness of communities to exert social control over their members.

Social disorganization is defined as the "inability of a community structure to realize the common values of its residents and maintain effective social controls" (Sampson & Groves, 1989, p. 777). Earlier studies have found that social disorganization leads to *neighborhood disorder* or incivilities associated to crime and violence (Sampson & Raudenbush, 1999; Skogan, 1990). Neighborhood disorder can be classified into two distinctive categories (i.e., social disorder and physical disorder) that indicate a collapse of local social disorganization. Skogan (1990) describes neighborhood *social disorder* as intimidating behaviors likely observed between strangers such as public intoxication or solicitation for prostitution, and can be experienced first-hand, such as catcalling or sexual harassment. Neighborhood *physical disorder* involves visual indicators of negligence and decay that can be directly noticed with undeniable evidence. An example of physical disorder is the deterioration of urban landscapes, including graffiti, vandalism, abandoned cars, broken windows, and garbage in the streets (Sampson & Groves, 1989; Skogan, 1990).

Current Study: Testing the Theories of Relative Deprivation and Social Disorganization as Contextual Influences on Adolescents' Bullying and Fighting Behaviors

Relative deprivation and neighborhood social and physical disorder together may affect individual and community processes in such a way that not only heightens a sense of social evaluation among youth (that is, they are more likely to draw comparisons of relative position to their peers), but also fosters a harsh social environment that can shift attitudes and behaviors towards a more pro-violent culture (Sampson & Raudenbush, 1999; Wilkinson & Pickett, 2009). Although the linkages between income inequality and youth violence including bullying, have been studied at an ecological level (Elgar et al., 2009, 2013; Wilkinson & Pickett, 2009), there is

little evidence about individual-level mechanisms and processes that may affect adolescents living in unequal social settings that constitute high levels of social disorganization.

This thesis addresses the pressing policy question of whether relative deprivation and social disorganization have direct or synergistic effects on bullying and physical fighting. Specifically, adolescent involvement in school bullying (as victim or as an aggressor) and physical fighting will be examined as a result of these individual and socioenvironmental contextual influences. Using schoolmates as a social reference group to measure relative deprivation, and geographically-derived indices of crime that capture physical and social neighborhood disorder, I examine whether relative deprivation in comparison to schoolmates and attending schools situated in socially disorganized neighborhoods influences adolescent bullying and fighting behaviors.

Research Questions and Hypotheses

The current study addresses the following research questions:

1) Does individual-level relative deprivation relate to neighborhood-level social disorganization, which is characterized by neighborhood physical and social disorder?
2) Which of these contextual influences pose a greater risk to involvement in school bullying and physical fighting: individual relative deprivation or neighborhood social disorganization?
3) Do relative deprivation and neighborhood social disorganization (i.e., neighborhood physical and social disorder) have direct and interactive influences on school bullying and physical fighting?

Firstly, I hypothesize that individual relative deprivation will positively correlate to

neighborhood physical and social disorder (i.e., level of neighborhood social disorganization) surrounding participants' schools.

Secondly, I hypothesize that neighborhood disorder is a weaker determinant of school bullying and physical fighting than relative deprivation. Given that the ecological context of neighborhood social disorganization provides a less direct influence than relative deprivation on individual-level outcomes (i.e., adolescent involvement in bullying and engagement in physical fighting), I expect that being relatively deprived will more closely relate to harmful behaviours and account for a greater portion of the variance in school violence.

Thirdly, I hypothesize that relative deprivation will positively relate to bullying victimization and bullying perpetration; however, relative deprivation will have a lesser effect on perpetration. I expect that relative deprivation relates more close to bullying victimization than perpetration given that students of lower economic position may be more vulnerable to psychological stress that accompanies relative deprivation. On the other hand, students that hold 'superior social standings' (i.e., who are less relatively deprived) in their social reference group may devalue their peers of 'lower social standings' by aggressively bullying them and maintaining their sense of self-worth. Moreover, I hypothesize that relative deprivation positively relates to physical fighting in adolescents. Lastly, I hypothesize that neighborhood physical and social disorder (i.e., level of neighborhood social disorganization) will positively relate to involvement of school bullying as a victim and as an aggressor, as well as to physical fighting.

Method

Design and Procedure

This study uses two sources of large, nationally representative data. Student-level relative deprivation and involvement in fighting and bullying were examined using data from the Canadian 2010 Health Behavior in School-aged Children (HBSC) World Health Organization cross-national collaborative study (www.hbsc.org). Neighborhood-level social disorganization was examined using crime data from the 2011 Crimecast Canadian census dissemination area data (http://crimecast.capindex.com).

The HBSC study is a cross-sectional school-based survey developed by an international research network. Nationally representative samples of adolescents attending schools in participating countries answer a standardized questionnaire on health, well-being, and health behaviors every four years. The HBSC network has been collecting data since 1982, and since 1990 in Canada (Currie et al., 2012). The most recent survey conducted in 2010 included 43 participating countries in Europe and North America. The Crimecast 2011 census dissemination area data provided crime data at 1 kilometer (km) and 5 km circular buffer boundaries surrounding 436 Canadian HBSC schools and is associated with 26,078 students.

The 2010 Canadian HBSC survey was administered by teachers or trained interviewers in classroom settings across all Canadian provinces and territories except New Brunswick and Prince Edward Island (Currie et al., 2008; Elgar, Craig, & Trites, 2013). Survey participation was voluntary and anonymous, and took students approximately 45 minutes to complete. Approval to conduct the HBSC survey in Canada was obtained from Queen's University. Approval to conduct this study of neighborhood crime and relative deprivation was approved by McGill University's Faculty of Medicine Research Ethics and Compliance (IRB) office.

Participants

HBSC survey data were drawn from 26,078 adolescents (49.4% male, 50.6% female) whose ages ranged from 9.2 to 19.2 years (M=13.8, SD=1.5), and school grade levels ranged from grade 6 to grade 10. Students were equally likely to be included in the sample owing to weighted probability selection technique of 1,294 classes within 436 schools. Weighted probability of school- and class-based cluster sampling ensured a balanced representation of school characteristics (e.g., language of instruction, province or territory, public or catholic school, and community size). Students attending private schools, special needs schools, or schools specifically for adolescents in custody were excluded from the Canadian HBSC survey.

Active consent (59%) or passive consent (41%) by parents was obtained depending on the schools and school jurisdictions. The response rates for provinces and territories, schools, and study participants were 85%, 57%, and 77%, respectively. Student nonparticipation of the HBSC standardized questionnaire was commonly due to failure to return consent forms, inability to receive parental consent, or absenteeism on the day of survey administration. Participants were excluded from the current study if they did not report key variables including age, gender, and family affluence. Schools with fewer than 10 respondents were also excluded from the analyses largely because a part of this study focuses on relative differences in affluence within schools. These exclusion criteria reduced the sample by 10.3% to 23,383 students (48.1% male, 51.9% female) from 1,262 classes in 413 schools across Canada (Figure 1).

Measures

Bullying Involvement: Involvement in bullying was measured by two questions derived from the international HBSC study (Currie et al., 2012), which are customized from Olweus's (1996) Bully/Victim Questionnaire. Before reporting bullying involvement, the following

definition of school bullying was given to respondents:

> We say a student is being bullied when another student, or a group of students, say or do nasty and unpleasant things to him or her. It is also bullying when a student is teased repeatedly in a way he or she does not like or when he or she is deliberately left out of things. But it is not bullying when two students of about the same strength or power argue or fight. It is also not bullying when the teasing is done in a friendly and playful way.

Students then self-reported their involvement in bullying with the items "How often have you been bullied at school in the past couple of months?" and "How often have you bullied others at school in the past couple of months?" Five response options for each question ranged from 'not at all' to 'several times a week'. Consistent with other HBSC studies on this topic, involvement in bullying (bullying others) and victimization (being bullied) in the past couple of months were dichotomized to indicate 'not more than once or twice' or 'at least two or three times a month'. Accordingly, respondents were classified as 'victims' or 'aggressors' of bullying if they reported 'at least two or three times a month' to either question. These cut-off points have been previously used and validated in earlier studies (Solberg & Olweus, 2003; Wang, Iannotti, & Nansel, 2009; Wang, Iannotti, & Luk, 2010).

Physical Fighting: Adolescents were asked to report how frequently they had been involved in a physical fight during the past 12 months with a single item from the HBSC questionnaire. Answer categories for this item were "1 = I have not been in a physical fight" "2 = 1 time," "3 = 2 times," "4 = 3 times," "5 = 4 times or more." Frequent physical fighting was defined as reporting at least two fights in the past 12 months. This cut-off point has been used in a previous study that identified risk factors associated with bullying perpetration (Shetgiri, Lin & Flores, 2012).

Absolute Family Affluence: The Family Affluence Scale (FAS) is a validated HBSC measure of material assets (Currie, Elton, Todd, & Platt, 1997; Warlde, Robb, & Johnson, 2002). The FAS has better criterion validity and is less affected by nonresponse bias than other assessments of socioeconomic status. It allows for international comparisons through common indicators of wealth and avoids income-based measures of parental occupation and parental education (Currie et al., 2008). The FAS is a 4-item index, which includes the following questions: "1=Does your family have a car or a van?" (No=0, Yes, one=1, Yes, two or more=2). "2=Do you have your own bedroom for yourself?" (No=0, Yes=1). "3=During the past 12 months, how many times did you travel away on holiday/vacation with your family? (Not at all=0, Once=1, Twice=2, More than twice=3). "4=How many computers does your family own?" (None=0, One=1, Two=2, More than two=3). The sum of these items provides a family affluence score ranging from 0 (lowest affluence) to 9 (highest affluence; Boyce, Torsheim, Currie, & Zambon, 2006; Currie et al., 2012).

Relative Deprivation: Relative deprivation was measured using the Yitzhaki Index (1979), which is a mathematical operationalization of Runciman's (1966) definition of relative deprivation. The Yitzhaki Index (1979) is an 'upward looking' index that represents the cumulative difference in affluence between an individual and that of all those with greater affluence within a reference group (Kondo, Kawachi, Subramanian, Takeda, & Yamagata, 2008; Yitzhaki, 1979). Unlike absolute affluence, this measure of relative deprivation is sensitive to several factors including an individual's family affluence score within the social reference group, the number of comparisons made, as well as to changes in the distribution of affluence in the reference group (Kondo et al., 2008). In this study, the Yitzhaki (1979) measure of relative deprivation was estimated for each student using the formula

$$RD_i = \frac{1}{N}\sum_j (y_j - y_i), \forall (y_j > y_i)$$

in which relative deprivation equals the average distance between the affluence of the student (y_i) and the affluence held by all other more affluent schoolmates (y_j). In this Canadian sample of students, relative deprivation scores were converted to SD units (z-scores) and ranged from 0.00 to 7.58, by which increasing scores indicate higher levels of relative deprivation.

Neighborhood Social Disorganization: Neighborhood social disorganization was measured by indicators of physical and social disorder using the level of crime surrounding Canadian HBSC schools at a 5 km circular boundary. Specific neighborhood crime levels were measured using the Crimecast dataset (CAP Index, Inc, 2012; www.capindex.com). The crime index (CAP index) is a measure of crime risk that produces a crime score for each census dissemination area in Canada for the year 2011. Crime scores are computed through computer modeling programs that link crime data (e.g., national and local police reports, client loss reports, offender surveys, and victim surveys) and demographic data (e.g., education, economic, population mobility, housing data, and population data) to neighborhoods, aggregated to the level of census dissemination areas. Crime scores indicate the likelihood that any of the following seven types of crime will be committed in the neighborhood: homicide, rape, robbery, aggravated assault, burglary, larceny, and auto theft. The scores range from 0 (lowest risk) to 2,000 (highest risk), with 100 being the average score for all dissemination areas. In the current study, dissemination area crime scores were aggregated within a 5 km circular buffer for each of the 413 participating HBSC schools to create neighborhood-level crime scores. Given the range of crime scores, the variable was converted to SD units (z-scores) to facilitate interpretation of regression results.

Sociodemographic Variables: At the individual level, covariates included a dichotomous

variable for gender, and two continuous variables for school grade and absolute family affluence. However, at the neighborhood-level, it should be noted that no additional control variables were considered.

Statistical Analyses

This study utilizes 23,383 participants nested within 413 HBSC school-neighborhoods. Therefore, data are represented at two hierarchical levels. Level 1 includes individual student participants within school-neighborhoods, and Level 2 includes the neighborhoods themselves. Analyzing multi-level data is vulnerable to dependence among observations (i.e., the error in predicting Y from X for one event is related to that of another event; Chung & Steinberg, 2006). For instance, students who live in the same school-neighborhood are more likely to share similar experiences than other participants living in another neighborhood that has different characteristics. This clustering effect violates the independence assumption, which can compromise the accuracy of confidence intervals and increase the probability of making a Type 1 error (Barcikowski, 1981).

With this in mind, the current study uses hierarchical linear modeling (HLM) statistical procedures that estimate variation at different levels of analysis (i.e., at Level 1 among students within school-neighborhoods, and at Level 2 between neighborhoods themselves). The HLM statistical procedures ensure that the relationship between neighborhood characteristics is not the effect of the aggregation of individual-level factors such as relative deprivation (Bryk & Raudenbush, 1992). The HLM approach generates standard errors that allow for statistical significance at both the individual-level (Level 1) and the neighborhood-level (Level 2).

Analyses were conducted with STATA Version 13 (StataCorp 2011, College Station, TX). First, the data was aggregated to the neighborhood-level, which enabled the investigation of

bivariate correlations between means of neighborhood crime surrounding HBSC schools, relative deprivation, and bullying and fighting outcomes.

Following correlational analyses, the level of clustering within schools was tested using the intraclass correlation coefficients (ICCs). The ICCs specify the proportion of variance in school bullying (victimization and perpetration) and physical fighting at the neighborhood level (Diez, 2002). For victimization, an ICC value of 0.03 was found, which indicates that 3% of the total variance in adolescent bullying victimization is explained at the neighborhood level. Intraclass correlation coefficients of 0.03 and 0.05 were found for bullying perpetration and for physical fighting, respectively. Likewise, 3% and 5% of the total variance in aggressing others and physical fighting, respectively, is explained at the neighborhood-level.

Next, a series of hierarchal statistical models were tested using the *melogit* command set in STATA. The first set of hierarchical models included only individual-level covariates (i.e., relative deprivation, family affluence, gender, and school grade). A second set of hierarchical models included the only neighborhood-level variable (i.e., crimes within school-neighborhoods). The last set of hierarchical models integrated covariates at both ecological levels in addition to the interaction between individual- and neighborhood-level covariates (i.e., relative deprivation and neighborhood crime).

Results

Descriptive Statistics

Table 1 presents descriptive statistics for the study variables along with data on the frequency and prevalence of bullying and physical fighting. As can be seen in Table 1, 52.0% of the sample was female. Mean school grade-level was 8.01 (*SD*=1.41).

Overall, the majority of students reported that their involvement in bullying in the past couple of months did not exceed once or twice as a victim (70%) or an aggressor (83.5%). Likewise, more than three quarters (79.6%) of the sample reported having been directly involved in a physical fight once or less in the past 12 months (Table 1). The sample had a mean relative deprivation score of 0.94 (*SD*=0.99), yet their average level of family affluence was 6.17 (*SD*=1.77, Table 1) on a 9-point scale, which indicates that few students reported low levels of family affluence.

Descriptive statistics (means and standard deviations) for neighborhood-level characteristics including average scores for seven types of crime at a 5 km circumference surrounding the 413 participating HBSC schools are presented in Table 2. While the average crime score (CAP index) is 100 for Canadian census dissemination areas, the overall crime score for this sample of school-neighborhoods was 60.5 (*SD*=37.18). This CAP index indicates that the crime risk for all seven types of serious crime is 39.5% below the Canadian national average of 100. Notably, average neighborhood crime scores surrounding the 413 HBSC schools also fell below the Canadian national average. Assaults had the lowest score (*M*=55.54, *SD*=42.17) and breaking and entering had the highest score (*M*=71.65, *SD*=44.79) in the study sample.

Bivariate Correlational Analyses

Correlations between study variables aggregated at the school level are shown in Table 3.

These results indicate that small but statistically significant correlations were found between relative deprivation and bullying involvement as a victim r=0.16 (p<0.01) and as an aggressor r=0.17 (p<0.01). Additionally, relative deprivation positively related to physical fighting r=0.17 (p<0.01). While overall neighborhood crime at a 5 km radial buffer positively related to relative deprivation r=0.16 (p<0.01), it was negatively associated to family affluence r=-0.29 (p<0.01). Similarly, family affluence was significantly and negatively correlated with relative deprivation r=-0.60 (p<0.01, Table 3). Bivariate correlations further specified that students who reported victimization by bullying were also more likely to be involved in bullying as a perpetrator (p<0.01), and involved in a physical fight (p<0.01, Table 3).

Hierarchical Linear Modeling: Multilevel Logistic Regression Analyses

Individual-Level (Level 1):

Table 4 shows the results of the multilevel logistic regression analyses. The first series of statistical models were run at the individual-level (Level 1). When individual-level variables including absolute family affluence, school grade, and female gender were accounted for, relative deprivation significantly increased the odds ratios of being victimized (OR=1.16, 95% confidence interval [CI] [1.08, 1.25]) and aggressing others (OR=1.12, 95% CI [1.02, 1.22]) by bullying at least two or three times a month in the past couple of months. Individual-level analyses further showed that for each standard deviation increase in relative deprivation, the odds of being involved in more than one physical fight during the past 12 months increased by 17% (OR=1.17, 95% CI [1.07, 1.27]).

Individual-level logistic regression analyses also indicated that engagement in physical fighting and involvement in bullying as victim and as an aggressor varied by school grade and gender, while holding all other individual-level variables constant. The pattern of results suggests

that with increasing school grade, odds ratios of physical fighting decreased by 11% (OR=0.89, 95% CI [0.87-0.92]) and odds ratios of victimization also decreased by 12% (OR=0.88, 95% CI [0.86-0.91]). With respect to gender, the odds ratios of aggressing schoolmates at least twice a month, and being involved in more than one physical fight during the past 12 months significantly decreased by 35% (OR=0.65, 95% CI [0.61-0.70]) and 65% (OR=0.35, 95% CI [0.33-0.38]) for females, respectively. However, the opposite is true for victimization, whereby females were more victimized than males at least two or three times a month in the past couple of months (OR=1.18, 95% CI [1.12-1.25]).

Neighborhood-Level (Level 2):

As shown in Table 4, the next series HLM statistical models were run at the neighborhood-level (Level 2). Overall neighborhood crime (CAP index) was evaluated as a Level 2 predictor of being victimized or aggressing others by bullying at least two or three times a month in the past couple of months, and for engagement in at least two physical fights during the past 12 months. Multilevel analyses show that overall neighborhood crime negatively associated with victimization. Accordingly, a 1 standard deviation difference in neighborhood crime associated with a 10% decrease in adolescents' risk of being victimized by bullying at least twice a month (OR=0.90, 95% CI [0.86-0.95]). Results from the Level-2 models further show that neighborhood crime is unassociated to bullying perpetration and physical fighting.

Individual-Level (Level 1) + Neighborhood-Level (Level 2) + Cross-Level Interactions:

Lastly, the contributions of Level-1 variables, Level-2 variables, and the cross-level interaction of relative deprivation and neighborhood crime were simultaneously assessed in a series of HLM statistical models. Particularly, this last series of statistical models addressed whether relative deprivation at Level-1, and neighborhood crime at Level-2, and the interaction

between relative deprivation and neighborhood crime, influenced adolescents bullying and fighting behaviors. As well, these statistical models controlled for the effects of Level-1 predictors including absolute family affluence, gender, and school grade.

As before, in the Level-1 models, relative deprivation associated with greater involvement in both victimization and perpetration of school bullying. With every 1 standard deviation increase in relative deprivation, the odds ratios of being victimized increased by 14% (OR=1.14, 95% CI [1.05-1.24]), and the odds ratios of aggressing others increased by 15% (OR=1.15, 95% CI [1.04-1.28]). Similarly, there are indications that relative deprivation positively related to physical fighting. For each 1 standard deviation of mean relative deprivation score, the odds of being involved in at least two physical fights significantly increased (OR=1.18, 95% CI [1.08-1.30]).

At the neighborhood-level, overall neighborhood crime negatively associated with bullying victimization. Accordingly, the odds of being victimized by bullying decreased significantly in association with higher levels of neighborhood crime (OR=0.91, 95% CI [0.86-0.96]). However, the analyses indicated that neighborhood crime did not relate to bullying perpetration and physical fighting. Likewise, the measure for the cross-level interaction between relative-deprivation and neighborhood crime was not associated to adolescent bullying or fighting behaviors.

The multilevel logistic regression models that utilized variables at both the individual- and neighborhood-levels did result in significant differences for the risk of victimization and perpetration of bullying, and physical fighting, as a function of family affluence, school grade, and gender. While holding all other individual differences constant, physical fighting positively related to family affluence (OR=1.06, 95% CI [1.01-1.11], Table 4).

Table 4 further indicates that frequent engagement in physical fighting during the past 12 months and being a victim by bullying at least two or three times a month decreased with school grade. The higher grade-levels related to lower odds ratios of victimization (OR=0.88, 95% CI [0.86-0.90]) and physical fighting (OR=0.89, 95% CI [0.87-0.92]). Meanwhile, the opposite pattern emerged for bullying perpetration, which positively related to school-grade (OR=1.08, 95% CI [1.05-1.12], Table 4). Concerning gender, and while holding all other variables constant, an equivalent pattern of results were observed for female involvement in bullying and physical fighting as in the Level-1 models. Females reported less bullying perpetration and physical fighting than males. However, this was not the case for victimization, which positively related to female gender (OR=1.19, 95% CI [1.12-1.25]).

Discussion

General Overview

The primary purpose of this thesis was to examine the combined relations among individual- and neighborhood-level contextual effects on school bullying and physical fighting in a representative sample of Canadian adolescents. To my knowledge, this is the first study to theoretically and empirically investigate the hypothesis that involvement in adolescent school bullying as a victim or as an aggressor, and engagement in physical fighting relate to student relative deprivation in schools and neighborhood social disorganization. This thesis is grounded in theory and integrates Runciman's (1966) *theory of relative deprivation* and Shaw and McKay's (1969) *theory of social disorganization* to help clarify socioeconomic inequalities in bullying and physical fighting. In an effort to accurately test both the relative deprivation and social disorganization theories on adolescent behavioral outcomes, Bronfenbrenner's (1979) ecological model of health provided a useful holistic theoretical framework. Another benefit in using a social-ecological framework for this research is that bullying and physical fighting were examined as outcomes of an interaction between two ecological systems. Hence, this research draws inferences on which of these two contextual social processes has a greater impact on adolescents' bullying and fighting behaviors.

First Hypothesis: Relative Deprivation and Neighborhood Social Disorganization are Positively Correlated

Results from the present study show strong support for the first hypothesis. Individual relative deprivation positively relates to neighborhood-level physical and social disorder, which represents social disorganization in 413 school-neighborhoods across Canada. This finding is consistent with studies that have previously suggested a similar pathway between income

inequality and social disorganization (Kawachi & Kennedy, 2002; Kawachi, Kennedy, & Wilkinson, 1999). Previous research has found that income inequality socially stratifies members of shared communities across all levels of affluence, reduces feelings of belongingness among its members, and increases feelings of deprivation (Elgar et al., 2009; Kawachi & Kennedy, 2002; Kawachi, Kennedy, & Wilkinson, 1999; Sampson & Groves, 1989; Skogan, 1990). Consequently, the current study supports the idea that this pathway creates neighborhood social disorganization and diminishes social control over acts of violence that are characterized by both neighborhood social and physical disorder (i.e., crime against people including assault and sexual harassment, and crime against landscapes including graffiti and vandalism).

Second Hypothesis: Individual Relative Deprivation Explains a Greater Portion of the Variance in Adolescent Bullying and Physical Fighting

Although the two ecological contexts of relative deprivation and neighborhood crime positively and significantly correlate with one another, the current findings supported the second hypothesis that bullying victimization, bullying perpetration, and physical fighting respond differently to the individual factor of relative socioeconomic position versus the neighborhood factor of social disorganization. As expected, the individual context of relative deprivation was systematically found to better predict involvement in frequent bullying and physical fighting. These results are consistent with previous studies that reported neighborhood effects account for a small portion of the overall variance in individual-level adolescent behavioral outcomes (Elliott et al., 1996; Furstenberg, Cook, Eccles, Elder, & Sameroff, 1999).

Third Hypothesis: Relative Deprivation and Social Disorganization are Positively Related to Adolescent Involvement in Bullying and Physical Fighting

The third hypothesis was that both relative deprivation and neighborhood social disorganization would be related positively to adolescents' involvement in bullying, whether as a

victim, or as an aggressor, and to physical fighting. Results showed support for the third hypothesis at the individual-level, but not at the neighborhood-level. After individual differences in absolute family affluence, school grade, and gender were held constant, relative deprivation significantly predicted being victimized and aggressing others by bullying. Likewise, relative deprivation was a strong determinant of being involved in physical fighting. These results suggest that relative deprivation is a credible source of social stratification in school contexts that can lead to bullying involvement and engagement in physical fighting among adolescents. Given that relative deprivation is hypothesized to operate through psychosocial pathways, these results support Wilkinson and Pickett's (2009) income inequality hypothesis. Namely, relative deprivation captures the effects of individual feelings of deprivation by measuring relative socioeconomic position and consequently provides a better estimate of SES than do levels of absolute family affluence, which disregards context altogether (Elgar et al., 2013).

The positive associations between relative deprivation and adolescents' involvement in bullying and fighting are consistent with previous research on adolescents becoming more involved in school bullying when the income distribution widens (Chaux, Molano, & Podlesky, 2009; Due et al., 2009; Elgar et al., 2009; Elgar et al., 2013). As was mentioned in the Introduction, income inequality has also been related to a wide range of health and social problems (Wilkinson & Pickett, 2006; 2007; 2009). These findings in turn, hint that health and social problems also relate to relative deprivation since it acts as the pathway between inequality and individual health and behavior. Still, the causal path from relative deprivation to health and social problems including school violence has not yet been established, and future research should explore these direct associations in greater depth.

Another recent study that further demonstrates support for the psychosocial effects of relative deprivation on health was carried out on a sample of adolescents in eight countries and examined the association between relative deprivation and psychosomatic symptoms. First, it was found that relative deprivation (also calculated using the Yitzhaki Index) related to psychosomatic symptoms in adolescents after differences in absolute affluence were held constant (Elgar et al., 2013). Second, it found that relative deprivation and rank affluence in schools or regions were stronger determinants of symptoms than absolute affluence. Taken together, the current research along with previous studies that investigated inequality and relative deprivation, compliment the income inequality hypothesis, extend the evidence base to adolescents, and suggest that the prominence of widening income gaps tap into something deeper than just negative discrepant comparisons of income (Wilkinson & Pickett, 2007). Greater inequality and wider socioeconomic distance between adolescents and their social reference groups are accompanied by a wide array of negative health-behaviors such as bullying or fighting, which are also known to be harmful to physical- and mental health, and psychological development.

Relative Deprivation's Differential Associations to Bullying Involvement

Additionally, the third hypothesis specified that relative deprivation would relate more closely to victimization than perpetration of bullying. However, the results did not support this prediction. From what is known about inequality and hierarchal societies, greater social stratification exposes adolescents to more status competition (Wilkinson & Pickett, 2009). Competition for superior status engenders behaviors that are characteristic of bullying, such as discrimination, peer rejection, or teasing. In effect, the context of inequality creates a platform for individuals to compete for status by socially prejudicing those below, while deprived

individuals may, or may not, also try to regain their status through equivalent behaviors (Elgar, 2009; Wilkinson, 2005, Wilkinson & Pickett, 2009). Wilkinson and Pickett (2009) cite this retaliatory chain of events passed down the social hierarchy as *the bicycling reaction.* "Displaced aggression among non-human primates has been labeled the bicycling reaction. Primatologist Volker Summer explains that the image being conjured up is of someone on a racing bicycle, bowing to their superiors, whilst kicking down on those beneath" (Wilkinson & Pickett, 2009, p. 160). Given that the data from this thesis did not support the bicycling reaction concept, future research on the association between relative deprivation and bullying may need to disentangle the different forms of bullying (e.g., physical bullying, verbal bullying, relational bullying, cyberbullying) in order to more closely investigate the direction of this relationship between victims and aggressors.

Neighborhood Social Disorganization

The third hypothesis further addressed the effect of the larger contextual factor of social disorganization to school bullying and physical fighting. Unexpectedly, the results indicated that adolescent involvement in bullying victimization *negatively* associated with neighborhood social disorganization. When comparing results from this research to previous studies that linked contextual influences of neighborhood safety (Espelage, Bosworth, & Simon, 2000) and neighborhood crime (Khoury-Kassabri, Benbenishty, Astor, & Zeira, 2004) onto individual child or youth bullying, these results are discordant. Research has consistently shown that youth living in unsafe neighborhoods are more frequently involved in bullying and are also more aggressive toward peers (Espelage et al., 2000; Swearer & Doll, 2001). Exposure to violent neighborhood contexts such as neighborhood crime put adolescents at risk of perceiving greater threats in their environments. Consequently, youth may engage in more violent acts such as bullying or fighting

in order to solve conflicts with others, and also view these forms of aggression as appropriate behavioral responses to daily challenges (Khoury-Kassabri et al., 2004; McCoy, Roy, & Sirkman, 2013).

In a recent review of the literature concerning bullying victimization in schools, Hong and Espelage (2012) utilized a social–ecological model to identify risk factors associated to this social problem. In contrast to the current study, results from previous research have indicated that neighborhoods regarded as unsafe and with high levels of violence positively relate to bullying victimization and perpetration (Hong & Espelage, 2012). Although the present study did not find neighborhood crime (which represented potential markers for neighborhood social disorganization) contributes to school bullying and physical fighting, future studies may consider investigating alternative relationships between social disorganization and individual-level adolescent outcomes, such as perceived safety in schools, or the ways in which students handle conflicts with peers.

The lack of a significant association between neighborhood-level social disorganization and adolescent physical fighting is consistent with recent research by Pickett et al. (2013) who note that both income inequality and family affluence were not determinants of frequent physical fighting in adolescents across 30 North American and European countries. However, one issue to consider is that both physical fighting and school bullying are multifactorial social problems that may be mediated by a variety of other variables across different ecological levels. For instance, at the individual-level, there is the critical relationship between youth and parents, and the extent of support youth are given by their parents (Baldry, 2003; Baldry & Farrington, 2000; Chung & Steinberg, 2006; Farrington, 1993; Hong & Espelage, 2012). At the school-level, there is also the student-school relationship that may be included, and the extent to which school connectedness

and school environment play a role in adolescent behavioral outcomes (Hong & Espelage, 2012). Therefore, future research investigating the contextual influence of social disorganization on youth violence should not rely entirely on aggregate measures of neighborhood crime as was done in the current study. Doing so may underestimate the complex influences of built and social environments on adolescent behavioral outcomes. Furthermore, including other potential mediators may determine which factors help decrease the risk for involvement in bullying and physical fighting.

The Role of Policy and How it may Help with Bullying and Fighting Involvement

The current research emphasizes that inequality and relative deprivation play an important role in determining socioeconomic inequalities in adolescent school bullying and physical fighting across Canada. Additionally, previous research has consistently shown that the neighborhood context of social disorganization also predicts adolescent outcomes such as peer deviance and adolescent violence (Bradshaw, Sawyer, & O'Brennan, 2009; Haynie, Silver, & Teasdale, 2006). Despite the abundance of existing research on school bullying and youth violence, Canadian governments have not legislated any anti-bullying reforms until recently.

Currently, only the provinces of Ontario, Quebec, Manitoba, and Nova Scotia have taken a legal stance against bullying and school violence (Panjvani, 2013; Shariff, 2013). In 2007, the parliament of Ontario passed Bill 212 (*Progressive discipline and school safety act*). Then in 2012, the parliament of Quebec passed Bill 56 (*An act to prevent and stop bullying and violence in schools*), and the parliament of Manitoba passed Bill 18 (*The public schools amendment act: safe and inclusive schools*). Lastly, the parliament of Nova Scotia achieved royal assent for Bill 30 (*Promotion of respectful and responsible relationships act*) in 2012; however, it is not yet in effect (Panjvani, 2013; Shariff, 2013). The Canadian bullying and cyberbullying legislations are

summarized in Appendix A. It may be that these acts were recently passed in response to the surge of public attention and pressure from high profile teen suicides related to bullying and cyberbullying across the country. These tragedies certainly heightened public awareness and concern about bullying and violence in schools, along with the destructive impact they have on student's physical and mental health. Nonetheless, the assents of these social policies are directly geared toward achieving and ensuring a safe school environment that can prevent or stop bullying and violence in schools. They were not however, implemented for redistributive measures or to help address the social determinants of school violence.

According to this research, the majority of Canadian adolescents are not involved in school bullying or physical fighting; however progressive social policies that are designed to improve economic inequalities may benefit those who are. Canadian social policies that may help reduce socioeconomic inequalities in adolescent involvement of school bullying, physical fighting, and overall school or neighborhood violence should aim at providing financial assistance to low-income families. Moreover, governments should implement a progressive tax-rate structure for personal income tax that has a maximum of tax-rate of 65% for top income earners (Atkinson, 2014; Oxfam, 2013). This policy recommendation would implement a steeper increase in tax rates for more affluent individuals, which should not be the same for those with smaller incomes. In doing so, international agencies, governments and researchers will tackle the real issue of inequality and not its underlying symptoms of poverty and youth violence. With a more even distribution in overall income and wealth, poverty and socioeconomic inequalities in youth violence could be reduced and potentially eliminated. For instance, high-income earners may spend more of their money on public services (e.g., after-school programs for youth) and less of their money on elite private services that undermine social development and limit social

mobility, such as private schooling or private healthcare (Oxfam, 2013; Wilkinson & Pickett, 2009).

Another way in which social policy can play a significant role in reducing inequality would be for governments to offer guaranteed employment at a living wage to individuals who seek such opportunity (Atkinson, 2014). This public policy has already been initiated as one of the Europe 2020 goals to reduce poverty. In doing so, governments would provide and create a public employment option to everyone, while at the same time contribute to an employment objective that helps tackle 'in-work' poverty (Atkinson, 2014). Concurrently, this would encourage small savings at the bottom of the social ladder; though not necessarily restrict excess at the top. Reassuring individuals to save publicly funded money provides alternative outlets for savings, and at the same time, these savings would not be in the interest of private shareholders' interests.

Other possible policy reforms that can help reduce inequality and social stratification should improve access to education, family services, and services directed toward adolescents such as sport and recreation. Increasing access to education and providing free public services (similar to Nordic countries like Sweden) places greater emphasis on community involvement, increases neighborhood control, and tackles bureaucratic barriers that maintain inequality (Oxfam, 2013). Furthermore, the current study suggests that governments should create, implement and monitor policy reforms that can be sustained over time to help reduce relative deprivation and youth violence. These policy reforms should benefit constituents across ecological systems. By and large, this research supports a multifaceted approach in reducing violence in schools that not only involves youth, parents, and teachers, but also focuses on empathy and healthy relationships.

This study brings forth a better understanding of how socioeconomic conditions foster harsh social environments where bullying and fighting are tolerated or even condoned. Therefore, although it is not a rapid solution, progressive taxation that redistributes wealth from rich to poor can help adolescents who are well aware of social class differences. Providing a more equal distribution of wealth and more equal provision of services to all members of society (regardless of income) would be great achievements and even better equalizers to societies. Unfortunately, this is not yet the case for most 'developed countries', which implies a relevant direction for future research.

Applying a policy perspective towards the serious health and social problems of school violence and bullying is the appropriate next step in this area of research. In doing so, researchers may further explore how patterns of school violence, bullying and fighting are related to social policy and whether prevalence rates shift as a function of policy applications. However, a variety of other types of data are required to make this possible. In a *World Report on Violence and Health* (2002), the WHO suggested that research includes community data (i.e., characteristics of population income, education, and employment), crime data (i.e., characteristics of neighborhood crime, violent events, and perpetrators of violence), and economic data (i.e., costs of policy applications, social services, treatment, and prevention; Zwi, Krug, Mercy, & Dahlberg, 2002). Simultaneously accessing and applying such data toward policy research may help improve the public health priority of school violence among youth.

Limitations and Strengths

Interpretations of the findings in this thesis are subject to several limitations. A considerable limitation for this research is the use of cross-sectional data. The HBSC is a large international survey that involves Canadian data; however, it utilizes a cross-sectional design.

Although the findings derived from these analyses likely fulfill epidemiological or sociological criteria (i.e., strength of statistical significance of associations), longitudinal studies are needed to confirm the predictive effects of relative deprivation on adolescent bullying and fighting involvement. Another limitation was that all the data on bullying involvement, physical fighting, family affluence, and other sociodemographic variables were self-reported. Again, future research would benefit from obtaining information from multiple sources, including the students themselves, their parents, teachers, and peers.

Additionally, despite the sample being representative of Canadian adolescents, analyses did not account for urban-rural geographic status of the school neighborhood, which decreases the generalizability of the results. A variable that describes student's geographic status should be considered in future relative deprivation and neighborhood crime research for two reasons. Firstly, the concentration of poverty and levels of crime and inequality may differ from rural to urban areas. Secondly, greater income inequality has been positively related to social mobility, which may translate to greater geographical segregation between rich and poor individuals (Wilkinson & Pickett, 2009). Another limitation related to neighborhood-level analyses was that information on social disorganization was a proxy composed of overall neighborhood crime in Canadian census dissemination areas, which may have created potential for misclassification. This may also explain why social disorganization did not positively relate to any adolescent bullying and fighting outcomes, while previous studies have consistently made this significant link.

Despite these limitations, the strengths of this study also warrant recognition. This research included a large and representative Canadian sample of adolescents and contributed to our understanding of the dynamics involved in school violence by taking into account student's

individual and neighborhood contexts in which bullying and fighting are embedded. Other strengths include the high response rates from Canadian students, schools, and provinces, and the use of the Yitzhaki Index (1979), which is a widely applied international measure of Runciman's (1966) theory of relative deprivation. Moreover, this study contributes to the existing knowledge of the field and supports the income inequality hypothesis. Individual-level findings of relative deprivation's influence on adolescent involvement in bullying and fighting were consistent with results from previous studies of relative deprivation and inequality (Due et al., 2009; Elgar et al., 2009; Elgar et al., 2013). Finally, the use of multilevel methods to investigate the relationships between individual-, and neighborhood-levels and adolescent behavioral outcomes is an added strength of this study as these analyses reduce misspecification and overestimation of neighborhood effects (Leventhal & Brooks-Gunn, 2000).

Conclusion

Bullying, physical fighting and other forms of school violence continue to be major social and public health concerns across OECD countries. This study represents an added effort to mobilize knowledge to other researchers in the field and to the Canadian population. On the whole, this research emphasizes that relative deprivation creates a school context that increases social distance between adolescents and their social reference groups, and also increases the risk for bullying and fighting behaviors. Moreover, reducing and preventing these serious and violent behaviors should continue to be grounded in ecological framework. In doing so, various ecological entities across societies can collaborate to achieve the highest impact on school violence prevention. Lastly, social policies must continue to push for reducing economic inequalities and creating safe school and neighborhood environments for youth and adolescents. Creating universal social policies designed at improving the safety and health of youth and the

population would not only help reduce harmful health-related behaviors and school violence, but also help target other inequalities in health and education.

Table 1. Individual-level characteristics of study sample (N = 23,383)

Variable	*Percent (%)*	*95% CI*
Gender		
Male	47.97	0.46-0.50
Female	52.03	0.50-0.54
Victim of Bullying in the Past couple of Months		
Not more than once or twice	70.49	0.69-0.72
At least two or three times a month	29.51	0.28-0.31
Aggressor of Bulling in the Past couple of Months		
Not more than once or twice	83.53	0.83-0.84
At least two or three times a month.	16.47	0.16-0.17
Physical Fighting Past 12 months		
Not more than once	79.68	0.78-0.81
At least twice	20.32	0.19-0.22
	M (SD)	*95% CI*
Relative Deprivation	0.94 (0.99)	0.92-0.95
Family Affluence	6.17 (1.77)	6.03-6.18
School Grade	8.01 (1.41)	7.84-8.16

Table 2. Neighborhood-level characteristics ($N = 413$ schools)

Neighborhood characteristics	*M (SD)*	*95% CI*
Crime in school neighborhood at 5 km circular buffer		
Overall crime	60.51 (37.18)	53.85-67.16
Homicide	57.87 (39.46)	50.61-65.13
Sexual assault	65.48 (35.16)	59.59-71.38
Robbery	56.84 (40.88)	49.06-64.62
Assault	55.54 (42.17)	47.66-63.42
Breaking and entering	71.65 (44.79)	63.99-79.30
Theft	62.01 (48.10)	53.98-70.04
Motor vehicle theft	64.84 (43.48)	57.49-72.18

Note: Average crime score is 100 for Canadian Census dissemination areas.

Table 3. Bivariate correlations between the study variables aggregated at the school-level (individual-level data were aggregated to school-level, n=23,383).

Variable	Overall Crime at 5 km	Relative Deprivation	Family Affluence	Victimization	Perpetration	Physical Fighting
Overall crime at 5km	-					
Relative Deprivation	0.16*	-				
Family Affluence	-0.29*	-0.60*	-			
Victimization	-0.13	0.16*	-0.07	-		
Perpetration	-0.08	0.17*	-0.20*	0.42*	-	
Physical Fighting	-0.08	0.17*	-0.20*	0.24*	0.44*	-

Note: * $p < 0.01$

Table 4: HLM analysis for the association between individual- and neighborhood-level variables and bullying and physical fighting.

Variables	Individual-Level Models			Neighborhood-Level Models			Individual- & Neighborhood-Level Models		
	Victimization	Perpetration	Fighting	Victimization	Perpetration	Fighting	Victimization	Perpetration	Fighting
		OR (95% CI)			OR (95% CI)			OR (95% CI)	
Individual-Level Variables									
Relative Deprivation	**1.16 (1.08-1.25)**	**1.12 (1.02-1.22)**	**1.17 (1.07-1.27)**				**1.14 (1.05-1.24)**	**1.15 (1.04-1.28)**	**1.18 (1.08-1.30)**
Family Affluence	1.03 (0.99-1.07)	1.03 (0.97-1.08)	**1.06 (1.01-1.12)**				1.02 (0.97-1.06)	1.02 (0.97-1.08)	**1.06 (1.01-1.11)**
School Grade	**0.88 (0.86-0.91)**	**1.08 (1.05-1.12)**	**0.89 (0.87-0.92)**				**0.88 (0.86-0.90)**	**1.08 (1.05-1.12)**	**0.89 (0.87-0.92)**
Female Gender	**1.18 (1.12-1.25)**	**0.65 (0.61-0.70)**	**0.35 (0.33-0.38)**				**1.19 (1.12-1.25)**	**0.65 (0.61-0.70)**	**0.35 (0.33-0.38)**
Neighborhood-Level Variables									
Neighborhood Crime				**0.90 (0.86-0.95)**	0.98 (0.93-1.04)	0.96 (0.91-1.01)	**0.91 (0.86-0.96)**	1.01 (0.95-1.08)	0.98 (0.93-1.04)
Cross-Level Interactions									
Relative Deprivation X Crime							0.87 (0.94-1.05)	0.94 (0.88-1.01)	0.97 (0.91-1.03)
Goodness of fit									
AIC	28774.3	21278.4	23302.3	28927.4	21456.5	24365.6	28758.5	21279.5	23303.7
BIC	28822.7	21326.8	23350.6	28951.6	21480.7	24389.8	28822.9	21343.9	23368.2

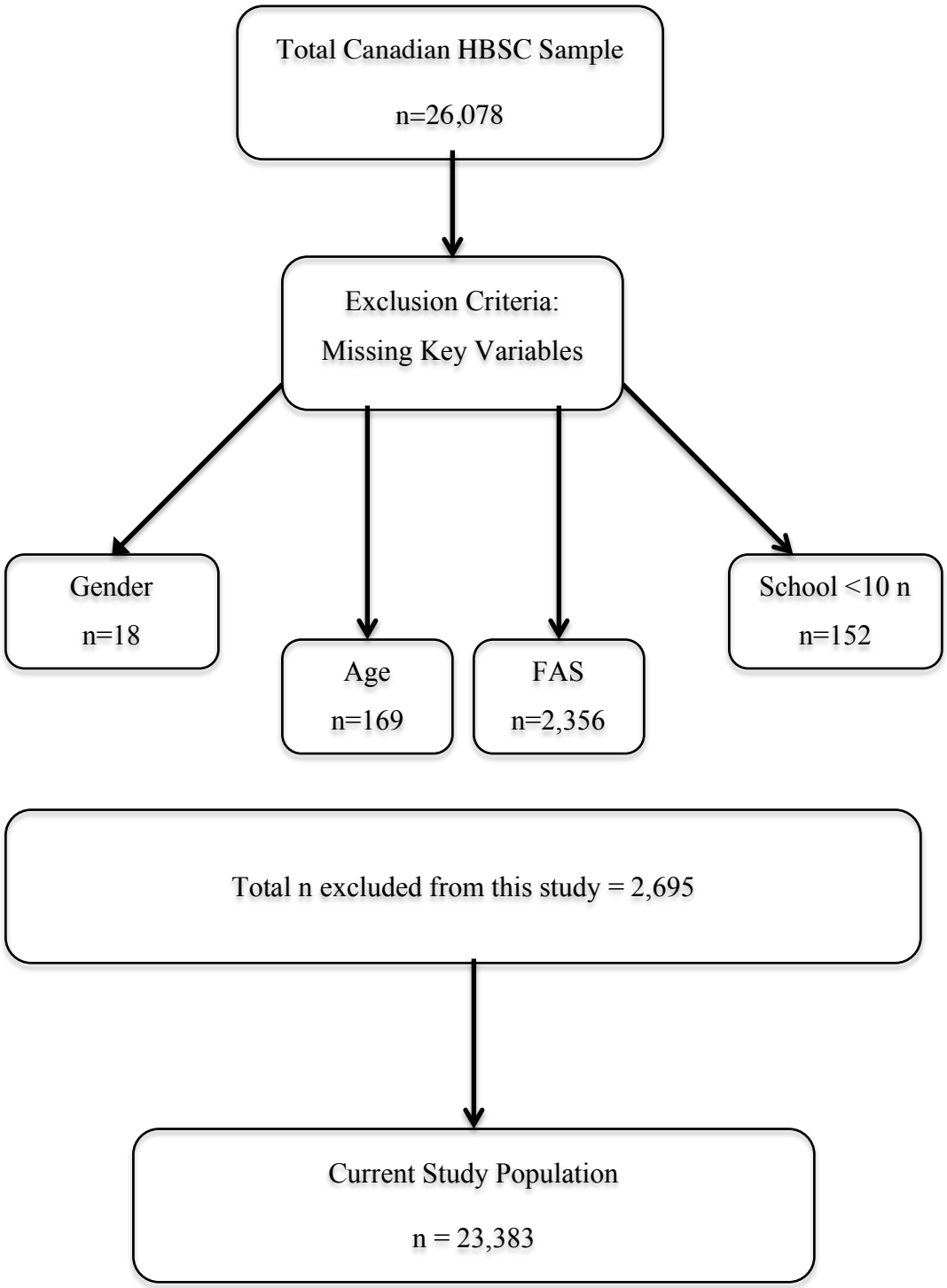

Figure 1: Number of students included in this study after applying exclusion criteria. HBSC = Health Behaviour in School-aged Children; FAS = Family Affluence Scale.

Appendix A

North American Cyberbullying Legislation: CANADA			
Province	**Name of Legislation**	**Status**	**Brief description**
Federal	Bill C-273	Second Reading and Referral to Committee in the House of Commons	Bill explicitly makes Cyberbullying a Criminal offence. Amendment would add a component of cyberbullying to three extant offences: Criminal Harassment (s. 264), Defamatory Libel (s. 298) and False Messages (s. 372).
Alberta	No legislation		
British Columbia	No legislation		
Manitoba	Safe Schools Charter	In effect	Amended the Public School Act, requiring implementation of school codes of conduct that bullying. Charter also called for development of policies concerning the use of school based email.
New Brunswick	Amendments to the Education Act	Introduced by Education Minister	The amendments would require principals to report all incidences of bullying to the superintendent and to develop anti-bullying plans.
Newfoundland	No legislation		
Nova Scotia	Bill 30: Promotion of Respectful and Responsible Relationships Act	Achieved royal assent	The bill defines bullying and cyberbullying. It also seeks to establish a provincial school code of conduct and requires data collection as well as monitoring of reported incidents.
Ontario	Bill 212: Progressive Discipline and School Safety Act	In effect	Recognizes cyberbullying. It allows principals to expel students for bullying for up to 20 days.
	Bill 13: Accepting Schools Act, 2011	Royal Assent received	The Bill amends the Education Act. It proposes to create a bullying awareness week, requiring schools boards to support pupils establishing equity-promoting organizations, requires school boards to adopt equity policies, and it requires administrators to suspend pupils and consider expulsion when the student has previously been suspended for bullying.
Prince Edward Island	No legislation		
Quebec	Bill 56: An Act to prevent and stop bullying and violence in schools	Came into effect June 2012	The legislation would amend the Education Act to make it mandatory for public and private schools to develop anti-bullying plans to address both traditional bullying and cyberbullying.
Saskatchewan	No legislation		

Shariff, S. (2013). *Map of North American Cyberbulling Legislation.* Retrieved from: http://definetheline.ca/law-policy/map-of-north-american-legislation

References

Adjaye-Gbewonyo, K., & Kawachi, I. (2012). Use of the Yitzhaki index as a test of relative deprivation for health outcomes: A review of recent literature. *Social Science & Medicine, 75*(1), 129-137.

Adler, N. E., Boyce, T., Chesney, M. A., Cohen, S., Folkman, S., Kahn, R. L., & Syme, S. L. (1994). Socioeconomic status and health. The challenge of the gradient. *The American Psychologist, 49*(1), 15-24.

Atkinson, A. B. (2014). After Piketty?. *The British Journal of Sociology, 65*(4), 619-38.

Baldry, A. C. (2003). Bullying in schools and exposure to domestic violence. *International Journal of Child Abuse & Neglect, 27*(7), 713-32.

Baldry, A. C., & Farrington, D. P. (2000). Bullies and delinquents: Personal characteristics and parental styles. *Journal of Community & Applied Social Psychology,10*(1), 17-32.

Barcikowski, R. S. (1981). Statistical power with group mean as the unit of analysis. *Journal of Educational Statistics, 6*(3), 267-285.

Bauman, S., Toomey, R. B., & Walker, J. L. (2013). Associations among bullying, cyberbullying, and suicide in high school students. *Journal of Adolescence, 36*(2), 341-350.

Björkqvist, K., K. Österman, K. M. J. Lagerspetz, S. F. Landau, G. V. Caprara, & A. Franczek. (2001). Aggression, victimization, and sociometric status: Findings from Finland, Israel, Italy, and Poland. In Martín, R.J., & Richardson, D.B. (Ed.), *Cross-cultural approaches to research on aggression and reconciliation* (pp. 111-119.) Hauppauge, NY, US: Nova Science Publishers

Boulton, M. J., & Smith, P. K. (1994). Bully/victim problems in middle-school children: Stability, self-perceived competence, peer perceptions, and peer acceptance. *British Journal of Developmental Psychology, 12*(3), 315-329.

Boulton, M. J., Smith, P. K., & Cowie, H. (2010). Short-term longitudinal relationships between children's peer victimization/bullying experiences and self-perceptions: Evidence for reciprocity. *School Psychology International, 31*(3), 296-311.

Boyce, W., Torsheim, T., Currie, C., & Zambon, A. (2006). The family affluence scale as a measure of national wealth: validation of an adolescent self-report measure. *Social Indicators Research, 78*(3), 473-487.

Bradshaw, C. P., Sawyer, A. L., & O'Brennan, L. M. (2009). A social disorganization perspective on bullying-related attitudes and behaviors: The influence of school context. *American Journal of Community Psychology, 43*(3-4), 204-220.

Brody, G. H., Ge, X., Conger, R., Gibbons, F. X., Murry, V. M., Gerrard, M., & Simons, R. L. (2001). The influence of neighborhood disadvantage, collective socialization, and parenting on African American children's affiliation with deviant peers. *Child Development, 72*(4), 1231-46.

Bronfenbrenner, U. (1979). *The ecology of human development: Experiments by nature and design*. Cambridge, Mass: Harvard University Press.

Brunstein, K, A., Marrocco, F., Kleinman, M., Schonfeld, I., & Gould, M. (2007). Bullying, depression, and suicidality in adolescents. *Journal of the American Academy of Child & Adolescent Psychiatry, 46*(1), 40-49.

Bryk, A. S., & Raudenbush, S. W. (1992). *Hierarchical linear models: Applications and data analysis methods.* Newbury Park: Sage Publications.

Chauhan, P., & Reppucci, N. (2009). The impact of neighborhood disadvantage and exposure to violence on self-report of antisocial behavior among girls in the juvenile justice system. *Journal of Youth and Adolescence, 38*(3), 401-416.

Chauhan, P., Reppucci, N. D., & Turkheimer, E. N. (2009). Racial differences in the associations of neighborhood disadvantage, exposure to violence, and criminal recidivism among female juvenile offenders. *Behavioral Sciences & the Law, 27*(4), 531-552.

Chaux, E., Molano, A., & Podlesky, P. (2009). Socio-economic, socio-political and socio-emotional variables explaining school bullying: A country-wide multilevel analysis. *Aggressive Behavior, 35*(6), 520-529.

Chen, E. (2004). Why socioeconomic status affects the health of children. A psychosocial perspective. *Current Directions in Psychological Science, 13*(3), 112-115.

Chen, E., Matthews, K. A., & Boyce, W. T. (2002). Socioeconomic differences in children's health: How and why do these relationships change with age?. *Psychological Bulletin, 128*(2), 295-329.

Chung, H. L., & Steinberg, L. (2006). Relations between neighborhood factors, parenting behaviors, peer deviance, and delinquency among serious juvenile offenders. *Developmental Psychology, 42*(2), 319–331. doi:10.1037/0012-1649.42.2.319.

Craig, W., Harel-Fisch, Y., Fogel-Grinvald, H., Dostaler, S., Hetland, J., Simons-Morton, B., Molcho, M., de Mato, M. G., Overpeck, M., Due, P., Pickett, W., HBSC Violence & Injuries Prevention Focus Group, and HBSC Bullying Writing Group (2009). A cross-national profile of bullying and victimization among adolescents in 40 countries. *International Journal of Public Health, S54,* 216–224.

Currie, C. E., Elton, R. A., Todd, J., & Platt, S. (1997). Indicators of socioeconomic status for adolescents: The WHO Health Behaviour in School-aged Children Survey. *Health Education Research, 12*(3) 385-397.

Currie, C., Nic Gabhainn, S., Godeau, E., Roberts, C., Smith, R., Currie, D., Pickett, W., Richter, M., Morgan, A., Barnekow, V. (Eds.) (2008) Inequalities in young people's health: HBSC international report from the 2005/06 Survey. Health Policy for Children and Adolescents, No. 5, WHO Regional Office for Europe, Copenhagen, Denmark.

Currie, C., Zanotti, C., Morgan, A., Currie, D., de Looze, M., & Roberts, C., et al. (Eds.). (2012). Social determinants of health and well-being among young people. Health Behaviour in School-aged Children (HBSC) study: International report from the 2009/2010 survey. Health Policy for Children and Adolescents, No. 6. Copenhagen: WHO Regional Office for Europe.

Diez, R. (2002). A glossary for multilevel analysis. *Journal of Epidemiology and Community Health*, *56*(8) 588– 594. doi: 10.1136/jech.56.8.588

Due, P., Merlo, J., Harel-Fisch, Y., Damsgaard, T., Holstein, B. E., Hetland, J., et al. (2009). Socioeconomic inequality in exposure to bullying during adolescence: A comparative, cross sectional, multilevel study in 35 countries. *American Journal of Public Health, 99,* 907–914.

Eibner, C., & Evans, W. (2005). Relative deprivation, poor health, habits and mortality. *Journal of Human Resources, 40*(3), 591-620.

Elgar, F. J., Craig, W., & Trites, S. (2013). Family dinners and mental health in Canadian adolescents. *Journal of Adolescent Health, 52,* 433-438.

Elgar, F. J., Craig, W., Boyce, W., Morgan, A., & Vella-Zarb, R. (2009). Income inequality and school bullying: Multilevel study of adolescents in 37 countries. *Journal of Adolescent Health, 45*(4), 351-359.

Elgar, F. J., De Clercq, B., Schnohr, C. W., Bird, P., Pickett, K. E., Torsheim, T., Hofmann, F., Currie, C. (2013). Absolute and relative family affluence and psychosomatic symptoms in adolescents. *Social Science & Medicine, 91*(1), 25-31.

Elgar, F. J., Pickett, K. E., Pickett, W., Craig, W., Molcho, M., Hurrelmann, K., & Lenzi, M. (2013). School bullying, homicide and income inequality: A cross-national pooled time series analysis. *International Journal of Public Health, 58*(2), 237-245.

Elliott, D. S., Wilson, W. J., Huizinga, D., Sampson, R. J., Elliott, A., & Rankin, B. (1996). The effects of neighborhood disadvantage on adolescent development. *Journal of Research in Crime and Delinquency, 33*(4), 389-426.

Espelage, D. L., Bosworth, K., & Simon, T. R. (2000). Examining the social context of bullying behaviors in early adolescence. *Journal of Counseling & Development, 78*(3), 326-333.

Fajnzylber, P., Lederman, D., & Loayza, N. (2002). Inequality and violent crime. *Journal of Law and Economics Chicago*, *45,* 1-40.

Farrington, D. P. (1993). Understanding and preventing bullying. *Crime and Justice, 17*, 381-458.

Farrington, D.P. (1994). Childhood, adolescent, and adult features of violent males. In Huesmann, L.R. (Ed.), *Aggressive Behavior: Current Perspectives* (pp. 215–40). New York: Plenum.

Fekkes, M., Pijpers, F. I., & Verloove-Vanhorick, S. P. (2004). Bullying behavior and associations with psychosomatic complaints and depression in victims. *The Journal of Pediatrics, 144*(1), 17-22

Furstenberg, F. F., Cook, T. D., Eccles, J., Elder, G. H., & Sameroff, A. (1999). *Managing to make it: Urban families and adolescent success.* Chicago: University of Chicago Press.

Gladden, R.M., Vivolo-Kantor, A.M., Hamburger, M.E., & Lumpkin, C.D. (2014). Bullying surveillance among youths: uniform definitions for public health and recommended data elements, version 1.0. *Atlanta, GA; National Center for Injury Prevention and Control, Centers for Disease Control and Prevention and U.S. Department of Education*.

Gold, R., Kennedy, B., Connell, F., & Kawachi, I. (2002). Teen births, income inequality, and social capital: Developing an understanding of the causal pathway. *Health and Place, 8*(2), 77–83.

Harel Y. (1999). A cross-national study of youth violence in Europe. *International Journal of Adolescent Medicine and Health, 11*(4), 121–134.

Haynie, D. L., Silver, E., & Teasdale, B. (2006). Neighborhood characteristics, peer networks, and adolescent violence. *Journal of Quantitative Criminology, 22*(2), 147–169. doi:10.1007/s10940- 006-9006-y.

Hong, J. S., & Espelage, D. L. (2012). A review of research on bullying and peer victimization in school: An ecological system analysis. *Aggression and Violent Behavior, 17*(4), 311-322.

Hsieh, C. C., & Pugh, M. D. (1993). Poverty, income inequality, and violent crime: A meta-analysis of recent aggregate data studies. *Criminal Justice Review, 18*(2), 182-202.

Kawachi, I., & Kennedy, B. P. (2002). *The Health of Nations*. New York: The New Press.

Kawachi, I., Kennedy, B., & Wilkinson, R.G. (1999). Crime: Social disorganization and relative deprivation. *Social Science & Medicine 48,* 719-731.

Kawachi, I., Subramanian, S. V., & Almeida-Filho, N. (2002). A glossary for health inequalities. *Journal of Epidemiology and Community Health, 56*(9), 647-652.

Khoury-Kassabri, M., Benbenishty, R., Astor, R., & Zeira, A. (2004). The contributions of community, family, and school variables to student victimization. *American Journal of Community Psychology, 34*(3/4), 187-204.

Klomek, A. B., Sourander, A., Kumpulainen, K., Piha, J., Tamminen, T., Moilanen, I., Almqvist, F., & Gould, M. S. (2008). Childhood bullying as a risk for later depression and suicidal ideation among Finnish males. *Journal of Affective Disorders, 109*(1-2), 47-55.

Kondo, N., Kawachi, I., Subramanian, S. V., Takeda, Y., & Yamagata, Z. (2008). Do social comparisons explain the association between income inequality and health? Relative deprivation and perceived health among male and female Japanese individuals. *Social Science & Medicine, 67*(6), 982-987.

Krug, E. G., Mercy, J. A., Dahlberg, L. L., & Zwi, A. B. (2002). The world report on violence and health. *The Lancet, 360*(9339), 1083-1088.

Kumpulainen, K., & Räsänen, E. (2000). Children involved in bullying at elementary school age: Their psychiatric symptoms and deviance in adolescence: An epidemiological sample. *Child Abuse and Neglect, 24*(12), 1567-1577.

Leventhal, T., & Brooks-Gunn, J. (2000). The neighborhoods they live in: The effects of neighborhood residence on child and adolescent outcomes. *Psychological Bulletin, 126*, 309–337.

Lind, J., & Maxwell, G. (1996). *Children's experience of violence at school.* Wellington: Office of the Commissioner for Children.

Magnusson, D., Stattin, H., & Dunér, R. (1983). Aggression and criminality in a longitudinal perspective. In Dusen, K. T., & Mednick, S. A. (Eds.), *Prospective Studies of Crime and Delinquency* (pp. 277-301). Dordrecht, Netherlands: Springer.

Marmot, M. (2002). The influence of income on health: Views of an epidemiologist. *Health Affairs* (*project Hope*), 21(2), 31–46.

Marrocco, F., Gould, M. S., Klomek, A. B., Kleinman, M., Altschuler, E., & Amakawa, L. (2013). Suicidal adolescents' experiences with bullying perpetration and victimization during high school as risk factors for later depression and suicidality. *Journal of Adolescent Health, 53*(1), S37-S42.

McCoy, D. C., Roy, A. L., & Sirkman, G. M. (2013). Neighborhood crime and school climate as predictors of elementary school academic quality: A cross-lagged panel analysis. *American Journal of Community Psychology, 52*(1), 128–140

Mellor, A. (1999). Scotland. In P. K. Smith, Y., Morita, J., Junger-Tas, D. Olweus, R., Catalano, & P. Slee (Eds.), *The nature of school bullying: A cross-national perspective* (pp. 91-111), New York: Routledge.

Merton. R.K. (1968). *Social Theories and Social Structures.* New York: Free Press.

Molcho, M., Harel, Y., & Dina, L.O. (2004) Substance use and youth violence. A study among 6th to 10th grade Israeli school children. *International Journal of Adolescent Medicine and Health, 16*(3), 239–251

Nansel, T. R., Overpeck, M., Pilla, R. S., Ruan, W. J., Simons-Morton, B., & Scheidt, P. (2001). Bullying behaviors among US youth: Prevalence and association with psychosocial adjustment. *Jama: The Journal of the American Medical Association, 285*(16), 2094-100.

Olweus, D. (1993). *Bullying at school: What we know and what we can do.* Oxford, UK: Blackwell.

Olweus, D. (1994). Annotation: Bullying at school: Basic facts and effects of a school based intervention program. *Child Psychology & Psychiatry & Allied Disciplines*, *35*(7), 1171-1190.

Olweus, D. (1994). Bully at school: Long-term outcomes for the victims and an effective school-based intervention program. In Huesmann, L. (Ed.), *Aggressive behavior: Current perspectives* (pp. 97-129). New York, NY: Plenum Press.

Olweus, D. (1996). *The revised Olweus Bully/Victim questionnaire*. Mimeo. Bergen, Norway: Research Center for Health Promotion (HEMIL Center), University of Bergen.

Oxfam International (2013). The cost of inequality: how wealth and income extremes hurt us all. Retrieved from*:* http://www.oxfam.org/sites/www.oxfam.org/files/cost-of-inequality-oxfam-mb180113.pdf

Panjvani, L. (2013) An overview of anti-bullying legislation and alternatives in Canada. *Law Now: Relating Law to Life in Canada.* Retrieved from: http://www.lawnow.org/an-overview-of-anti-bullying-legislation-and-alternatives-in-canada/

Pickett, K. E., & Wilkinson, R. G. (2008). Child wellbeing and income inequality in rich societies: Ecological cross sectional study. *Child: Care, Health & Development, 34*(2), 280-281.

Pickett, K. E., Mookherjee, J., & Wilkinson, R. G. (2005). Adolescent birth rates, total homicides, and income inequality in rich countries. *American Journal of Public Health, 95*(7), 1181-3.

Pickett, W., Iannotti, R. J., Simons-Morton, B., & Dostaler, S. (2009). Social environments and physical aggression among 21,107 students in the United States and Canada. *Journal of School Health, 79*(4), 160-168.

Pickett, W., Molcho, M., Elgar, F. J., Brooks, F., de Looze, M., Rathmann, K., …Currie, C. (2013). Trends and socioeconomic correlates of adolescent physical fighting in 30 countries. *Pediatrics, 131*(1), 18-26. doi: 10.1542/peds.2012-1614

Reijntjes, A., Kamphuis, J. H., Prinzie, P., & Telch, M. J. (2010). Peer victimization and internalizing problems in children: A meta-analysis of longitudinal studies. *Child Abuse & Neglect, 34*(4), 244-252.

Rigby, K. (1999). Peer victimization at school and the health of secondary school students. *British Journal of Educational Psychology, 69*(1), 95-104.

Robinson, W. S. (1950). Ecological correlations and the behavior of individuals. *American Sociological Review, 15*(3), 351-357.

Rudatsikira E., Muula, A.S., & Siziya, S. (2008) Variables associated with physical fighting among US high-school students. *Clinical Practice and Epidemiology in Mental Health*, *4*(16)*,* 1-8.

Runciman, W. G. (1966). *Relative deprivation and social justice: A study of attitudes to social inequality in twentieth-century England.* Berkeley: University of California Press.

Sampson, R. J., & Groves, W. B. (1989). Community structure and crime: Testing social-disorganization theory. *American Journal of Sociology, 94*, 774–802.

Sampson, R. J., & Raudenbush, S.W. (1999) Systematic social observation of public spaces: A new look at disorder in urban neighborhoods. *American Journal of Sociology 105,* 603-651.

Schwartz, D. (2000). Subtypes of victims and aggressors in children's peer groups. *Journal of Abnormal Child Psychology, 28*(2), 181-192.

Shariff, S. (2013). Law and policy. *Define the Line: Map of North American Cyberbulling Legislation.* Retrieved from: http://definetheline.ca/law-policy/map-of-north-american-legislation.

Shaw, C. R., & McKay, H. D. (1942). Juvenile delinquency and urban areas: A study of rates of delinquents in relation to differential characteristics of local communities in American cities. Chicago, Ill: The University of Chicago Press.

Shaw, C. R., & McKay, H.D. (1969) *Juvenile Delinquency and Urban Areas*: *A Study in Rates of Delinquency in Relation to Differential Characteristics of Local Communities in American cities.* Chicago, IL: University of Chicago Press.

Shetgiri, R., Lin, H., & Flores, G. (2012). Identifying children at risk for being bullies in the United States. *Academic Pediatrics, 12*(6), 509-522.

Skogan, W. G. (1990) *Disorder and Decline: Crime and the Spiral of Decay in American Neighborhoods*. New York: The Free Press.

Solberg, M. E., & Olweus, D. (2003). Prevalence estimation of school bullying with the Olweus bully/victim questionnaire. *Aggressive Behavior, 29*(3), 239-268.

Sourander, A., Helstelä, L., Helenius, H., & Piha, J. (2000). Persistence of bullying from childhood to adolescence: A longitudinal 8-year follow-up study. *Child Abuse & Neglect, 24*(7), 873-881.

Stattin, H., & Magnusson, D. (1989). The role of early aggressive behavior in the frequency, seriousness, and types of later crime. *Journal of Consulting and Clinical Psychology, 57*(6),710-8.

Swearer, S. M., & Doll, B. (2001). Bullying in schools: An ecological framework. *Journal of Emotional Abuse, 2,* 7-24.

Wagstaff, A., & van Doorslaer,. E. (2000). Income inequality and health: What does the literature tell us?. *Annual Review of Public Health, 21*, 543.

Walsh, S., Molcho, M., Harel-Fisch, Y., Huynh, Q., Kukaswadia, A., Aasvee, K., Varnai, D., ... Pickett, W. (2010). Physical and emotional health problems experienced by youth engaged in violent behaviour. *Injury Prevention,* 16(Suppl 1), A1–A289.

Wang, J., Iannotti, R. J., & Luk, J. W. (2010). Bullying victimization among underweight and overweight U.S. youth: Differential associations for boys and girls. *Journal of Adolescent Health, 47*(1), 99-101.

Wang, J., Iannotti, R. J., & Nansel, T. R. (2009). School bullying among adolescents in the United States: Physical, verbal, relational, and cyber. *Journal of Adolescent Health, 45*(4), 368-375.

Wardle, J., Robb, K., & Johnson, F. (2002). Assessing socioeconomic status in adolescents: the validity of a home affluence scale. *Journal of Epidemiology and Community Health, 56*(8), 595-599.

Waschbusch, D. A., & Elgar, F. J. (2007). Development and validation of the conduct disorder rating scale. *Assessment, 14,* 65-74.

Wilkinson, R. G. (1996). *Unhealthy societies: The afflictions of inequality*. London: Routledge.

Wilkinson, R. G. (2005). *The impact of inequality: How to make sick societies healthier*. NY: New Press.

Wilkinson, R. G., & Pickett, K. E. (2006). Income inequality and population health: A review and explanation of the evidence. *Social Science & Medicine, 62*(7), 1768-1784

Wilkinson, R. G., & Pickett, K. E. (2007). The problems of relative deprivation: Why some societies do better than others. *Social Science & Medicine, 65*(9), 1965-1197.

Wilkinson, R. G., & Pickett, K. E. (2009). *The spirit level: Why more equal societies almost always do better*. London: Allen Lane.

Yitzhaki, S. (1979). Relative deprivation and the gini coefficient. *The Quarterly Journal of Economics, 93*(2), 321-324.

Zwi, A.B., Krug, E.G., Mercy, J.A., & Dahlberg, L.L (2002). World report on violence and health: Exploring Australian responses. In Krug, E.G., Dahlberg, L.L., Mercy, J.A., Zwi, A.B., & R. Lozano (Eds.), *World report on violence and health* (pp. 405-408). Geneva: World Health Organization.