Developmental Trajectories of Elementary School Peer Victimization as Related
to School Safety and Climate

by

Christine Polihronis
Master of Arts, Carleton University, 2012

A thesis submitted to the Faculty of Graduate and Postdoctoral
Affairs in partial fulfillment of the requirements for the degree of

Doctor of Philosophy

in

Psychology

Carleton University
Ottawa, Canada

© 2017, Christine Polihronis

Abstract

The goal of this study was to better understand how children's perceptions of their school's context (both climate and safety) were related to peer victimization trajectories (both relational and physical) from grades 3 to 6. A total of 886 children from three Canadian provinces in grades 3 and 4 at baseline were followed across 5 waves from the spring of 2011 to the spring of 2013. Children's perceptions of their physical and relational victimization experiences, school safety, and school climate (teacher-child relationships, peer relationships, and fairness) were collected at all 5 time points. Individual growth curve modeling was used to determine the level of victimization as well as the rate of changes from grade 3 to grade 6. Two cohort-sequential growth curve models indicated that relational and physical victimization declined by 8% and 10%, per year, respectively. Boys were higher in physical victimization and girls were higher in relational victimization at all time points, but declined at similar rates over time. Children who never felt safe and had overall negative relationships with their teachers reported more relational victimization across time. Boys who reported overall good teacher relationships also reported higher levels of physical victimization. Children who never felt safe reported the highest levels of relational and physical victimization. Poor peer relationships and feeling safe sometimes were associated with slight increases in physical victimization, whereas good peer relationships were associated with slight decreases in physical victimization. The lack of contribution of teacher relationships, peer relationships, fairness, and safety to the rate of decline for relational victimization suggests that more research is needed to determine the factors beyond those measured that will increase the rate of decline. Multiple relationships may be associated with children's trajectories of peer victimization and highlight the necessity of assessing family, peer, as well as teacher relationships within a single study.

[303/350 words]

Acknowledgements

The past five years of my life would have not been possible without the support from the following people. First, thank you to my advisor, Dr. Tina Daniels for your guidance and encouragement over the years. I am grateful for your pep talks, for believing in me even when I didn't believe in myself, and for offering to meet at Bridgehead coffeehouse on multiple occasions. Thank you for taking me on close to 8 years ago! I would like to express my gratitude to Dr. Bonnie Leadbeater and to my committee members, Dr. Andrea Howard and Dr. Shelley Brown for your help and patience in guiding me along this journey. Thank you to my internal examiner Dr. Rania Tfaily, and to my external examiner, Dr. Shelley Hymel for your time in reviewing my document and for your insightful feedback during the defense. Thank you to my colleague and lab partner Nikky Summers for being my cheerleader during this entire process. You are an amazing friend, and I couldn't have done this without you. Thank you to my past and present lab mates: Danielle Sadler, Kat Magner, Alyssa Bonneville, Adrian Biletoff, Carolanne Tomsine for your encouragement, help with stats, and with editing the many drafts of my document. I would also like to thank Etelle Bourassa and June Callender for their administrative support. I am so grateful to have such amazing friends: Amanda Riley, Heather Yates, Natasa Vrachimis, and Dima Moukheiber! Thank you so much for the chats, dinner dates, and for giving me a much needed break from the thesis. Thank you to Zopito Marini, my undergraduate advisor at Brock University, for the words of encouragement and chats over coffee at Tim Hortons over the years. I also thank my colleagues and mentors at CHEO for their helpful advice and for their support throughout this entire process: Dr. Janet Olds, Dr. Mario Cappelli, Paula Cloutier, Dr. Allison Kennedy, Stephanie Leon,

Alicia Biafore, Lisa Currie, and Michael Ranney. And last but certainly not least, thank you to my parents, Betsy and Angelo Polihronis, and sister Helen. I wouldn't have made it this far if it wasn't for your endless love, support, phone calls, answering machine messages, funny e-mails, and cute photos of the dog.

Table of Contents

Abstract	ii
List of Tables.....	vi
List of Figures	vii
List of Appendices	viii
Introduction	1
Peer Victimization.....	3
Types of victimization	3
Trajectories of peer victimization.....	4
Contextual Factors Related to Victimization	6
Definition and components of school climate	7
School climate and peer victimization	9
Teacher-child relationships and victimization	10
Student-interpersonal relationships	11
School fairness and equity.....	12
School safety	13
Conceptualization of school safety.....	16
Measurement of school safety.....	17
Next Steps.....	19
Current Study	19
Research Questions and Hypotheses	20
Changes in victimization trajectories.	20
School climate and safety	21

Method	22
Participants.....	22
Procedure.....	25
Measures	27
Physical and relational victimization	27
Children's perceptions of school safety	28
Children's perceptions of school climate.....	29
Data Analytic Strategy: Growth Curve Modeling	30
Results.....	32
Preliminary Data Analysis	32
Missing data	33
Multiple imputation.....	37
Intercorrelations	38
Physical victimization, relational victimization, and safety.....	38
Victimization, school climate, and school safety.....	40
School climate and school safety	40
Growth Curve Modeling	43
Centering predictor variables	43
Separating the variance in victimization	44
Determining the shape of victimization trajectories	46
Physical Victimization Model	50
Conditional school climate and school safety models	50
Interactions with school climate, school safety, and gender	50

Relational Victimization	57
Conditional school climate and school safety models	57
Interactions with school climate, school safety, and gender	60
Discussion	64
Declining Peer Victimization Trajectories	65
Gender Differences	66
School Safety and School Climate	67
Cohort-Sequential Design	70
Strengths and Limitations	72
Implications	78
References	80
Appendices	107

List of Tables	Page
Table 1. Average Scores for Victimization and School Climate for Total Sample	34
Table 2. School Safety Percentages for the Total Sample	35
Table 3. Missing Data on Victimization, School Climate and School Safety for Total Sample and by Cohort from T1-T5	36
Table 4. Imputed Correlation Coefficients Between Victimization and Safety.....	39
Table 5. Imputed Correlations for Victimization, School Climate and School Safety	41
Table 6. Imputed Correlations for all School Climate Variables.....	42
Table 7. Random Intercept and Slope Model Building for Relational and Physical Victimization Trajectory	45
Table 8. Linear Growth Trajectory Model for Physical Victimization with Between and Within Centered Predictors of School Climate and School Safety	51
Table 9. Interactions Between Gender, School Safety, and School Climate for Physical Victimization.....	53
Table 10. Linear Growth Trajectory Model for Relational Victimization with Between and Within Centered Predictors of School Climate and School Safety	58
Table 11. Interactions Between Gender, School Safety, and School Climate for Relational Victimization.....	62
Table 12. Centering of Three Time Varying School Climate Predictor Variables	126
Table 13. Person Mean and Grand Mean Centering School Safety as Sometimes Safe and Never Safe.....	127

List of Figures	Page
Figure 1. A cohort-sequential longitudinal design from grade 3 to 6	23
Figure 2. The predicted linear trajectory for physical victimization and raw estimates for each cohort from grades 3 to 6.....	48
Figure 3. The predicted linear trajectory for relational victimization and raw estimates for each cohort from grades 3 to 6.....	49
Figure 4. Levels of physical victimization for boys and girls with poor and good teacher relationships	56

List of Appendices	Page
Appendix A: Parent Consent Form for Child Participation in Control Schools	107
Appendix B: Parent Consent Form for Child Participation in Program Schools.....	110
Appendix C: Child Assent and Debriefing Instructions	113
Appendix D: Family Information Questionnaire	114
Appendix E: Social Experiences Questionnaire and Your School Experiences	116
Appendix F: School Climate Survey.....	119
Appendix G: Physical and Relational Victimization Means and Standard Deviations by Cohort.....	120
Appendix H: School Climate Means and Standard Deviations by Cohort	121
Appendix I: School Safety Percentages and Frequencies by Cohort.....	122
Appendix J: Imputation Description	123
Appendix K: Centering Time, School Climate, and School Safety	124

Developmental Trajectories of Elementary School Peer Victimization as Related to School Safety and Climate

Schools are important places for children that not only foster learning, but should also provide a safe context where children can develop the social skills for healthy peer relationships. This is not always the case, as maladaptive peer relationships such as victimization with school peers can unfold over time (Olweus, 1994; 2003; 2010).

Examining how peer victimization develops over time in schools is important, since peer victimization has been found to lead to increases in internalizing and externalizing mental health difficulties (Copeland, Wolke, Angold, & Costello, 2013; Reijntjes, Kamphuis, Prinzie, Boelen, van der Schoot, & Telch, 2011; Reijntjes, Kamphuis, Prinzie, & Telch, 2010). Nearly two decades of research have been conducted to understand how school contexts are associated with peer victimization (Craig & Pepler, 1997; Crick & Nelson, 2002; Espelage, Holt, & Poteat, 2010; Espelage & Swearer, 2009; Kochenderfer-Ladd, Ladd, & Kochel, 2009).

Despite this extensive and growing literature, however, most of this research has been cross-sectional and school climate has been conceptualized as a static characteristic of the school environment (Leadbeater et al. 2014). Moreover, although most assessments rely on individuals' reports of components of school climate, little is known about the stability of or variability in individuals' perceptions of school climate, how their individual perceptions change over time, or what factors influence individuals' perceptions of school climate. Research also has found that student's report less peer victimization, more school connectedness, and feel more safe when a school's climate is positive (Bosworth & Judkins, 2014; Wang, Berry, & Swearer, 2013; Wilson, 2004).

However many models in the literature have not captured the developmental progression of victimization over time within the school context. Supportive relationships between students and teachers, as well as other peers may change from year to year, however as some authors have suggested, these changes over time within school environment are not well understood in terms of how they are associated with developmental changes in peer victimization over time (Juvonen & Graham, 2014).

To better understand how victimization unfolds over time within school contexts, Bronfenbrenner's (1979) ecological systems approach indicates that a child exists at the center within interrelated hierarchical contexts, such as family networks, classroom and school contexts, and larger communities. Children often experience victimization within the school context, or what Bronfenbrenner calls the microsystem, where children interact directly with peers and teachers over time. Although there have been many components of school climate that have been identified, researchers have shown that good relationships between teachers and students, good relationships with peers, feeling like the school is a fair place, and feeling safe at school contribute to less victimization. Since these relationships at school also occur over time, they may be related to each child's developmental trajectory of victimization. More specifically, the updated Process-Person-Context-Time model (Bronfenbrenner & Morris, 1998; 2006) suggests that a child's perception of their school is formed by their reciprocal interactions between peers and teachers at school over time, by their individual characteristics, and by changes in their school context over time. Therefore, it was important to examine child development from a longitudinal perspective, taking into account multiple measurements of these interactions between school climate, school safety, and victimization. Changes in peer

victimization over time should be associated with how that child perceives their direct and indirect relationships at school, specifically with their peers and teachers. Since school contextual factors are amenable to change and intervention, longitudinal approaches with multiple measurements are therefore needed to demonstrate how children's perceptions of their school environments over time are associated with their individual victimization trajectories over time. Therefore, the focus of this dissertation was to examine how changes in children's perceptions of their peer and teacher relationships at school were associated with changes in children's individual developmental trajectories of victimization in the elementary school years.

Peer Victimization

Peer victimization is the consequence of bullying perpetration, by being exposed to the repetition of an intentionally harmful behaviour in the context of a perceived or actual power imbalance between the perpetrator and a selected target (Laurion, Feinberg, Settanni, & Faunce, 2004; Olweus, 1994, 2003, 2010; Solberg & Olweus, 2003; Vaillancourt et al., 2008). When victimization is examined in the early elementary school years, two main types are reported.

Types of victimization. Two forms of victimization have been consistently identified in the early preschool and elementary school years: overt victimization (e.g., physically or verbally harming a victim by hitting, kicking, hurtful name calling, verbal threats) and relational victimization (e.g., harming a child's peer relationships through exclusion or friendship withdrawal; Crick & Bigbee, 1998; Crick, Casas, & Ku, 1999; Crick & Grotpeter, 1996; Godleski, Kamper, Ostrov, Hart, & Blakey-McClure, 2014; Hawker & Boulton, 2000; Olweus, 1993; Ostrov & Kamper, 2015). Researchers have

found that boys are often the recipients of physical victimization and girls report more relational victimization in cross sectional (Crick & Bigbee, 1996; Crick et al., 1999) and in longitudinal studies (Biggs et al., 2010; Ostrov , 2010; Pellegrini & Long, 2002; Troop-Gordon & Ladd, 2005), although, not all studies have demonstrated this gender difference for relational victimization (Crick & Grotpeter, 1996). When examined over time, victimization has been found to decrease at the same rates for both boys and girls in elementary schools (Giesbrecht, Leadbeater, & MacDonald, 2011; Rudolph, Troop-Gordon, Hessel, & Schmidt, 2011) and from kindergarten to grade 12 (Ladd, Ettekal, & Kochenderfer-Ladd, 2017), where other have found increases in relational victimization in the elementary ages increased at equal rates for both boys and girls in grades 3 to 5 (Biggs et al., 2010). It seems that boys and girls differ in their experiences of physical and relational victimization in the early years, but changes in boys' and girls' physical and relational victimization trajectories may be more similar over time.

Trajectories of peer victimization. Individual growth curve approaches are beneficial for estimating the natural development of victimization in childhood. These models allow for examining overall growth in victimization over time, while taking into consideration that changing predictors can explain why each child can have a different level and growth in victimization over time (Curran, Obeidat, Losardo, 2010; Singer, 1998; Willett, Singer, & Martin, 1998). Measuring trajectories of victimization using growth models have demonstrated an overall decreasing victimization trajectory in childhood and adolescence (Giesbrecht et al., 2011; Troop-Gordon & Ladd, 2005; Ladd et al., 2017). One study did not find a change in victimization from grades 3 to 6, as overall victimization levels were low to moderate (Biggs et al., 2010).

Most studies that employed growth curve modelling have not examined victimization as the main outcome of measurement, nor have examined how victimization is associated with changes in the school context (with the exception of Giesbrecht et al., 2011). For example, growth curve modelling studies to date have found that increases in victimization trajectories as predictors were related to the development of stress (Troop-Gordon et al., 2016), or mental health and emotional outcomes (Biggs et al., 2010; Rudolph et al., 2011; Troop-Gordon et al., 2005). Three studies to date have examined the trajectories of victimization and the associations between the school environment (Giesbrecht et al., 2011; Gage, Larsen, and Prykanowski, 2014; Nylund et al., 2007). Gage and colleagues (2014) as well as Nylund et al. (2007) used group-based modelling approaches and found that trajectories of victimization were related to perceptions about the school context. More specifically, Gage et al. (2014) found that children's perceptions of receiving support at school from adults were important for further decreasing victimization among those with low, average, and high reported bullying/safety trajectory groups. In this study, the outcome was measured by a number of non-validated items pertaining to a global measure of school safety, relational, and physical victimization, and therefore, it was unclear as to how trajectories of victimization were affected using validated measures apart from school safety.

Nylund et al. (2007) separated out bullying group trajectories using group-based modeling and found that among those who followed low, moderate, or high victimization trajectories, those who reported higher victimization trajectories from grades 6 to 8 were less likely to feel safe at school and were more depressed a year later. Although these studies examined how trajectories were associated with outcomes related to the school

environment and affect, they did not determine how the school environment was related to further changes in children's victimization trajectories.

The only study to use a growth curve modeling approach was conducted by Giesbrecht and colleagues (2011), which demonstrated that changes to children's school contexts were related to further changes in their relational and physical victimization trajectories. They found that by using validated measures of victimization, children who participated in a primary prevention program had further declined by 46% for relational victimization and 24% for physical victimization from grades 1 to 3 (Giesbrecht et al., 2011). Although the program was aimed at decreasing victimization, it was unclear how the program affected the school context, including student's attitudes, norms, and values related to bullying. Further studies are needed to determine how changes in children's perceptions of their school climate are associated with changes in victimization that allow for children's individual variability in victimization. To understand how school contexts contribute to possible changes in victimization, factors related to school climate and safety were reviewed. More specifically, children's perceptions of school safety, teacher and peer relationships, and fairness were important components of school climate that were explored further as associated with peer victimization.

Contextual Factors Related to Victimization

Children not only vary in their victimization rates between one another, but also vary in their experiences with victimization over time. As demonstrated by Giesbrecht et al., (2011), there was little variability in victimization levels between schools, while the majority of variability in victimization existed between students within a school (50-52%), and among children's individual experiences (43-46%) from grade 1 to 3

(Giesbrecht et al., 2011). This has also been supported by hierarchical studies examining victimization at one point in time, where greater variability in victimization has been found between the children within schools rather than between different schools (Brand, Felner, Shim, Seitsinger, & Dumas, 2003; Richard et al., 2011; Veenstra et al., 2014). Since the majority of variation exists between children as well as within occasions, it is important to examine how perceptions of school climate may contribute to children's varying experiences of victimization.

Definition and components of school climate. School climate is best understood from an individual child's subjective perceptions of the atmosphere or tone of the school from their direct interactions with others, by observing the interactions with others at school, and by how they view themselves as fitting in or belonging to their school community. Cohen (2012) describes school climate as "How we feel about being in school, the quality of life or school climate, is not only colored and shaped by how safe we feel; it is also shaped by how supported, engaged, helpfully challenging, and joyful (or not!) school life is" (p. 237). School climate is often considered to be composed of multiple dimensions (Brand et al., 2003; Cohen, 2006; Furlong et al. 2005; Haynes, Emmons, & Ben-Avie, 1997; Haynes, Emmons, & Comer, 1994; Thapa, Cohen, Guffey, & Higgins-D'Allesandro; 2011), as the number of dimensions (from 3 to 11) and types of dimensions often vary. Some researchers have identified three common components (Moos, 1979) including interpersonal relationships between students and teachers, cognitive/affective dimensions, and organizational features. Others have identified four components: safety, peer relationships and fairness, teaching and learning, and the physical environment (Brand et al., 2003) and up to 11 different factors of school climate

(Cohen, 2006). Although many components have been identified, the extent to which they are valid components of school climate was not known.

To determine the most agreed upon dimensions of school climate, Zullig, Koopman, Patton, and Ubbes (2010) compared five psychometrically validated child-report school climate measures completed by students in grades 6 to 12. Exploratory and confirmatory factor analyses revealed that the most common dimensions included social relationship and physical dimensions, including: 1) teacher-child relationships accounted for 27.6% of the variance; school's social environment accounted for 2.1%; and 3) perceived exclusion/privilege (e.g., fairness) was 1.8%. Safety, order and discipline as well as the physical environment together accounted for less than 5% of the total variance combined. This study demonstrated that teacher relationship, peer relationships, and fairness were the top three dimensions of school climate included in self report measures, with some variability present. Although middle and high school students in grades 6 to 12 were included, these constructs may have differed for younger elementary school students.

The most widely used, direct, and valid measure of school climate among elementary and middle school children is the School Climate Survey (Haynes et al., 1993;1994), which has been used among elementary and middle school samples to examine children's perceptions of their school climate (Kuperminc et al., 1997; Leadbeater et al., 2014; 2015; Mitchell, Bradshaw, & Leaf, 2009). Consistent with the common components of school climate mentioned earlier, this scale includes relationship aspects (measures of teacher-child relationships, child-interpersonal relationships, parent involvement) and environmental characteristics, such as fairness, order and discipline,

and sharing of resources (Haynes et al., 1994). When this measure was used to examine paths to victimization among younger elementary school children from grades 1-4, the school disorder subscale was removed (Leadbeater et al., 2015). Using a validated measure of school climate with the most common relationship components identified in the literature will be important to understand how each component relates to changes in peer victimization over time.

Overall, the studies above have demonstrated that school climate is measured by a number of constructs composed of different relationships and organizational features, where the most important components of school climate as perceived by children include the relationships between students and teachers, the relationships between students in the school, and how fairly students are treated. These three aspects of school climate were examined in the present study as they relate to peer victimization.

School climate and peer victimization. School climates are important for healthy child development outcomes, including academic achievement (MacNeil, Prater, & Busch, 2009) as well as contributing to internalizing and externalizing behaviours (Kuperminc, Leadbeater & Blatt, 2001). Furthermore, school climate also has an impact on children's relationships at school, including the positive relationships with teachers and peers (DeRosier & Newcity, 2005; Eliot, Cornell, Gregory, & Fan, 2010; Espelage & Swearer, 2009, as well as the impact of the school's physical environment such as disorganization and cleanliness (Osher, Kendziora, Spier, & Garibaldi, 2014). When children perceived the climate of their school as positive, this has been linked to lower bullying and victimization rates in schools (Cook et al., 2010; Cohen, 2012; Espelage & Swearer, 2009; Leadbeater et al., 2014; Waasdorp et al., 2011), as well as feeling safe at

school (Benbenishty and Astor, 2005; DeRosier & Newcity, 2005; Samdal, Nutbeam, Wold, & Kannas, 1998). Poor school climate has also been linked to a number of emotional and behavioural outcomes, including conduct behaviours such as weapon carrying and gang violence (Brookmeyer Fanti, & Henrich, 2006; Gottfredson, Gottfredson, Payne, & Gottfredson, 2005; Kuperminc, Leadbeater, Emmons, & Blatt, 1997; Steffgen et al., 2013). One of the most widely studied factors of school climate is positive relationships between students and classroom teachers.

Teacher-child relationships and victimization. Teachers play an important role in creating a classroom climate in which bullying and victimization is not tolerated. Many programs encourage children and youth to report the behaviour to school personnel, as adults are seen as protective (Giesbrecht et al., 2011). Among cross-sectional studies examining multiple school climate factors, Richard et al. (2011) found teacher-student relationships consistently remained the strongest protective factor for both physical and relational victimization. The supportive adults at school have shown to be a protective factor for children reporting victimization and emotional problems (Yeung & Leadbeater, 2010). However, direct involvement from teachers are not always necessary, as children were less likely to feel safe in areas of schools with low adult presence and monitoring (Blosnich & Bossarte, 2011; Jeong et al., 2013; Vaillancourt et al., 2010).

Moving beyond presence, the type of relationship children have with their teacher also matters. Among supportive and caring climates, students are more likely to depend on teachers and seek help when victimized (Eliot et al., 2010; Troop-Gordon & Kopp, 2011), however when the school culture is supportive of victimization over time, children are less likely to seek help from adults (Unnever & Cornell, 2004). On the other hand,

poor teacher relationships can also contribute to a negative school environment. For example, research has shown that relationships with teachers characterized by conflict and punishment have been linked to victimization (Jeong, Kwak, Moon & Miguel, 2013; Reavis, Keane, & Calkins, 2010). According to the Bronfenbrenner and Morris model (1998; 2006), and consistent with the findings above, teacher-child relationships are central to creating a positive school climate and in decreasing children's victimization experiences. The relationships that children have with one another have also shown to be important for those who are victimized.

Student-interpersonal relationships. Children interact daily with peers at school, and these interactions play an important protective role in preventing victimization from escalating over time (Goldbaum et al., 2003; Hodges, Boivin, Vitaro, & Bukowski, 1999; Rigby, 2005). According to Bronfenbrenner and Morris' (1998; 2006) theory, children's perceptions of their school climate are not only shaped by direct daily interactions with peers at school, but also by observing the ongoing interactions between peers at school. Murray-Harvey and Slee (2010) found that among children and youth in grades 5 to 9, the strongest relationship was found between positive peer relationships and lower victimization, followed by teacher and family relationship factors relating to decreased victimization. Similarly, a meta-analysis conducted by Cook and colleagues (2010) demonstrated that among 153 studies published between 1990-2006, the strongest contextual predictors for victimization were poor student relationships (effect size = -.35) followed by a negative school climate (-.16) and community factors (-.15). Although variability existed in how studies measured school climate, it was defined in this meta-analysis by school belonging and fair treatment by teachers. Leadbeater and colleagues

(2014) also found reciprocal relationships between child reports of increased victimization and poor child-interpersonal relationships over time. Therefore, children who reported poor child-interpersonal relationships in their school experienced more victimization over time, and the victimization experienced by these children also was indicative of poor child-interpersonal relationships later on. In conclusion, positive relationships in schools—whether direct adult relationships or positive peer relationships ---both serve as protective factors for children who are victimized by their peers and are important components of a positive school climate. Children's perceptions of how fairly they are treated at school also have shown to be an essential part of school climate that is associated with peer victimization.

School fairness and equity. It is the school's responsibility to ensure that all students are being treated fairly by teachers. Few studies to date have examined the relationship between victimization and perceptions of fairness, although the following studies have demonstrated that an association exists between a climate of unfairness and increased victimization. According to Graham et al. (2007), children who were both aggressive and victimized viewed their schools as less fair and perceived their school as less safe. Boys in this study viewed their school as more unfair and they reported disliking school more than girls. Another study by Jeong et al. (2013) demonstrated that among 22,686 adolescents, those students who attended schools where rules were strictly enforced perceived their schools as more fair and were less likely to experience victimization. In these cross sectional studies, those who felt that school was unfair reported more victimization.

When a fair school climate was examined longitudinally, Leadbeater and

colleagues (2014) found a reciprocal association between fairness and victimization, in that children who reported more overall victimization were less likely to believe that children in their school were treated fairly over time. Children who perceived their schools as unfair were also more likely to be victimized at the next point in time. However, the extent to which perceptions of fairness at school is related, over time, to levels and rates of relational and physical victimization is currently not known. Also needed is an examination of the longitudinal relationship between fairness and victimization in younger children as most research to date (with the exception of Leadbeater et al., 2014) has been on adolescents. Thus, three common components of a school's social climate (teacher relationships, student relationships, and fairness) have been identified as important in understanding the development of peer victimization in schools. It is also important to examine how safe children feel at school to provide additional information about the school's context.

School safety. School safety and school climate are often thought of as synonymous, but each can provide unique and meaningful information about a school when examined separately (Cohen, 2012). Many cross-sectional studies point to a relationship between peer victimization and feeling unsafe at school (Benbenishty & Astor, 2005; Beran & Tutty, 2002; Goldstein, Young, & Boyd, 2008; Glew, Fan, Katon, & Rivara, 2008; Graham et al., 2006; Leadbeater et al., 2013; Skrzypiec et al., 2011; Waasdorp et al., 2011). Even children who also were the perpetrators of bullying and those who have witnessed the bullying episode have reported feeling less safe at school (Glew et al., 2008). From the studies above, school climate can be conceptualized as the tone or atmosphere of a school, while school safety can be conceptualized as another

component of school climate characterized by protection from physical, emotional, or social harm (Cohen, 2012). For example, students were more satisfied with schools when schools were perceived as fair, safe, and the student and teacher relationships were supportive (Samdal et al., 1998). In addition, researchers have found that among cross sectional studies, positive child interpersonal relationships (Cushing, Horner, & Barrier, 2003) and positive teacher relationships have been shown to positively influence student's feelings of safety at school (Benbenishty & Astor, 2005). Some researchers have found that a child's perception of safety may be based on a school's climate that is accepting of victimizing students with less favourable or weak characteristics (Almeida, Caurcel, & Machado, 2006), while others have suggested that schools are less safe from security measures taken by schools (e.g., security staff, security cameras, locked doors, expulsions) or by students' behaviours (e.g., weapon carrying, drug involvement, gang activity; Zhang, Musu-Gillette, & Oudekerk, 2016). Should school safety be measured as school climate, or should it be examined separately?

To examine the extent by which school safety and climate were related, Skiba, Simmons, Peterson and Forde (2004) developed and validated a Safe and Responsive Schools Secondary Survey to measure the construct validity between items of school climate and school safety among secondary school students. By using a single item of school safety, approximately 47% of the variance was explained by the addition of variables related to weapon carrying, incivility/disruptive behaviours, and school connection/climate. This indicated that although while there was considerable overlap between school climate and safety, 53% of the variance in school safety was unaccounted for, which meant that other factors were responsible for feelings of safety in secondary

school.

Many researchers have examined these components separately when considering the role of peer victimization, and have often used school safety as an outcome. For example, Waasdorp et al. (2011) examined outcomes of safety and school climate (referred to as school belonging), and found that students who reported being victimized, as well as schools that had more indirect bullying, were more likely to feel like their school was unsafe, and felt like they did not belong. Victimization was measured by a singular item, and it was unclear whether safety was associated with more relational or physical forms of victimization.

Cross-sectional studies that have examined outcomes of victimization have also found separate associations for school safety and school climate. Beran and Tutty (2002) found that among elementary school children in grades 4-6, higher school safety and higher teacher support was associated with more verbal forms of victimization than physical forms. Goldstein et al. (2008) found that while controlling for overt victimization, relational victimization reported by students in grades 7-12 was associated with a child's individual's perception of feeling unsafe, as well as related to their perception of their school's poor social climate. Although this cross-sectional study examined school climate and safety separately, the construct of school climate was measured as "social experiences." It was unclear whether social experiences referred to the relationships between students and teachers, or whether they referred to the interpersonal relationships between students. Furthermore, Richard et al. (2011) found that there was less relational and physical victimization in schools that reported higher school safety (as a measure of school climate), had positive teacher relationships and had

higher social bonding. No gender differences in this study existed for school safety, teacher relationships, and school bonding.

There have been a few studies to date that have examined the longitudinal association between school safety and victimization, although most have demonstrated a relationship between ongoing victimization and feeling less safe at school. A longitudinal study by Lester, Cross, Dooley and Shaw (2012) demonstrated that youth in grades 7 who were followed over 2 years reported that feeling safe at school and connectedness to school were reciprocally associated with victimization for boys, but not for girls in middle school. In this study, the forms of victimization were combined into a total victimization score, and therefore it was unknown whether safety and climate were related to relational and physical victimization trajectories for boys and girls in elementary school. Although the above studies examined victimization and safety over time, they did not utilize the longitudinal information to examine trajectories of victimization.

Conceptualization of school safety. The relationship to different forms of victimization has been tied more closely to physical victimization, which may be due to children's interpretation of school safety or items related to dangerous situations and weapon carrying. In the early elementary school years, children's perceptions of how safe they feel at school as measured by a single item were linked to more verbal forms of victimization than physical forms (Beran & Tutty, 2002). Richard et al. (2011) found that among 18,222 middle school students, schools that were more safe (as a measure of school climate) was a stronger protective factor for physical than relational victimization, which may be due to the construct of school safety as composed of an item of feeling safe

from outside dangers, and may be due to boys reporting more physical victimization than girls. Children's experiences with safety and school climate may also differ for boys and girls. Among a middle school sample of children and youth in grades 6 to 12 (Furlong, Greif, Bates, Whipple, & Jiminez, 2005), boys consistently felt less safe at school, and reported more physical and verbal victimization and weapon attacks than girls. Safety in this study was measured by gang related activity, criminal activity, and substance abuse. Feelings of safety may also be impacted not only by its measurement, but also by the severity of the victimization. For example, in a cross-sectional middle school sample, 72.7% of children who were never bullied always felt safe, whereas only 7.7% of children who were bullied in three different ways (multiple forms of verbal, physical, relational and cyber) reported feeling always safe (Skrzypiec et al., 2011). Safety in this context was therefore associated with children's exposure to various types of peer victimization. Therefore, more research is needed to understand how their victimization trajectories are associated with feeling safe at school.

Measurement of school safety. The measurement of school safety in the literature as a component of school climate or separate from school climate has been inconsistent. Some studies have examined school safety as part of a school climate dimension among elementary school students (Bear Gaskins, Blank, & Chen, 2011; Koth et al., 2008), as well as middle and high school students (Bear et al., 2011; Furlong, Morrison & Boles, 1991); and may also use selected items and scales from multiple validated surveys (Fan, Williams, & Corkin, 2011; Lester & Cross, 2015; Richard et al., 2011). The school safety questions utilized for younger elementary school students have examined more general perceptions of safety (e.g., I feel safe in this school; Bear et al.,

2011) as well as in locations in schools (e.g. on the bus, in the classroom, in the hallways) where children feel safe (Kosciw et al., 2012; Goldstein et al., 2008; Richard et al., 2011; Skiba et al., 2004). Measurements of safety in older samples have also included personal safety components related to school climate, which included suspensions and expulsions (Skiba & Knesting, 2001) and protection from outside danger, physical harassment, theft, gang and drug involvement, and weapon carrying (Brand et al., 2003; DeRosier & Newcity, 2005; Furlong et al., 2005; Richard et al., 2011; Skiba et al., 2004). However, the items of school safety related to school violence, including drug involvement, gang involvement, and weapon carrying, may not be valid or developmentally appropriate measurements for elementary school children (Khondaker, Rice, & Russell, 2010). However, not all school climate surveys or studies examining school climate include a school safety component (Baly, Cornell, & Lovegrove, 2014; Furlong et al., 2005; Leadbeater et al., 2014; 2015). The understanding of what constitutes school safety has been largely based on secondary school samples related to school violence, where single item measures have mostly been used in younger elementary samples. For example, school safety has been measured by a singular item in the younger years (e.g. “How safe do you feel at school?”) without including school climate but including school locations (Vaillancourt et al., 2010), teacher support (Beran & Tutty, 2002) and other qualitative information around bullying prevention programs (Leadbeater et al., 2013). While the use of a single item to assess of school safety does not determine the context nor reasons for safety, it can provide additional information about schools when paired with school climate and other behavioural indicators (Skiba & Knesting, 2001). Thus, school safety should be measured separately from school climate, as both provide unique and important

information about children's perceptions of their school, which can be used to inform how to change children's victimization trajectories. Furthermore, examining children's perceptions of school climate and school safety as separate may be helpful for schools to further elucidate the components for targeted intervention and prevention efforts (Booren, Handy, & Power, 2010; Cohen, 2012).

Next Steps

Consistent with Bronfenbrenner and Morris' theory (1998; 2006), as well as cross-sectional and longitudinal studies above, researchers have identified many aspects of school climate related to the relationships within school (e.g., direct teacher-child and child support, in addition to indirect child-interpersonal relationships) and positive characteristics of the school (e.g., fairness) that are associated with decreased victimization. The studies presented examined the impact of school climate on victimization, or on the effects of victimization on perceptions of school safety and school climate. It is unknown how children's varying perceptions of their school climate and school safety over time are associated with victimization trajectories over time among elementary school children. No studies to date have taken a person centered approach to examine how changes in an individual child's perceptions of school climate and safety that occur over time that are associated with their trajectories of victimization.

Current Study

The objectives of this study were to use individual growth curve modeling to determine the nature of the overall growth trajectories of physical and relational victimization from grades 3 to 6 and to determine if changes in school climate and safety were associated with changes in children's trajectories of physical and relational

victimization over time.

Research Questions and Hypotheses

Changes in victimization trajectories. The following research questions were examined as pertaining to changes in children's victimization trajectories:

- Do children's relational and physical victimization trajectories decrease from grades 3-6?
- Do relational and physical victimization trajectories decrease at different rates from grades 3-6?
- Do boys and girls differ in their levels of relational and physical victimization from grades 3 to 6?
- Do boys and girls change at the same rate in their trajectories of relational and physical victimization?

It was expected that there would be considerable variability among each child's victimization levels and in their rates of change in physical and relational victimization experiences (Biggs et al., 2010; Rudolph et al., 2011; Snyder et al., 2003). Consistent with previous research, it was expected that overall physical victimization would decline faster than relational victimization over time as studies have demonstrated an annual decline by 11% for physical victimization and 7% for relational victimization for children in grades 1 to 3 (Giesbrecht et al., 2011). It was also expected that boys would report higher physical victimization trajectories than girls, and girls would report higher relational victimization trajectories than boys, however the rates of decline would be similar between boys and girls (Giesbrecht et al., 2011; Ladd et al., 2017; Rudolph, et al., 2011). Research questions and hypotheses were also provided for school safety and

climate.

School climate and safety. The following research questions were examined as pertaining to school safety and school climate:

- Does a poor school climate and feeling unsafe at school contribute to children's levels and rates of change in children's victimization trajectories?
- Are changes in school climate and safety associated with higher rates and changes of children's victimization trajectories?
- Do boys and girls differ in their trajectories of relational and physical victimization based on poor school climate and safety?

According to Bronfenbrenner & Morris' theory (1998; 2006), children who were victimized were expected to be more likely to perceive negative direct and indirect interactions with their peers and adults at school. It was hypothesized that if a child perceived their peer and teacher relationships to be poor, if they believed they were being treated unfairly, and if they felt that they were unsafe at school, they would also report higher trajectory levels of victimization. Due to the paucity of research on rates of change over time, no hypotheses were made. It was hypothesized that boys would have higher physical victimization trajectories when reporting feeling unsafe, whereas girls would have higher relational victimization trajectories and would report feeling less safe (Goldstein et al., 2008), and it was expected that girls and boys be similar in their rates of change. It was important to determine children's experiences of school climate and safety over time, but also which aspects of the school climate and safety influenced trajectories over time, since these aspects may be promising avenues for intervention or prevention purposes in the elementary school years.

Method

Participants

This study uses data collected as part of a larger project funded by the Public Health Agency of Canada. The original purpose for the collection of data was to conduct a randomized controlled trial of a Canadian based, primary prevention, anti-bullying program. Sixty-eight percent of the children ($n = 605/886$) and 58% (14/24) of schools participated in this larger study that received the intervention. As the effects of this programme were not part of the current study and they were controlled for in all subsequent analyses. These procedures were presented below in the Results section.

Eight hundred eighty six children participated in one or more waves of the current study (420 boys and 465 girls) from two cohorts ($n = 433$ in grade 3 and $n = 453$ children at grade 4) from 24 schools. The sizes of the schools ranged from 10-102 students in a school. Children in grades 3 and children in grade 4 in the spring of 2011 comprised the two cohorts that were followed biannually for two and half years until they were in the spring of grade 5 and 6. Participants were surveyed in spring of 2011 (Baseline, T1), fall of 2011 (T2), spring of 2012 (T3), fall of 2012 (T4), and spring of 2013 (T5). Schools were located in rural cities across three Canadian provinces representing Eastern, Central and Western Canada. A cohort sequential design was used to develop trajectories of victimization (physical and relational) from Grade 3 to Grade 6 (Figure 1).

Approximately 87% ($n=786/886$) of parents or caregivers at T1 provided demographic data on their child's sex, ethnicity, socioeconomic status, and living arrangements. Mothers ($n = 677$, 76.4%), fathers ($n = 80$, 9.0%) or legal guardians ($n = 29$, 3.3%) provided demographic data. This was a highly educated sample, as parents'

School entry	Grade 3	Grade 4		Grade 5		Grade 6	
	Spring	Fall	Spring	Fall	Spring	Fall	Spring
2008	T1 (2011)	T2 (2011)	T3 (2012)	T4 (2012)	T5 (2013)		
2007			T1 (2011)	T2 (2011)	T3 (2012)	T4 (2012)	T5 (2013)

Figure 1. A cohort-sequential longitudinal design from grade 3 to 6. Participant recruitment started in the spring of 2011 from two cohorts, where data collection began in grade 3 for one cohort, and in grade 4 for the second cohort. Five measurements were taken for each cohort so that a child's trajectory could be examined from grades 3 to grade 6 using seven data points. A 1-year overlap between the two cohorts existed over three measurement occasions from Grade 4 spring, grade 5 fall, and grade 5 spring. Data was not collected intentionally (otherwise known as planned missingness) for cohort 1 in grades 6 fall and spring, and for cohort 2 in grades 3 spring and 4 fall.

level of education was below high school for 22.3% of mothers ($n = 198$) and 29.4% of fathers ($n = 260$). Children in the study were primarily Caucasian ($n = 739$, 83.4%) with the following other ethnicities represented in this rural Canadian sample: Aboriginal ($n = 14$; 1.6%), Asian or Canadian Asian ($n = 12$, 1.4%), mixed ($n = 10$; 1.2%); Black or African Canadian ($n = 3$; 0.3%), East Indian ($n = 3$; 0.3%), Hispanic or Latino ($n = 1$, 0.1%) and other ($n = 3$, 0.3%). Approximately 11.4% ($n = 101$) parents did not provide information regarding their child's ethnicity.

This was consistent with the Canadian National Household Survey data from 2011, where individuals who were white or Caucasian individuals represented 76.7% of the Canadian population, 19.1% identified as other visible minorities, and 4.3% identified as Aboriginal (Statistics Canada, 2013). The majority of students had one sibling ($n = 363$, 40.7%), followed by two siblings ($n = 239$, 27%), three or more siblings ($n = 92$, 10.2%) and only a small amount were the only child of the family ($n = 87$, 9.8%). The majority of children (approximately 62%) lived with both parents in the same house ($n = 552$), 18.1% lived with their mother or father in a single-family home ($n = 161$), 6.1% were from separated households and lived with both parents in different houses ($n = 54$), and 1.7% lived with another caregiver ($n = 15$).

Missing data ranged from 8-30% over time, which is considered low to moderate over 5 waves of data collection, and was consistent with previous studies of a similar design (Leadbeater et al., 2015). Other studies that have used a cohort-sequential design have reported missing data up to 46% (Biggs et al., 2010), which was considerably more than reported in this study. An examination of possible differences between those who completed the study and those who dropped out is discussed in the Results section.

Procedure

Prior to data collection, a meeting was conducted with the principal investigator and research assistants on the administration and completion of questionnaires and on preparation of the scanned questionnaires after data collection. Ethics approval was obtained annually from all sites including the Carleton University Psychology Research Ethics Board prior to data collection (#104573 11-085). School board approval was obtained from the school board district superintendents prior to data collection. A letter of invitation (Appendix A) and consent form (Appendix B) were sent home to parents. Two waves of parent consent were conducted (T1 & T2) in an attempt to increase sample size at the younger ages. Parent consent was only required once at the beginning of the study. Passive consent was implied throughout the remainder of the study. Research assistants administered the surveys in classrooms. A statement of anonymity, confidentiality, and privacy was read aloud to students prior to filling out the questionnaire (see Appendix C for scripted assent and debriefing statements). All students were instructed to follow along, and were provided with a blank solid coloured sheet of paper to cover their answers or to cover the words appearing above while completing the questionnaire. Two or three other assistants monitored the children's progress, answered questions, and ensured that the children were following along. First, research assistants read aloud two practice questions "How often do you eat lunch at school?" and "How often does your class go outside to play?" in order to familiarize children with the response scale. These practice questions were not included in the dataset. Children were provided with the questionnaires in the following order: The Things that Happen to Me (THM - Appendix D) questionnaire—which is comprised of

two practice questions to ensure that students are familiar with filling out the questionnaire, the Social Experiences Questionnaire (SEQ - Appendix E) assessing specific forms of victimization and the Your School Experiences questionnaire (YSE) assessing general victimization and school safety— was first distributed to students. This safety item was intentionally put after the victimization questions to prime students to complete school safety questions taking into consideration their experiences of past and current victimization. The School Climate Survey (SCS - Appendix F) assessed various aspects of school climate, and was included directly after the safety question in the THM questionnaire. Research assistants rotated around the classroom to ensure that children were responding to the correct item and monitored their responses. Participants were given approximately 30 minutes per classroom to complete the survey. At the end of each data collection session, children were debriefed by the research assistants and reminded to seek help from a trusted adult if they witnessed or experienced victimization at school. Codes were provided to each child, and identifying site information was stored in a locked and password protected excel file. Data was collected at each site, cleaned, and returned to the site of the Primary Investigator to be compiled into an anonymized dataset. Children who did not complete a wave of assessment were either absent during the day of data collection, did not receive consent (T1 only), withdrew from the study, or moved to schools that were not involved in the study. Efforts were made to collect participants who were missing at every wave. Researchers visited the schools on a subsequent day or tracked children who moved schools to other participating schools. It was estimated that approximately 80% of eligible children participated in the study.

Measures

Physical and relational victimization. Since behaviour based items to assess severity have been encouraged (Sawyer, Bradshaw, & O'Brennan, 2007; Solberg & Olweus, 2003; Vaillancourt et al., 2008), frequency items were used to assess children's experiences of victimization by examining the frequency of behaviours to elicit harm, intentionality, and demonstrate a power imbalance. Children's self-reports of physical and relational peer victimization were measured using the 17-item modified elementary school version of the Social Experience Questionnaire (SEQ; Crick & Grotpeter, 1996; see Appendix E; Desjardins, Yeung, Sukhawathanakul, Leadbeater, & MacDonald, 2013). Child self-report data was collected for behaviours that were characteristic of physical victimization, relational victimization, and prosocial behaviour. Five items pertained to physical victimization (e.g., "How often are you hit by another kid at school?", "How often do you get pushed or shoved by another kid at school?" and "How often does another kid yell at you or call you mean names?", see items 2, 4, 7, 11, 16) which referred to receiving direct harmful physical and verbal behaviours. The relational victimization subscale included five items which are characteristic of behaviours intended to exclude or harm relationships (e.g., "How often does another kid tell lies about you to make others not like you anymore?" and "How often do kids leave you out on purpose when it's time to play or do an activity?", see items 3, 6, 10, 12, 14). Prosocial behaviour items (1, 5, 8, 13 17) were not used in any analyses. For younger children, the SEQ was adapted from a five to a three-point scale from 0 = *never*, 1 = *sometimes*, and 2 = *almost all the time* (Desjardins et al., 2013; Leadbeater & Hoglund, 2009; Leadbeater et al., 2003; Leadbeater & Sukhawathanakul, 2011). Higher scores were associated with more

frequent victimization and total scores were used for all analyses and ranged from 0-10. This measure has demonstrated good internal reliability values for physical victimization (Cronbach's $\alpha = .76$) and relational victimization (Cronbach's $\alpha = .72$; Leadbeater et al., 2003) in cross sectional studies, and were consistent with the original internal consistency coefficients (Cronbach's alpha) of .78 for physical victimization and .80 for relational respectively (Crick & Grotpeter, 1996). In this study, Cronbach's alpha ranged from .80 to .83 for physical victimization and .80 to .84 for relational victimization. In longitudinal studies, researchers have demonstrated that elementary school children are able to understand and distinguish the separate constructs of physical and relational victimization separately over time regardless of age, sex, and grade level (Desjardins et al. 2013; Desjardins & Leadbeater, 2010).

Children's perceptions of school safety. Children's perceptions of school safety were measured by a single item "How often do you feel safe at school?" on the Your School Experiences (YSE) Questionnaire (Appendix E). This item was intentionally included directly after the specific victimization questions to prime their reports of experiences of feelings of safety based upon their victimization experiences. This single safety item was measured on a 5-point scale, which included 1 (*at no time*) to 5 (*all the time*). Higher original scores indicated increased feelings of safety at school. This scale was modified into a three-point scale similar to Rigby and Slee (1998): never (*at no time*), sometimes (*sometimes* and *few times*), and always (*many times* and *all the time*). The scale was structured such that higher scores represented feeling less safe at school to match the typical positively skewed distribution of victimization (0 = *always safe*, 1 = *sometimes safe*, 2 = *never safe*; Tabachnick & Fidell, 2007). This single item

demonstrated good face validity.

Children's perceptions of school climate. The School Climate Survey (SCS; Hayes, Emmons, & Comer, 1993) was used to assess children's perceptions of the social and physical characteristics of their school environment, however only the social components were used for this study (see Appendix F). School climate was measured on a three-point Likert scale from 2 (*agree*), 1 (*not sure*), and 0 (*disagree*). Higher original scores reflected children's perceptions of a positive school climate. This self-report version was comprised of five subscales: (1) Teacher-Child Relationships, (2) Student-Interpersonal Relationships (3) Fairness, (4) Sharing of Resources, and (5) Parent Involvement. Relationship factors of school climate (student and teacher relationships) and relationships based on equal treatment with school (fairness) were examined in this study. This item response was reverse scored (0 = *agree*, 1 = *not sure*, 2 = *disagree*) so that higher scores indicated more negative perceptions of school climate to match the typical positively skewed distribution of victimization (Tabachnick & Fidell, 2007).

The Teacher-Child Relationships subscale referred to caring and trust between teachers and students within a school (e.g., "My teachers work hard to get me to do well on tests", items 10, 11, 17, 19, 25, 27, 29, 34, and 36). The Student-Interpersonal (Peer) Relationships subscale referred to caring, respect, and trust among students within a school (e.g., "Children at my school are caring people", items 2, 5, 15, 16, 21, 24, and 33). School fairness referred to equal treatment of students from their school teachers and administrators regardless of ethnicity or socioeconomic status (e.g., "Everyone is treated equally well at my school", items 3, 7, 13, 30 and 31). The Cronbach's alpha values demonstrated good internal consistency for teacher-child relationships ($\alpha = .87$), student-

interpersonal relationships ($\alpha = .84$), and fairness ($\alpha = .83$). Studies have demonstrated that the survey subscales were equivalent across the elementary school years (Leadbeater, Sukhawathankul, Thompson, & Holfield, 2015) and reliability of the subscales over time that ranged from $\alpha = .76$ to $.80$ at each time point (Leadbeater et al., 2015). Cronbach's alpha in this study for Teacher relationships ranged from $\alpha = .83$ to $.89$, Peer relationships ranged from $\alpha = .82$ to $.88$, and fairness ranged from $\alpha = .77$ to $.81$. Leadbeater et al. (2015) demonstrated that the elementary school version of the SCS was predictive of children's reports of physical and relational victimization, as well as internalizing and externalizing problems as reported by both parents and teachers.

Data Analytic Strategy: Growth Curve Modeling

An individual longitudinal growth curve modeling approach was used to provide greater detail in understanding how children's levels of victimization and their rates of change in victimization were associated with their perceptions of school climate and school safety over time. This approach also allowed for children's rates of victimization to be correlated over time points, as Ordinary Least Squares Regression models have assumed that measurements are independent (Howard, 2015; Hox & Boom, 2012; Singer & Willett, 2003). In addition, it is important to utilize a method that can account for longitudinal data that has nesting structure involved and data closer in time is likely to be more similar than independent. This nesting structure includes occasions over time that are nested within an individual child (Level-1), differences between children (Level-2), and the differences between schools (Level-3; Field, 2009; Hoffman, & Stawski, 2009; Luke, 2010; Raudenbush & Bryk, 2002).

Two cohorts of children were followed at the same time and were expected to

follow an overall extended victimization trajectory from grades 3 to 6 (Miyakazi & Raudenbush, 2000). This design was beneficial since obtaining a trajectory that was extended to 3 years (with seven time points) was collected within a shorter time span of 2.5 years (with five time points) and was less affected by participant drop out due to the shorter time span (Galbraith, Bowden, & Mander, 2014). This design was used by Olweus (2005), by joining cohorts of children in grades that were of similar ages to compare bullying trajectories. Since no significant differences were found between cohorts in their slopes of victimization in this study, an extended victimization trajectory was formed from grades 3 to 6 by merging children from two cohorts (cohort 1 starting in grades 3 and ending in grade 5; and cohort 2 starting in grade 4 and ending in grade 6 (Raudenbush & Chan, 1992). The shape of the physical and relational victimization trajectories were explored through linear and curvilinear models, and variability in the levels and rates of change were explored.

Time varying predictor variables of school climate and school safety in this study changed in two ways: (1) relative to the child's own average (within-person), and (2) relative to the overall average of the sample (between-person). In using this method, each child was expected to vary in their levels and rates of victimization change across occasions as well as between children (Hoffman, 2015; Singer, 1998; Singer & Willett, 2003).

The first model allowed the intercept (level of victimization at grade 5 fall) to vary to determine if each child differed in their own levels of victimization and if children differed from one another in their levels of victimization. Second, random slopes were compared to the random intercept model to determine if children varied in the rate of

change of their victimization trajectories. Since variation was expected among children's individual intercepts (levels of victimization) and slopes (changes in victimization), time varying school safety and school climate were added at Level-1 to attempt to explain why some children were different than others in their rates and changes of relational and physical victimization. At the second level, the time invariant (non-changing) variables of sex, and averages of school climate and safety were introduced to explain the variation between children's initial levels of and rates of change in victimization. Differences in victimization experiences were examined for boys and girls, conditional on levels of school safety and school climate. The interactions with time were added to the third step, and interactions between school safety and school climate were examined last.

Results

A preliminary investigation of the data were conducted. Measures of central tendency (Means and standard deviations, frequency and percentages) and correlations were reported for all variables for the total sample. Mechanisms for addressing missing data were reported below as handled by multiple imputation. Growth curve modeling of relational and physical victimization as outcomes were conducted, and all predictor variables were centered at the person level mean (Level-1) and at the grand mean (Level-2).

Preliminary Data Analysis

Preliminary data were analyzed using IBM SPSS statistics version 24.0 and SAS Studio Software 9.4. An investigation of the scatterplots and range data was performed first in SPSS 22 and re-checked in SAS studio software to ensure variables were within the correct range and to observe for missing data. Descriptive measures of central

tendency (Mean and SD) for the outcome variables of victimization, and school climate were reported for the total sample in Table 1. The frequencies and percentages for school safety were reported in Table 2. Data reported by cohort is presented in Appendix G-I. Approximately 74-83% of children always felt safe at school, 13-21% felt safe sometimes, and less than 5% never felt safe at school from grades 3 to 6. Missing data were explored for victimization, school safety, and school climate variables in total and for each cohort (Table 3). This examination revealed up to 30% missing data for the total sample at T5. To examine attrition in this sample, an examination of the missing data pattern after a full wave was completed. A small frequency ($n = 47$) had completed the first wave and dropped out after the first wave, 16 had the first two waves complete and dropped out after the second wave, 75 had the first three waves complete and dropped out after the third wave, and 72 had four complete waves and dropped out at T5. The remaining missing data in the sample was arbitrary. Higher rates of dropout at T4 and T5 were possibly a result of school changes, moving and/or parent withdrawal.

Missing data. Missing data at the end of the study was compared to the child's descriptive information as well as victimization, safety and school climate variables. A significantly higher proportion of children in the grade 3 cohort ($n = 133/433$; 30.72%) were more likely to drop out by T5 compared to children in the grade 4 cohort ($n = 110/453$; 24.28%), $\chi^2(1) = 4.60, p = .03$. There were no significant differences found for sex, program involvement, SES, and ethnicity in drop out by T5. No significant differences were found for those who dropped out by T5 and for those who did not drop out in their victimization experiences, perceptions of school safety, and in school climate at T1 and at T2.

Table 1

Average Scores for Victimization and School Climate for Total Sample

	Overall Mean	Grade 3 Spring	Grade 4 Fall	Grade 4 Spring	Grade 5 Fall	Grade 5 Spring	Grade 6 Fall	Grade 6 Spring
Physical, M	2.27	2.79	2.60	2.44	2.16	2.12	1.91	1.65
SD	1.82	2.44	2.33	2.35	2.16	2.16	2.02	1.85
N	886	383	394	797	759	703	374	343
Range	0-10	0-10	0-10	0-10	0-10	0-10	0-10	0-9
Relational, M	2.56	2.93	2.83	2.83	2.37	2.43	2.09	2.02
SD	2.01	2.46	2.48	2.47	2.36	2.44	2.31	2.24
N	886	383	394	796	759	703	374	343
Range	0-10	0-10	0-10	0-10	0-10	0-10	0-10	0-10
Teacher, M	2.35	1.76	1.82	2.17	2.05	2.62	2.73	2.84
SD	2.80	2.82	3.06	3.45	3.13	3.75	3.95	3.82
N	886	383	392	795	759	703	374	343
Range	0-18	0-16	0-18	0-18	0-17	0-18	0-18	0-18
Peers, M	4.72	4.07	4.41	4.52	4.73	4.90	5.09	4.86
SD	2.88	3.28	3.48	3.56	3.50	3.67	3.61	3.71
N	886	383	392	795	759	703	374	343
Range	0-14	0-14	0-14	0-14	0-14	0-14	0-14	0-14
Fairness, M	2.98	2.83	2.96	2.99	2.97	2.98	2.84	2.74
SD	2.20	2.58	2.71	2.72	2.70	2.83	2.83	2.80
N	886	383	392	795	758	702	374	343
Range	0-10	0-10	0-10	0-10	0-10	0-10	0-10	0-10

Note. Total N at shared time points (Grade 4 spring, grade 5 fall, grade 5 spring) = 886;
 Total N for Cohort 1 (Grade 3 spring, grade 4 fall) = 433; Total N for Cohort 2 (Grade 6
 fall, grade 6 spring) = 453

Table 2

School Safety Percentages for the Total Sample

School safety	Grade 3 Spring	Grade 4 Fall	Grade 4 Spring	Grade 5 Fall	Grade 5 Spring	Grade 6 Fall	Grade 6 Spring
Total N	383	389	793	775	694	370	340
Always, %	73.89	74.04	76.55	81.03	78.10	83.24	83.24
N	283	288	607	628	542	308	283
Some, %	21.93	21.59	20.55	15.35	18.87	13.79	14.11
N	84	84	163	119	131	51	48
Never, %	4.18	4.37	2.98	3.61	3.02	2.97	2.65
N	16	17	23	28	21	11	9

Note. Total N at shared time points (Grade 4 spring, grade 5 fall, grade 5 spring) = 886; Total N for Cohort 1 (Grade 3 spring, grade 4 fall) = 433; Total N for Cohort 2 (Grade 6 fall, grade 6 spring) = 453.

Table 3

Missing Data on Victimization, School Climate and School Safety for Total Sample and by Cohort from T1-T5

Cohort	T1		T2		T3		T4		T5	
	C1	C2	C1	C2	C1	C2	C1	C2	C1	C2
Sex (T1), %	.00	0								
N	1	0								
Age, %	2.6	1.3	2.6	1.3	2.6	1.3	2.8	1.3	2.6	1.1
Cohort, N	11	6	11	6	11	6	12	6	11	5
Total, %	1.9		1.9		1.9		1.9		1.8	
Total, N	17		17		17		17		16	
Victimization										
Physical, %	11.5	9.7	9.01	8.2	10.4	11.0	20.8	17.4	30.7	24.3
Cohort, N	50	44	39	37	45	50	90	79	133	110
Total, %	10.6		8.6		10.7		19.1		27.4	
Total, N	94		76		95		169		243	
Relational, %	11.5	9.7	9.01	8.2	10.6	11.0	20.8	17.4	30.7	24.3
Cohort, N	50	44	39	37	46	50	90	79	133	110
Total, %	10.6		8.6		10.8		19.1		27.4	
Total, N	94		76		96		169		243	
School climate										
Teacher, %	11.5	9.7	9.5	8.2	10.9	11.0	20.8	17.4	30.8	24.3
Cohort, N	50	44	41	37	47	50	90	79	133	110
Total, %	10.6		8.8		10.9		19.1		27.4	
Total, N	94		78		97		169		243	
Peers, %	11.5	9.7	9.5	8.2	10.9	11.0	20.8	17.4	30.8	24.3
Cohort, N	50	44	41	37	47	50	90	79	133	110
Total, %	10.6		8.8		10.9		19.1		27.4	
Total, N	94		78		97		169		243	
Fairness, %	11.5	9.7	9.5	8.4	10.9	11.3	20.8	17.4	30.8	24.3
Cohort, N	50	44	41	38	47	51	90	79	133	110
Total, %	10.6		8.9		11.1		19.1		27.4	
Total, N	94		79		98		169		243	
School safety, %										
Cohort, N	50	44	44	39	49	56	92	83	136	113
Total, %	10.6		9.4		11.9		19.8		28.1	
Total, N	94		83		105		175		249	

Note. Total sample N = 886; Cohort 1 (C1), n = 433; Cohort 2 (C2), n = 453

The percentages of missing data at any point in time by outcome were reported. A total of 6.5% ($n = 58/886$) completed one wave at any point in time, and 15% ($n=9/58$) reported they were never victimized; 3.6% ($n = 32/886$) completed two waves overall and 6.3% ($n= 2/32$) were never victimized over the two completed waves, 12.5% ($n = 111/886$) completed three waves overall, and less than 1% ($n=1/111$) were never victimized over the three completed waves; 17.6% ($n = 156/886$) completed four waves overall and less than 2% ($n = 3/156$) were never victimized over the four completed waves, and 59.7% ($n = 529/886$) children completed all five waves and less than 2% ($n = 6/529$) were never victimized. In total, approximately 89.7% ($n = 796/886$) completed at least three or more waves, as this was important to properly estimate a child's trajectory over time (Singer & Willett, 2003). Any child with one data point available was included in this sample and missing data were imputed. The details of the imputation were provided below.

Multiple imputation. To prevent the automatic deletion of children with any missing data point on school climate or safety and to produce valid parameter inferences, multiple imputation was conducted (Enders, 2010; Garson, 2015; Little & Rubin, 1987; Schafer, 1997). Multiple imputation was conducted on the wide dataset using PROC MI in SAS (Allison, 2000; Yuan, 2011), and generated 50 complete datasets for all time points since there was approximately 30% data missing (Enders, 2010). The estimates were pooled by PROC MIANALYZE and the imputed estimates were used for all further analyses. Gender and cohort were included in the imputation model as auxiliary variables, which have shown to help provide additional information for the missing estimates (Hardt, Herke, & Leonhart, 2012). A more detailed description of the imputation can be found in Appendix J.

Intercorrelations

Correlations were examined between physical and victimization, school climate, and school safety at all time points.

Physical victimization, relational victimization and safety. Physical and relational victimization were moderately correlated at each time point, with the strongest correlations at common measurements in time between .59 and .67 (Table 4). This indicated that higher physical victimization was related to higher relational victimization. No correlations between physical and relational victimization were above .70. A decision was made to pursue physical and relational victimization as separate outcomes, as significant gender differences have been found in the frequency of the different forms of victimization by others (Biggs et al., 2010; Crick & Bigbee, 1996; Crick et al., 1999; Elsaesser, Gorman-Smith & Henry, 2012; Ostrov, 2010; Pellegrini & Long, 2002; Troop-Gordon & Ladd, 2005). Physical and relational victimization were both significantly positively correlated with school safety at each time point. Correlations were strongest at shared points in time, and ranged from .33 to .45 for physical victimization and from .27 to .50 for relational victimization. This indicated that higher physical and relational victimization were both related to feeling less safe at school.

Table 4

Imputed Correlation Coefficients Between Victimization and Safety

Time	Physical Victimization (PV)					Relational Victimization (RV)					School Safety (SS)				
	T1	T2	T3	T4	T5	T1	T2	T3	T4	T5	T1	T2	T3	T4	T5
PV															
T1	-														
T2	.55*	-													
T3	.48*	.59*	-												
T4	.37*	.46*	.53*	-											
T5	.34*	.45*	.49*	.55*	-										
RV															
T1	.65*	.45*	.43*	.36*	.32*	-									
T2	.43*	.64*	.52*	.42*	.37*	.53*	-								
T3	.39*	.44*	.67*	.45*	.39*	.50*	.60*	-							
T4	.29*	.36*	.43*	.62*	.44*	.42*	.50*	.59*	-						
T5	.27*	.35*	.38*	.41*	.59*	.35*	.44*	.49*	.58*	-					
SS															
T1	.41*	.31*	.25*	.21*	.21*	.38*	.33*	.28*	.20*	.19*	-				
T2	.30*	.39*	.30*	.25*	.22*	.29*	.39*	.30*	.19*	.21*	.39*	-			
T3	.28*	.31*	.45*	.30*	.27*	.30*	.36*	.50*	.31*	.26*	.30*	.34*	-		
T4	.18*	.25*	.32*	.38*	.28*	.22*	.26*	.35*	.41*	.25*	.21*	.32*	.40*	-	
T5	.17*	.24*	.25*	.24*	.33*	.17*	.22*	.26*	.22*	.27*	.18*	.28*	.31*	.34*	-

Note. Correlation coefficients are from PROC MIANALYZE * = p < .001

Victimization, school climate, and school safety. School climate variable and school safety were both related to relational and physical victimization (Table 5). For physical victimization, the strength of these correlations were moderate (Cohen, 1992) and ranged from .25-.31 for teacher-child relationships, .33-.40 for student interpersonal relationships, and .28-.35 for fairness. This indicated that as children's teacher relationships, student relationships and fairness became increasingly poor, the higher their reported physical victimization. For relational victimization, correlations for school climate were strongest at shared (concurrent) points in time. These correlations ranged from .24-.33 for teacher-child relationships, .34-.39 for student interpersonal relationships, and .33-.37 for fairness. Similar to the findings for physical victimization, these significant positive correlations indicated that as children's teacher relationships, student relationships and fairness became increasingly poor, the higher their reported relational victimization.

School climate and school safety. Correlations between the independent variables of school climate and safety were also examined in Table 6. All school climate variables were moderately related and below .70. The strongest correlations were between student interpersonal relationships and fairness (.60-.68). This indicated that the more students rated their interpersonal relationships as poor, the less fair they felt they were treated. The relationship between school safety and school climate was also significant. All correlations were moderate, and indicated that when teacher relationships, student relationships and fairness were increasingly poor, the less safe children felt at school.

Table 5

Imputed Correlations for Victimization, School Climate and School Safety

Time	Physical Victimization (PV)					Relational Victimization (RV)					School Safety (SS)				
	T1	T2	T3	T4	T5	T1	T2	T3	T4	T5	T1	T2	T3	T4	T5
TC															
T1	.25*	.20*	.20*	.16*	.13*	.24*	.20*	.16*	.13*	.15*	.33*	.23*	.16*	.14*	.14*
T2	.21*	.25*	.26*	.16*	.18*	.18*	.27*	.27*	.12*	.18*	.27*	.44*	.28*	.23*	.20*
T3	.15*	.22*	.31*	.18*	.16*	.18*	.24*	.33*	.19*	.15*	.23*	.28*	.40*	.29*	.20*
T4	.17*	.24*	.26*	.32*	.19*	.15*	.22*	.25*	.29*	.20*	.24*	.23*	.28*	.40*	.18*
T5	.20*	.28*	.26*	.25*	.29*	.19*	.27*	.28*	.25*	.32*	.21*	.24*	.25*	.28*	.42*
SI															
T1	.39*	.28*	.24*	.18*	.19*	.39*	.28*	.25*	.17*	.20*	.39*	.27*	.17*	.13*	.15*
T2	.22*	.37*	.28*	.23*	.27*	.24*	.35*	.23*	.18*	.20*	.29*	.39*	.22*	.20*	.21*
T3	.17*	.29*	.40*	.26*	.26*	.23*	.30*	.38*	.24*	.22*	.23*	.29*	.42*	.26*	.24*
T4	.24*	.27*	.32*	.38*	.28*	.25*	.29*	.32*	.37*	.22*	.24*	.28*	.32*	.37*	.25*
T5	.18*	.24*	.25*	.22*	.33*	.15*	.22*	.27*	.28*	.34*	.13*	.18*	.22*	.20*	.36*
FA															
T1	.34*	.27*	.20*	.19*	.21*	.33*	.25*	.18*	.18*	.20*	.35*	.26*	.20*	.15*	.21*
T2	.27*	.34*	.25*	.22*	.24*	.25*	.34*	.24*	.21*	.22*	.27*	.33*	.23*	.24*	.23*
T3	.17*	.25*	.35*	.23*	.22*	.21*	.28*	.37*	.25*	.22*	.22*	.28*	.39*	.25*	.25*
T4	.18*	.25*	.21*	.31*	.23*	.21*	.27*	.27*	.34*	.23*	.22*	.19*	.27*	.35*	.25*
T5	.19*	.24*	.19*	.25*	.28*	.21*	.24*	.25*	.29*	.33*	.16*	.17*	.25*	.24*	.36*

Note: Correlation coefficients are from PROC MIANALYZE * = $p < .001$, TC = Teacher child relationships, SI = student interpersonal (peer) relationships, FA = fairness

Table 6
Imputed Correlations for all School Climate Variables

	Teacher-Child (TC)					Student-Interpersonal (SI)					Fairness (FA)				
	T1	T2	T3	T4	T5	T1	T2	T3	T4	T5	T1	T2	T3	T4	T5
TC															
T1	-														
T2	.45*	-													
T3	.46*	.60*	-												
T4	.32*	.40*	.50*	-											
T5	.35*	.42*	.48*	.61*	-										
SI															
T1	.51*	.38*	.31*	.27*	.29*	-									
T2	.39*	.48*	.36*	.32*	.35*	.58*	-								
T3	.29*	.38*	.51*	.35*	.36*	.44*	.60*	-							
T4	.25*	.29*	.35*	.52*	.44*	.41*	.48*	.57*	-						
T5	.21*	.24*	.28*	.35*	.57*	.38*	.43*	.48*	.60*	-					
FA															
T1	.48*	.33*	.27*	.26*	.27*	.67*	.48*	.35*	.33*	.26*	-				
T2	.34*	.45*	.32*	.25*	.26*	.46*	.63*	.43*	.37*	.30*	.54*	-			
T3	.31*	.35*	.54*	.37*	.34*	.38*	.44*	.68*	.46*	.35*	.40*	.54*	-		
T4	.22*	.26*	.34*	.55*	.40*	.30*	.35*	.40*	.62*	.40*	.37*	.46*	.57*	-	
T5	.19*	.22*	.29*	.38*	.55*	.35*	.34*	.38*	.43*	.60*	.39*	.39*	.50*	.61*	-

Note. Correlation coefficients are from PROC MIANALYZE *= p < .001.

Growth Curve Modeling

Individual growth curve models were conducted using SAS PROC MIXED Software (Bell, Ene, Smiley, & Schoeneberger, 2013; Hoffman, 2015; Singer, 1998) to assess the levels and rates of change in overt and relational victimization. The ICC's were first examined to determine the amount of variability in victimization that occurred between children and between occasions for the same child that could be explained by school safety and school climate. Both linear and quadratic forms of change were examined for the average shape of the trajectories for physical and relational victimization. Lower AIC and BIC values and deviance tests (-2LL) were used to assess model fit, where smaller values indicated a better fit (Hoffman, 2015; Singer & Willett, 2003). Prior to creating the models, the predictor variables were centered.

Centering predictor variables. For the intercept to have a meaningful value, time was centered at grade 5 fall. All school climate variables were centered to provide a meaningful intercept value when equalled to 0. Person mean centered school climate reflected deviations in a child's perceptions of school climate than what was usual (positive coefficients = worse than usual; negative = better than usual; 0 = child's average), whereas grand mean centered school climate reflected the deviation in a child's overall perception of school climate relative to all children in the sample (positive coefficients = worse overall compared to the average; negative = better overall compared to the overall average; 0 = at the grand mean). Within person school safety was transformed into two variables (sometimes safe and never safe), whereas between person school safety reflected the proportion each child felt safe sometimes and never felt safe. Further details of how the variables were centered are reported in Appendix K.

Within-person centered variables (e.g., teacher relationships, peer relationships, fairness, feeling safe sometimes and never feeling safe) were included in the first step. Time invariant variables (e.g., sex) and grand mean centered variables (e.g., overall teacher relationships, peer relationships, fairness, and proportion of feeling safe sometimes and never feeling safe) were added to the second model. In the third model, interactions with time were added to determine the rate of change in victimization for each of the predictors. Finally in the fourth model, interactions between gender, school climate, school safety, and time were examined to determine if victimization trajectories differed for boys and girls based on their perceptions of school climate and safety. Due to the vast amount of interactions tested, the fourth model is presented in a separate table.

Separating the variance in victimization. A two level random intercept model (Table 7 – Model 1A) was used to partition the variance in two: (1) including the variance in occasions and (2) differences between children in physical and relational victimization. The ICC for physical victimization (Table 7 – Model 1A) indicated that 46% ($2.42/2.42+2.83$) of the variability in children's experiences were explained by the differences between children, with the remaining 54% ($2.42/2.42 + 2.83$) was accounted for by variability in occasions for a child.

Table 7

Random Intercept and Slope Model Building for Relational and Physical Victimization Trajectory

	Model 1A: random child intercepts only	Model 2A: Random intercepts, random slope	Model 2B: Random intercept, fixed slope	Model 3A: Random intercept, random slope, fixed quadratic
Physical Victimization				
Gr 5 Mean	2.23** (0.06)	2.23** (0.06)	2.23** (0.06)	2.23** (0.07)
Rate of change		-0.22** (0.02)	-0.22** (0.02)	-0.22** (0.03)
Acceleration				-0.003 (0.01)
Covariance (2,1)		-0.16*		-0.16*
Intercept (1,1)	2.42**	2.51**	2.45**	2.51**
Slopes (2,2)		0.13**		0.13**
Residual	2.83**	2.34**	2.70**	2.35**
Parameters	3	6	4	7
-2LL	18648	18367	18475	18367
AIC	18654	18379	18483	18381
BIC	18669	18408	18502	18414
Relational Victimization				
Gr 5 Mean	2.51** (0.07)	2.52** (0.07)	2.52** (0.07)	2.52** (0.07)
Rate of change		-0.19** (0.03)	-0.19** (0.03)	-0.19** (0.03)
Acceleration				-0.00
Covariance (2,1)		-0.04		-0.04
Intercept (1,1)	3.06**	3.11**	3.07**	3.11**
Slopes (2,2)		0.15**		0.15**
Residual	2.70**	2.70**	3.09**	2.70**
Parameters	3	6	4	7
-2LL	19260	19068	19153	19068
AIC	19266	19080	19161	19082
BIC	19281	19109	19180	19115

Note. ** p<.001, * <.05, Estimates are from PROC MIANALYZE with 50 combined imputation estimates.

The ICC value for relational victimization indicated that 53% ($3.06/2.70 + 3.06$) of the variance in the level of relational victimization was accounted for by differences between children, while the remaining 47% ($2.70/3.70 + 2.06$) was accounted for by the variability in occasions for a child.

Determining the shape of victimization trajectories. To determine the overall shape of children's victimization trajectories from grades 3 to 6, an unconditional model was examined with only time included (Model 2A). Both linear and quadratic time were examined. When a slope parameter was added to the model and set as random in Model 2A (indicating that each child had a different rate of change in their relational victimization trajectory), this indicated a better model fit for both physical victimization, $-\Delta 2LL(3) = 281, = p < .001$, and relational victimization, $-\Delta 2LL(3) = 192, = p < .001$. A quadratic effect was included in Model 3A to determine if children became faster or slower in their rate of change in victimization over time, however the acceleration parameter was not significant and was removed from the model. Therefore, Model 2A included the best fit for relational and physical victimization by predicting an overall linear declining trajectory, where children experienced variability in their levels (random intercepts) and in their rates of change (random slopes) over time. The AIC, BIC, and deviance statistics ($-2LL$) were smaller, indicating a better model fit.

The final unconditional linear growth model for victimization is shown in the equation below, with random intercepts and random slopes:

$$\text{Level 1: } \text{victimization}_{ti} = \beta 0_i + \beta 1_i(\text{Time}_{ti}) + e_{ti}$$

$$\text{Level 2: } \beta 0_i = \gamma_{00} + U_{0i}$$

$$\beta 1_i = \gamma_{10} + U_{1i}$$

Composite equation: $\text{victimization}_{ti} = (\gamma_{00} + U_{0i}) + (\gamma_{10} + U_{1i})(\text{Time}_{ti}) + e_{ti}$

The linear model allowed children to have their own individual victimization trajectory, which included different victimization levels (intercepts) and rates of change (slopes). The meaning of these parameters were as follows: γ_{00} was the predicted victimization level at grade 5 fall and U_{0i} was how much an individual child deviated from the predicted intercept; γ_{10} was the predicted mean rate of change in victimization from the fall to spring of each year and U_{1i} was by how much the individual child deviated in slope from the predicted linear slope. The level 1 residual variance (e_{ti} parameter) was the time-specific deviation of by how much the child deviated from their own predicted trajectory. A covariance estimate was also included to reflect the relationship between children's levels and changes in their victimization rates to reflect whether children who were higher in victimization decreased at faster rates than others.

In Table 7, Model 2A shows that relational and physical victimization both followed overall declining trajectories and were similar in their rates of change. In the unconditional models with no predictors, relational victimization was at 2.52 in the fall of grade 5 and decreased by approximately 8% ($0.19/2.52$) from fall to spring of each school year, while physical victimization was at 2.23 in the fall of grade 5 and decreased by approximately 10% ($0.22/2.23$) from fall to spring of each school year. To confirm this decreasing trajectory, the raw relational victimization means for each cohort were plotted against the predicted declining trajectory for physical victimization (Figure 2) and relational victimization (Figure 3), which confirmed a declining trajectory from grade 3 to 6.

Figure 2. The predicted linear trajectory for physical victimization and raw estimates for each cohort from grades 3 to 6.

Figure 3. The predicted linear trajectory for relational victimization and raw estimates for each cohort from grades 3 to 6.

Physical Victimization Model

Conditional school climate and school safety models. For the physical victimization model (Table 8), the addition of the Level-1 within person centered school climate and school safety variables reduced the intercept variance in physical victimization by approximately 15% ($2.51-2.14/2.51$), slope variance by 15% ($0.13-0.11/0.13$), and the residual error variance by 9% ($2.34-2.14/2.30$). In the Level-2 model, program participation (0 = no program; 1 = program) was included as a covariate (Raudenbush & Bryk, 2002; Peugh, 2009) and all models with level 2 variables were conditional on non-significant program effects. The interpretation of the school climate and safety estimates were conditional on non-significant program status and sex, although non-significant effects were not included in the tables. The addition of the level 2 predictors further reduced the intercept variance of physical victimization by an additional 30% ($2.14-1.49/2.14$). When interactions with time were added to the model, the reduction in residual variability was less than 1%. Interactions were added to determine if the associations between school climate and victimization, as well as safety and victimization were different for girls and boys. In addition, interactions were tested between school safety and school climate to determine the changes in children's victimization trajectories for children who felt more or less safe based on their perceptions of school climate. Parameters were interpreted in the final model (Table 9).

Interactions with school climate, school safety, and gender. Table 9 is an extension of Table 8, and included both within person and between person interactions of school safety, school climate, and gender, along with interactions by time.

Table 8

Linear Growth Trajectory Model for Physical Victimization with Between and Within Centered Predictors of School Climate and School Safety

	Model 2A: Unconditional Random intercepts, random slope	Model 3A: Conditional Level 1 model	Model 3B: conditional Level 1 and 2 model	Model 4 Level 1 and 2 with Time
Gr 5 Mean	2.23** (0.06)	2.03** (0.06)	1.99 ** (0.09)	1.97** (0.09)
Fixed Parameters				
Teacher (PM)		0.01 (0.01)	0.01 (0.01)	0.02 (0.01)
Peers (PM)		0.11** (0.02)	0.12** (0.01)	0.12** (0.02)
Fairness (PM)		0.05* (0.02)	0.06* (0.02)	0.05* (0.02)
Sometimes safe (PM)		0.85** (0.10)	0.57** (0.10)	0.55** (0.10)
Never safe (PM)		1.56** (0.22)	1.06** (0.24)	1.00** (0.24)
Level 2				
Girls = 1			-0.40** (0.10)	-0.40** (0.10)
Teacher (GM)			0.01 (0.03)	0.01 (0.03)
Peers (GM)			0.15** (0.03)	0.15** (0.03)
Fairness (GM)			0.06 (0.04)	0.07 (0.04)
Sometimes safe (GM)			1.27** (0.26)	1.39** (0.26)
Never (GM)			2.40** (0.59)	2.47** (0.59)
Rate of change	-0.22** (0.02)	-0.22** (0.02)	-0.22** (0.02)	-0.17** (0.04)
Teacher (PM)				0.02 (0.01)
Peers (PM)				-0.02 (0.01)
Fairness (PM)				-0.01 (0.00)
Sometimes safe (PM)				-0.04* (0.06)
Never safe (PM)				-0.11 (0.01)
Girls = 1				-0.01 (0.04)
Teacher(GM)				-0.00 (0.01)
Peers (GM)				0.00 (0.01)
Fairness (GM)				-0.01 (0.02)

Sometimes (GM)				-0.22 (0.12)
Never (GM)				0.01 (0.30)
Covariance (2,1)	-0.16*	-0.13*	-0.11*	-0.11*
Intercept (1,1)	2.51**	2.14**	1.49**	1.49**
Slopes (2,2)	0.13**	0.11*	0.11*	0.11*
Residual	2.34**	2.14**	2.13**	2.12**
Parameters	6	11	17	28
-2LL	18367	17904	17624	17586
AIC	18379	17926	17658	17642
BIC	18408	17979	17739	17643

Note. ** $p < .001$, * $p < .05$, Estimates are from PROC MIANALYZE with 50 combined imputation estimates; PM = Person mean centered; GM = grand mean centered.

Table 9

Interactions Between Gender, School Safety, and School Climate for Physical Victimization

Parameters	Level Gr. 5 fall	SE	p	Rate of Change	SE	p
Physical Victimization Trajectory Main Effects	1.790	0.148	<0.001	-0.217	0.063	<0.001
TV (PMC)						
Teacher	0.013	0.022	0.567	0.009	0.014	0.544
Peers	0.120	0.024	<0.001	-0.037	0.016	0.018
Fairness	0.054	0.031	0.082	-0.001	0.020	0.981
Sometimes	0.636	0.151	<0.001	-0.048	0.086	0.573
Never	0.255	0.351	0.469	-0.125	0.216	0.562
TI (GMC)						
Girls	-0.264	0.203	0.193	0.013	0.085	0.881
Teacher	-0.077	0.050	0.128	0.003	0.022	0.902
Peers	0.169	0.052	0.001	0.001	0.021	0.979
Fairness	0.118	0.069	0.087	-0.015	0.028	0.588
Sometimes	1.256	0.406	0.002	-0.171	0.189	0.365
Never	2.390	1.044	0.023	-0.098	0.478	0.837
TV and TI Interactions						
TV (PMC) x girls						
Teacher	0.003	0.028	0.912	0.002	0.017	0.901
Peers	-0.007	0.029	0.818	0.023	0.019	0.226
Fairness	-0.008	0.037	0.822	-0.029	0.023	0.203
Sometimes	-0.181	0.210	0.391	-0.041	0.115	0.723
Never	0.033	0.471	0.944	-0.166	0.289	0.566
TI (GMC) x girls						
Teacher	0.112	0.056	0.046	-0.006	0.024	0.811
Peers	-0.063	0.059	0.290	0.001	0.025	0.961
Fairness	-0.064	0.077	0.401	0.006	0.032	0.859
Sometimes	0.056	0.536	0.917	-0.077	0.233	0.742
Never	-0.392	1.292	0.762	0.033	0.632	0.958
School Climate (SC) and School Safety (SS) interactions						
TV (PMC) SC x						

TV (PMC) SS						
Teacher*Some	0.030	0.046	0.521	0.003	0.028	0.921
Peers*Some	-0.022	0.053	0.681	-0.016	0.032	0.614
Fairness*Some	0.073	0.068	0.283	0.019	0.042	0.650
Teacher*Never	0.126	0.082	0.128	0.050	0.051	0.325
Peers*Never	0.010	0.117	0.934	0.069	0.069	0.315
Fairness*Never	-0.180	0.143	0.210	-0.167	0.089	0.063
TV (PMC) SC x						
TI (GMC) SS						
Teacher*Some	-0.045	0.073	0.542	0.011	0.044	0.811
Peers*Some	0.021	0.083	0.803	0.010	0.053	0.856
Fairness*Some	-0.046	0.109	0.674	0.015	0.070	0.834
Teacher*Never	0.033	0.128	0.798	0.025	0.093	0.786
Peers*Never	-0.133	0.185	0.473	-0.002	0.115	0.988
Fairness*Never	0.242	0.237	0.309	0.196	0.137	0.156
TI (GMC) SC x						
TI (GMC) SS						
Teacher*Some	-0.027	0.123	0.828	0.006	0.055	0.911
Peers*Some	0.113	0.147	0.440	-0.071	0.064	0.267
Fairness*Some	-0.011	0.173	0.950	0.082	0.074	0.267
Teacher*Never	0.265	0.258	0.305	-0.110	0.120	0.359
Peers*Never	-0.260	0.462	0.574	0.148	0.213	0.487
Fairness*Never	-0.185	0.476	0.697	0.119	0.226	0.600
TI SC (GMC) x						
TV (PMC) SS						
Teacher*Some	0.023	0.045	0.610	0.001	0.029	0.976
Peers*Some	0.027	0.050	0.588	0.068	0.032	0.035
Fairness*Some	-0.037	0.064	0.566	-0.076	0.041	0.063
Teacher*Never	-0.024	0.098	0.804	0.013	0.066	0.849
Peers*Never	0.153	0.141	0.278	0.029	0.102	0.779
Fairness*Never	0.260	0.175	0.139	-0.095	0.125	0.449
Covariance (2,1)						
Intercept (1,1)	-0.11					
Slopes (2,2)	1.45					
Residual	0.10					
	2.07					
Parameters						
	96					
-2LL	17454					
AIC	17654					
BIC	18133					

Note. ** $p < .001$, * $p < .05$; Estimates are from 50 imputed datasets; PMC= Person mean centered; GMC = grand mean centered; SC = school climate; SS = school safety.

The addition of the interactions reduced the intercept variance of physical victimization by 3% (1.49-1.45/1.49), and reduced the residual variability by 2% (2.12-2.07/2.12). The variability in slope was reduced by an additional 9% (.11-.10/.11). The deviance and AIC values became larger, which indicated that this was not the best fitting model, partially due to the additional 68 parameters added. However, the non-significant interactions were retained to examine our hypotheses.

An examination of the interactions in Table 9 revealed that gender was a significant moderator between school climate and physical victimization. The standard deviation from the original uncentered variable was used to graph the interaction (Hoffman, 2015), which was reported in Table 1 at grade 5 fall. More specifically, while holding all other variables constant, boys who reported good teacher relationships overall (1 SD higher = 3.13) were higher in their levels of physical victimization than girls ($\beta = 0.11$; See Figure 4). In addition, the slope interaction between overall peer relationships and feeling safe sometimes was significant ($\beta = 0.07$) and was explored further. Those who had poor peer relationships (1 SD higher = 3.50) and reported feeling safe sometimes at specific points in time had increasing rates of physical victimization by .12, whereas those with good peer relationships (1 SD lower = -3.50) and felt safe sometimes decreased at a faster rate by .39. Both interaction effects may be due to a Type 1 error, and therefore should be interpreted with caution. All other gender, school climate and school safety interactions were not significant, indicating that levels and rates of change in physical victimization did not differ for boys and girls with different levels of peer relationships, fairness, and safety. The significant main effects for physical victimization were explored. While controlling for other variables in the model, poor peer relationships

Figure 4. Levels of physical victimization for boys and girls with poor (+1SD) and good (-1SD) teacher relationships

than usual ($\beta = 0.12$), and feeling sometimes safe at certain points in time ($\beta = 0.64$) were significantly associated with higher levels of physical victimization. There was a significant slope interaction between poor peer relationships than usual and time which decreased at a slightly faster rate by $\beta = -.04$. The rate of decline in physical victimization for boys and girls was not statistically significant, indicating that boys and girls had similar rates of decline in physical victimization from grade 3 to 6.

In addition, overall poor perceptions of peers ($\beta = .17$), feeling sometimes safe overall ($\beta = 1.26$), and never feeling safe overall ($\beta = 2.29$) were significantly associated with higher levels of physical victimization. The highest levels of physical victimization were for children who reported feeling never safe overall relative to children who always felt safe. A similar model was tested for relational victimization and was reported below.

Relational Victimization

Conditional school climate and school safety models. A similar model as presented above for physical victimization was examined for relational victimization. This was conducted by adding school climate and safety variables to explain the variation in relational victimization levels and rate of change (Table 10). Similar to the physical victimization model, a better model fit was observed by smaller values for the -2 Log likelihood, AIC, and BIC values. The addition of the within person centered variables of school climate and school safety variables reduced the intercept variance in relational victimization by 14% (3.11-2.69/3.11), slope variance by approximately 13% (0.15-0.13/0.15), and the residual error variance by 9% (2.70-2.46/2.70). In other words, within person centered variables of safety and climate explained 15% of the variability of why some children had higher levels of victimization than others, 15% of why some children

Table 10

Linear Growth Trajectory Model for Relational Victimization with Between and Within Centered Predictors of School Climate and School Safety

	Unconditional Model	Conditional Level 1	Conditional Level 1 and 2	Conditional Level 1 and 2 with Time
Gr 5 Mean	2.52** (0.07)	2.30** (0.07)	1.73** (0.10)	1.72** (0.10)
Fixed Parameters				
Teacher (PM)		0.03* (0.02)	0.04* (0.01)	0.04* (0.01)
Peers (PM)		0.10** (0.01)	0.11** (0.01)	0.11** (0.02)
Fairness (PM)		0.07* (0.02)	0.07* (0.02)	0.07* (0.02)
Sometimes safe (PM)		0.93** (0.10)	0.64** (0.10)	0.63** (0.10)
Never safe (PM)		1.49** (0.21)	0.96** (0.21)	0.96** (0.22)
Level 2				
Girls = 1			0.48** (0.11)	0.48** (0.12)
Teacher (GM)			0.01 (0.03)	0.01 (0.03)
Peers (GM)			0.11** (0.03)	0.11** (0.03)
Fairness (GM)			0.13** (0.04)	0.13** (0.04)
Sometimes safe (GM)			1.53** (0.29)	1.56** (0.29)
Never (GM)			3.00** (0.64)	3.00** (0.64)
Rate of change	-0.19** (0.03)	-0.18** (0.03)	-0.19** (0.03)	-0.15** (0.04)
Teacher (PM)				0.00 (0.01)
Peers (PM)				-0.01 (0.01)
Fairness (PM)				0.00 (0.01)
Sometimes safe (PM)				0.04 (0.06)
Never safe (PM)				0.09 (0.13)
Girls = 1				0.03 (0.05)
Teacher (GM)				0.01 (0.01)
Peers (GM)				0.01 (0.01)
Fairness (GM)				0.00 (0.02)
Sometimes (GM)				-0.28* (0.13)
Never (GM)				-0.27 (0.30)
Covariance (2.1)	-0.04	-0.02	-0.01	-0.001

Intercept (1,1)	3.11**	2.69**	1.90**	1.90**
Slopes (2,2)	0.15**	0.13*	0.12**	0.12**
Residual	2.70**	2.46**	2.46**	2.45**
Parameters	6	11	17	28
-2LL	19068	18605	18322	18305
AIC	19080	18627	18356	18361
BIC	19109	18680	18438	18495

Note. ** $p < .001$, * $< .05$, Estimates are from PROC MIANALYZE with 50 combined imputation estimates; PM = Person mean centered; GM = grand mean centered.

changed at different rates than others, and 9% of why some children deviated from their own overall average relational victimization trajectory. When the between person centered predictors were added to the model (while controlling for non-significant program effects), this further reduced the relational victimization intercept variance by an additional 29% ($2.69-1.90/2.69$), indicating that these variables explained why some children had higher levels of relational victimization than other children. The addition of time did not result in a better fitting model, nor did it result in a significant reduction in intercept or slope variance, although a slight reduction in residual error variance was observed.

Interactions with school climate, school safety, and gender. Table 11 is an extension of Table 10, and includes the interactions between school safety, school climate, and gender. The addition of the interactions reduced the intercept variance by 6% ($1.91-1.85/1.9$), slope variance by 8% ($.12-.11/.12$) and reduced the variability in slope by 2% ($2.45-2.40/2.45$). Similar to the model for physical victimization, the addition of the interactions did not result in a significantly better model fit due to larger deviance and AIC values. Despite this, the non-significant interactions in the model were retained to further examine our hypotheses.

Only one significant interaction emerged between school climate and safety for predicting higher levels of relational victimization. Children who had poor overall teacher relationships (1 SD higher = 3.13) and never felt safe at certain points in time had higher levels of relational victimization compared to those who were always safe (1 SD lower = -3.13; $\beta = 0.29$ - See Figure 5). This interaction effect should be interpreted with caution due to the many interactions tested, and may be likely the result of a Type I error. All

other school climate and school safety interactions were not significant in influencing the level and the rate of change in relational victimization. In addition, there were no significant interactions between gender and school climate, suggesting that gender did not moderate the relationship between relational victimization and school climate. There were also no significant interactions that emerged for gender and school safety, suggesting that gender did not moderate the relationship between relational victimization and school safety. This indicated that levels and rates of change in relational victimization did not differ for boys and girls with different levels of teacher relationships, peer relationships, fairness, nor safety.

Similar to physical victimization, significant main effects were explored for any interactions that were not significant. The statistically significant Level 1 main effects of school climate and school safety indicated that while controlling for other variables in the model, poor peer relationships than usual ($\beta = 0.10$), poor fairness than usual ($\beta = 0.07$), and feeling sometimes safe at certain points in time ($\beta = 0.53$) were significantly associated with higher levels of relational victimization. No significant changes were evident in the relational victimization slope by including school climate and safety.

Both boys and girls differed in their levels of victimization, as girls were higher in relational victimization by 0.53 units compared to boys. Similar to physical victimization, the slope parameters were not significant for gender, which indicated that boys and girls declined in their relational victimization trajectories at similar rates. At Level-2, overall poor perceptions of fairness ($\beta = 20$), feeling safe sometimes overall ($\beta = 1.93$), and never feeling safe overall ($\beta = 2.75$) relative to all children in the sample were related to higher levels of relational victimization.

Table 11

Interactions Between Gender, School Safety, and School Climate for Relational Victimization

Parameters	Level Gr. 5 fall	SE	p	Rate of Change	SE	p
Relational Victimization Trajectory	1.558	0.653	<.001	-0.211	0.066	0.002
Main Effects						
TV (PMC)						
Teacher	0.035	0.024	0.153	0.004	0.016	0.789
Peers	0.096	0.027	<0.001	-0.002	0.016	0.905
Fairness	0.067	0.034	0.049	-0.019	0.021	0.378
Sometimes	0.534	0.158	<0.001	0.008	0.096	0.934
Never	0.443	0.357	0.215	-0.106	0.199	0.595
TI (GMC)						
Girls	0.533	0.227	0.019	0.073	0.092	0.426
Teacher	-0.061	0.057	0.286	0.012	0.022	0.574
Peers	0.092	0.058	0.110	-0.009	0.002	0.713
Fairness	0.198	0.077	0.010	-0.019	0.031	0.534
Sometimes	1.933	0.458	<0.001	-0.243	0.204	0.234
Never	2.747	1.074	0.011	-0.190	0.482	0.694
TV and TI Interactions						
TV (PMC) x girls						
Teacher	0.005	0.032	0.865	-0.016	0.019	0.398
Peers	0.036	0.032	0.266	-0.005	0.020	0.807
Fairness	-0.021	0.041	0.608	0.016	0.025	0.532
Sometimes	0.127	0.232	0.584	0.038	0.139	0.783
Never	-0.109	0.513	0.831	0.077	0.292	0.791
TI (GMC) x girls						
Teacher	0.076	0.064	0.235	-0.002	0.027	0.928
Peers	0.022	0.066	0.735	0.002	0.026	0.945
Fairness	-0.040	0.085	0.635	0.020	0.036	0.572
Sometimes	-0.638	0.625	0.308	-0.148	0.271	0.587
Never	-0.244	1.446	0.866	-0.383	0.688	0.578
School Climate (SC) and School Safety (SS) interactions						
TV (PMC) SC x						
TV (PMC) SS						
Teacher*Some	-0.036	0.052	0.488	-0.046	0.030	0.129

Peers*Some	0.084	0.064	0.188	0.002	0.033	0.949
Fairness*Some	0.047	0.075	0.531	0.028	0.042	0.510
Teacher*Never	0.032	0.091	0.722	-0.008	0.054	0.881
Peers*Never	0.047	0.122	0.700	0.063	0.074	0.393
Fairness*Never	-0.101	0.157	0.518	-0.092	0.095	0.334
TV (PMC) SC x						
TI (GMC) SS						
Teacher*Some	0.066	0.085	0.437	0.057	0.044	0.197
Peers*Some	-0.120	0.094	0.202	-0.023	0.051	0.654
Fairness*Some	0.016	0.124	0.901	0.021	0.071	0.775
Teacher*Never	-0.098	0.137	0.474	0.074	0.095	0.439
Peers*Never	-0.012	0.195	0.552	-0.006	0.107	0.957
Fairness*Never	0.186	0.272	0.496	0.161	0.155	0.298
TI (GMC) SC x						
TI (GMC) SS						
Teacher*Some	0.036	0.134	0.787	0.005	0.061	0.929
Peers*Some	0.115	0.154	0.458	-0.061	0.071	0.390
Fairness*Some	-0.228	0.186	0.221	0.103	0.083	0.216
Teacher*Never	0.155	0.267	0.562	-0.078	0.129	0.547
Peers*Never	-0.519	0.489	0.288	0.075	0.214	0.725
Fairness*Never	0.293	0.531	0.581	0.174	0.243	0.474
TI (GMC) SC x						
TV (PMC) SS						
Teacher*Some	-0.010	0.051	0.851	0.005	0.032	0.879
Peers*Some	0.036	0.058	0.541	0.044	0.038	0.247
Fairness*Some	0.011	0.074	0.884	-0.051	0.047	0.280
Teacher*Never	0.294	0.109	0.007	0.061	0.066	0.357
Peers*Never	-0.135	0.154	0.383	0.032	0.114	0.777
Fairness*Never	0.105	0.176	0.552	-0.152	0.153	0.322
Covariance (2,1)	-0.013	0.057	0.814			
Intercept (1,1)	1.854	0.148	<0.001			
Slopes (2,2)	0.112	0.028	<0.001			
Residual	2.399	0.152	<0.001			
Parameters	96					
-2LL	18367					
AIC	18379					
BIC	18408					

Note. ** p<.001, * <.05, Estimates are from PROC MIANALYZE with 50 combined imputation estimates; PMC= Person mean centered; GMC = grand mean centered; SC = school climate; SS = school safety.

In conclusion, changes in overall relational victimization trajectories were relatively unaffected by individual changes in poor teacher-child and student relationships, perceptions of being treated less fair than others, and feeling unsafe at school. Although slight decreases in physical victimization were evident for children with good friendships who felt safe some of the time and increases in physical victimization trajectories were evident for children with poor peer relationships overall and who felt safe some of the time, overall changes in these trajectories were unaffected by poor teacher-child relationships, being treated less fair, and feeling less safe at school. This may suggest that peer victimization is a developmental process that gradually declines with time. Poor school climate and safety, compared to what is usual for the child as well as overall, were more likely to be associated with higher levels of reported physical and relational victimization.

Discussion

The goal of this study was to examine the associations between school climate, safety and trajectories of relational and physical victimization among rural Canadian elementary school children. Efforts were made to determine whether physical and relational victimization trajectories decreased with time in the early elementary school years, which has been demonstrated in the later years (Smith, Madsen, & Moody, 1999). It was also of importance to further understand if children's perceptions of their school climate and school safety were related to levels of victimization and in changes in these overall developmental trajectories. This study demonstrated that although friendships may produce slight changes in physical victimization trajectories, positive school climates were not enough to further reduce victimization over time than what was already

occurring. It may be that when bullying attitudes and norms are ingrained in a school's culture, changing the norms and ensuring schools are safe may be a necessary first step before changes in behaviours can be observed.

Declining Peer Victimization Trajectories

The findings of this study strongly indicate that physical and relational victimization is a developmental process in the early elementary school years that declines over time. Physical victimization was found to decrease by approximately 10% from fall to spring of each school year, while relational victimization was found to decrease by 8% from fall to spring of each year. This is consistent with the findings of Giebrecht et al. (2011) who reported that from grades 1 to 3 the average levels of physical and relational victimization declined by 11% and 7% per year, respectively. The question remains, what accounts for these declines in victimization and what variables might increase the rate of decline?

There are many possible reasons why rates of reported peer victimization were found to decline over time. First, as children enter school, they may try out a number of goal directed aggressive behaviours (Volk et al., 2014), and eventually learn which children are assertive and will stand up for themselves (Veenstra et al., 2010). Second, children learn skills to better address bullying such as social competence, self-regulation, conflict resolution, cooperation and coping mechanisms from interacting with peers and teachers within their school environment (de la Riva & Ryan, 2015; Posner & Rothbart, 2000; Smith et al., 1999). Third, children may report less physical and relational victimization over time because other forms of victimization, such as cyber bullying, may be used (Beran & Li, 2007). The reason for this is that the identity of perpetrators can be

anonymous behind a screen, and children are and less likely to be caught or reprimanded by school personnel.

Gender Differences

As expected, gender differences were evident in the trajectories of both relational and physical victimization in this study. In the early elementary school grades, consistent with the literature on finding gender differences in victimization (Biggs et al., 2010; Crick & Bigbee, 1996; Crick et al., 1999; Elsaesser et al., 2012; Ostrov, 2010; Pellegrini & Long, 2002; Troop-Gordon & Ladd, 2005), boys reported higher levels of physical victimization and girls reported higher levels of relational victimization. This confirmed that looking at different forms of victimization was important, as boys and girls in elementary school had different experiences with physical and relational victimization. Similar to findings by Geisbrecht et al. (2011) in a sample of children in grade 3, girls and boys reported similar rates of decline in their physical and relational victimization trajectories in the early elementary school grades, which may be consistent with the developmental course of physical and relational victimization as becoming non-normative over time.

An unexpected finding was that good teacher relationships were related to higher levels of physical victimization for boys compared to girls. This association was contrary to our hypothesis, as poor teacher relationships were expected to be related to changes in victimization. This association can be explained in a number of ways. First, if teachers are aware of physical victimization, they may react immediately because it is perceived as more serious and harmful than relational (Boulton, 1997; Craig et al., 2000; Xie, Swift, Cairns, & Cairns, 2002). Second, since schools may have more clear policies for

addressing physical victimization than relational victimization (Mishna, Scarcello, Pepler, & Wiener, 2005; Sairanen & Pffeffer, 2011), teachers may have been more willing to immediately respond to physical forms of victimization for boys as the behaviours are also more observable and normative among this age, whereas relational forms of victimization are often intended to be hidden from adults and may be more difficult to address (Atlas & Pepler, 1998; Craig & Pepler, 1997; Kochenderfer-Ladd & Pelletier, 2008; Mishna et al., 2005; Troop-Gordon & Ladd, 2015). Third, boys are more likely to reach out to others when they are victimized, such as teachers, friends, and family members where girls are more likely to hide it (Silva, Pereira, Mendonça, Nunes, & de Oliveira, 2013). No other gender differences were found in this study, suggesting that boys and girls may have similar experiences with school safety and school climate as related to relational and physical victimization.

School Safety and School Climate

Contrary to expectations, changes in children's victimization trajectories from grades 3 to grades 6 were unaffected by most of the school climate variables (teacher-child relationships, peer relationships, and fairness) or school safety. It may be that factors beyond a child's perception of their school climate are needed to change the developmental trajectories of victimization, and that victimization is a normative developmental process. The only significant finding was for physical victimization, where poor peer relationships for children who sometimes felt safe were related to slightly higher levels of victimization and to a slightly increasing rates of physical victimization. Good peer relationships and feeling sometimes safe were associated with a slightly faster rate of decline. This finding is consistent with what would be predicted as

researchers have demonstrated that friends are protective for victims (Schmidt, & Bagwell, 2007), however must be interpreted with caution because of the many interactions that were tested.

Children in this study who reported feeling unsafe reported the most victimization, although solely feeling safe did not change the rate of decline in victimization. It would have been beneficial to determine what other school or classroom factors were related to school safety that were not indicated by the school climate items. Open ended self-reports of school safety could have provided additional information that were not captured by the survey items in this study, such as who children rely on to feel safe at school. For example, McNamara (2013) found that through qualitative interviews, children reported that being around a friend at recess helped them to feel safe, which is consistent with the interaction found in this study. The question, however, is who do children rely on to feel safe? The social support hypothesis may provide support. Victimized children were more likely to support one another if they had been targeted by the same perpetrator (Huitsing, Snijders, Van Duijn, & Veenstra, 2014). If a close friend is not available, children with fewer friends to defend them in class may feel rejected and isolated and may depend on the teacher for help (Sainio et al., 2010; Troop-Gordon & Kopp, 2011).

The causal direction of this relationship between feeling unsafe, poor school climate, and victimization was not formally tested in this study. The research design used in this study examined associations and relationships between variables, and therefore it cannot be stated that poor school climate and poor safety caused more children to report victimization. It is likely that experiences of victimization may further compound feeling

less safe at school, however future studies should explore the causal mechanisms for this. In this study, students' higher perceptions of feeling unsafe were associated with higher relational victimization compared to physical victimization. Since it was located directly after the SEQ victimization items, this provided a context by which children perceived feeling safe at school by reflecting upon their victimization experiences. In addition, this safety item did not include items around school violence, gang activity, weapon carrying and dangerous situations. The school safety item used in this study did not specify the context and locations related to the underlying structure of school safety. Although this item had good face validity, it was limited in content validity.

In this study, even those who perceived their school climate as positive experienced a decrease in victimization at a similar rates to those who viewed their school climate as poor. The lack of contribution of teacher and peer relationships to the rate of decline for relational victimization suggests that more research is needed to determine the factors beyond school climate that will further reduce relational victimization, such as parent support (Yeung & Leadbeater, 2010). For example, Reavis et al. (2010) reported that among children in kindergarten to grade 5, teacher-child relationships were not related to victimization after accounting for mother-child relationships and the presence of friendships. Such findings suggest that multiple relationships may be associated with children's trajectories of peer victimization and highlight the necessity of assessing multiple family, peer, and teacher relationships within a single study.

Another reason as to why changes in rate of victimization were not observed may be due to a school's culture, rather than a school's climate. A school's culture is different

from climate, in that culture reflects the beliefs and assumptions within schools, and may enhance our understanding of how children view the climate of their school around bullying and victimization (Van Houtte, 2005; Van Houtte & Van Maele, 2011). This would be helpful in the context of victimization to understand how children and teachers think about reporting victimization, what the norms are around asking teachers and peers for help, and the risks or benefits associated with standing up for victims. Changing bullying behaviours take a long time when the attitudes that support bullying are a normative and ingrained part of the school's culture (Smith, Cousins, & Stewart, 2005), which may be why anti-bullying programs targeting behaviours have found little to no success in reducing bullying behaviours (Ferguson, San Miguel, Kilburn, & Sanchez, 2014; Jimenez-Barbero et al., 2016; Merrell, Isava, Gueldner, & Ross, 2008; Smith et al., 2004).

Cohort-Sequential Design

This study demonstrated that a cohort-sequential design was useful to capture the development of victimization in the early elementary school years within a shorter period of time (Olweus, 2005; Mayakazi & Raudenbush, 1992). In this study, the cohort sequential design revealed that rates of physical and relational victimization were highest in the spring of grade 3 and were the lowest in the spring of grade 6. The lack of statistically significant differences in cohorts levels and rates of change for physical and relational victimization suggests that rates in overt and relational victimization were similar across shared developmental periods in 2012 and in 2013, however this does not guarantee that differences will not exist between cohorts in adolescence or adulthood.

For example, a study using a cohort sequential design found that victimization

trajectories for each cohort differed in terms of their levels and decreased at different rates over time, preventing an overall trajectory to be formed (Averdijk, 2014). This may have been due to the study comparing 18 overlapping cohorts, how victimization was measured (assault), and including a wider age range of adolescents and adults (from 12-29 years old at Time 1). In the current study, a cohort sequential design was appropriate for relational and physical forms of victimization among elementary school children, but could have differed if other forms of more serious forms of sexual victimization or harassment were included. In addition, since technology is constantly evolving, cohort period effects could have provided different results for cyber bullying and victimization. It is likely that experiences of cyber victimization for children in elementary and middle school in 2017 are quite different compared to those who attended elementary and middle school in 2000. There may have also been cohort-period differences in this study if trajectories were extended to include adolescent and adult cohorts.

Since the decrease observed in this study is limited to children in elementary schools from grades 3 to 6, it cannot be assumed that this decrease in victimization using this design would continue throughout school transitions. While some studies have demonstrated decreases in victimization that continue over middle school transitions (Shell, Gazelle, Faldowski, 2014; Ladd et al., 2017), and others have found victimization to increase over the transition (Bowes et al., 2013). In future research it would be important to examine if declines in victimization continue over school transitions. As youth are transitioning from elementary to middle or high school and have to re-negotiate their roles within a new context and a different social hierarchy what happens to victimization trajectories and what are the necessary components in these new contexts

that would keep children safe and lead to steeper rates of decline in victimization?

A positive finding in this study was that the majority of rural children in this sample felt safe at school, with approximately 20% who felt safe sometimes and less than 5% who never felt safe at school. These rates of safety are consistent with what has been reported by other researchers (Beran & Tutty, 2002; Goldstein et al., 2008; Leadbeater et al., 2013; Vaillancourt et al., 2010; Waasdorp et al., 2011). What is concerning however, is that some children do not feel safe in their school. Since schooling is mandatory for children, this means that some of the children in this sample are attending school daily even though they feel it is not a safe environment for them. Despite this, they are expected to learn at the same rate as children who feel safe. Further research is needed to determine what will help these children to feel safe at school. Perhaps measures of safety in the early years should explore forms of safety that are developmentally appropriate for this age, such as psychological safety, emotional safety, and physical safety (Cohen, 2012). This also highlights the importance of focusing on what makes schools safe places in the early elementary school years beyond school climate and the absence of victimization.

Strengths and Limitations

This study came with a number of strengths, and was based upon a larger study funded by the Public Health Agency of Canada. Victimization, safety, and school climate were measured over 2.5 years using validated and reliable scales for elementary school children. The longitudinal cohort sequential design allowed for studying the development of victimization over 3 years among two cohorts of elementary school children, and to examine how these victimization trajectories unfolded from grades 3 to 6. A large rural

sample of children from three provinces in Canada were included. In addition, growth curve modeling was used to capture the variability in children's victimization experiences as well as to examine the associations between school safety and climate on the rates and changes in victimization over time. This thesis adds to the literature by demonstrating the unique within and between person effects of each aspect of school climate and school safety on children's developmental trajectories of relational and physical victimization. Despite the strengths of this study, it also came with a number of limitations.

First, we followed a large proportion of children over 2.5 years, and attrition was minimal. By the end of the study, 30% data was missing arbitrarily. However, due to the large number of children in the study and the cohort-sequential design, it was considered less problematic. For example, studies report *minimal attrition* rates of approximately 25% when having a sample of over a thousand students (Leadbeater et al., 2015). In addition, studies have reported a power loss of approximately 7% with 30% attrition using a cohort-sequential design (Galbraith, Bowden, & Mander, 2014). Since active parental consent was only required at the beginning of the study and not required every year, this minimized attrition rates. Multiple imputation was also a good method to handle missing data for up to 30% of the sample (Enders, 2010), however the standard errors may have been biased as the interactions were computed after the imputation and not before as suggested by some researchers (Von Hippel, 2009). Since the data were longitudinal and nested, this could have introduced some error into the imputation estimates, as multiple imputation assumes that each observation is independent. Introducing cluster variables that account for nesting in longitudinal data can create an increasing complexity in the imputation model (Young & Johnson, 2015).

Children in this study were primarily Caucasian and resided in rural cities of three Canadian provinces. One school board was represented in each province, and not all rural cities within these provinces were represented. Furthermore, we did not examine different forms of victimization associated with race, ethnicity, or sexual orientation as these were not included in the validated SEQ. Our rural sample was not ethnically diverse, however was similar to Canadian population data from 2011. In addition, the findings are limited to children from elementary schools located in three rural Canadian provinces. These findings may not be generalized beyond these Canadian school systems, nor can they be generalized to inner city locations or provinces that were not captured in this study as bullying prevention is mandated provincially. Past experiences of victimization and perceptions of school safety and climate were not examined before grade 3 and therefore, overall perceptions of school climate were likely to be based on past school experiences and relationships that were not measured in this study.

This study used children's self-reports of victimization, school climate and safety. Self-reports may come with a number of limitations, such as being influenced by poor treatment from other peers and inconsistency in reporting (Bovaird, 2010). Since peer reports of victimization and perpetration based on peer nominations are not often not permitted in schools, self-reports were the best method available to gain an accurate picture of victimization, particularly since it is often hidden from adults and not always observable. That being said, studies have demonstrated that when self reports are anonymous, students respond honestly and accurately (Ladd & Kochenderfer-Ladd, 2002; Olweus, 2010; Pellegrini, 2002).

In this study, victimization, school safety, and school climate were measured

biannually. Examining only two points in the school year may have underestimated the change in rates of victimization that were reported by children over time. A self-report method that could be used in the future includes daily diaries, which provide insight into the fluctuation or stability of children's victimization experiences over longer periods of time (Astor, Meyer, & Behre, 1999; Pellegrini & Long, 2002).

In the current study, the strongest correlations between both forms of victimization were at a shared point in time, suggesting that relational and physical victimization co-occur in these early ages. In addition, it is likely that past experiences of victimization also had an impact on current reports of victimization as indicated by the significant correlations. Although we did not control for the effects of past physical and relational victimization in our models before grade 3, it is likely that students were entrenched in the school's climate and culture by grade 3, and thus it was difficult to observe any further changes in victimization. Future research should examine the effects of school climate on multivariate models when relational and physical victimization are allowed to co-occur.

The extent to which children were involved as bully perpetrators or were involved as bystanders was also not examined. Children are often dually involved as both bully perpetrators and victims (Biggs et al., 2010; Haltigan & Vaillancourt, 2014; Ostrov, 2010), where victimization and aggression have been associated over time. Children who were victimized were more likely to bully others later on rather than bully perpetrators being victims (Haltigan & Vaillancourt, 2014). Therefore, victims may pick up on certain characteristics of other weak peers to easily gain power and status over them to eventually learn who they can bully. However selecting a target may either come at a

high or a low cost depending on the social status of the child and if the child effectively retaliates in front of others (Volk et al., 2014). Therefore, for some children in this study, it is likely that they were involved as both bully perpetrators and victims, and measuring bullying would have provided more information as to why the school climate was not related to changes in victimization. It is likely that these children are also involved in different roles outside of bullying, such as onlookers or defenders (Salmivalli, 1999; Salmivalli, Lagerspetz, Bjorkqvist, Osterman, & Kaukiainen, 1996). They may contribute to the cycle of victimization of other students in schools if they are aware of bullying situations and do not feel comfortable intervening, since they may fear being the next target. Future studies should also examine the extent to which school climate factors further attenuate trajectories of victimization for those who are also involved as bully perpetrators or other participant roles.

Caution must be made in the interpretation of this study, as nesting at the classroom level was not controlled for. It is likely that children who were in a single classroom together were more similar to one another than children in other classrooms, and that teachers may have had an influence on children's perceptions of their school climate, safety, and victimization. In this study, we did not control for possible classroom effects since the classroom identification variable came with a number of issues. Missing classroom ID data was also evident for 8-30%, and any child missing a classroom ID would have removed them entirely from the analyses, which would have biased the results. Children also changed classrooms over time, and therefore it would have been difficult to provide an estimate of the missing ID variable. Some children shifted from one class to another from fall to spring (T2 to T3, or T4 to T5) or may have changed

teachers depending upon whether data collection initially occurred during a morning or afternoon class.

Although school effects were examined, schools were relatively similar in their levels of victimization. This is consistent with previous hierarchical studies, which have demonstrated that more variability in victimization exists between students within schools than between schools themselves (Brand et al., 2003; Richard et al., 2011; Veenstra et al., 2014). A cautionary note should be made however. By excluding both classroom and school effects, contextual effects that are unaccounted for and included in lower order effects (Hoffman, 2015). This may raise the risk of making a Type 1 error. Imputing the school ID identification variable was not possible, and therefore the complete ID variable at T2 was used. A limitation of using the school variable at one time point to control for school effects was the assumption that children remained in the same schools over the duration of the study which was not the case for some children. Other anomalies existed for some schools that could not be accounted for. For example, in some small towns, whole school populations were moved to different school buildings for different grades. Thus although the population of students did not change, the physical environment and the structure of the space did.

This study did not include a standard definition when asking children about their victimization experiences. In the bullying literature, best practices include providing a definition of bullying/victimization including the power differential, intentionality, and repetition of harmful behaviour (Solberg & Olweus, 2003). However, to gain a more accurate picture of victimization experiences, children are more likely to accurately report bullying involvement based on items assessing behaviours such as hitting, kicking,

and exclusion rather than using the word bullying, which elicits under reporting of the behaviour (Sawyer et al., 2007; Vaillancourt et al., 2008). Although a definition was not explicitly stated in the present study, the items used to measure victimization in this study included perceptions of intentionally harmful behaviours (e.g. leave you out on purpose). A time frame in which children experienced these behaviours was not specified, and therefore perceptions of victimization may have differed depending upon a more limited or wider time frame used (within the past year vs. within the past three months). In addition, since children were asked about their victimization experiences closer to the beginning of the year (fall), they may have overestimated their experiences due to a limited frame of reference (a couple months). Asking about victimization again in the spring would have included a longer reference period (several months), and possible priming effects from being asked in the fall. Therefore this could have explained why children perceive their rates of victimization to decreasing by 8-10% from the fall to the spring of each year.

Implications

Implications point to the importance of improving school safety to reduce physical and relational victimization levels, regardless of whether anti-bullying or prevention programs are in place. Findings from this study can be used to inform prevention efforts in the early elementary school years, in that when children do not feel safe, this is tied to reporting more victimization. Children's perceptions of their school environment and safety are not enough to further reduce victimization rates, fostering good relationships from the start are a step forward in keeping rates of victimization consistently low. Teachers should receive regular training to identify victimization, and

should have support in order to keep children safe. Teachers and other peers should be taught how to help children resolve both physical conflict and how to repair relationships, as these skills are necessary for developing healthy friendships and dating relationships in the future. Educators need to determine what contributes to children's perceptions of safety, particularly if they are victimized, and this information should be easily and immediately accessible to classroom teachers on a regular basis. Many schools in Canada use disciplinary action such as suspensions and expulsions for bullying involvement (e.g., Bill 212 in Ontario) despite lack of evidence demonstrating an improvement in bullying rates or school safety (Martinez, 2009; Skiba & Knesting, 2001). Therefore, schools must look beyond these measures to determine how to keep children feeling safe, even if victimization is occurring. Schools must be safe learning environments for all children. Researchers should be involved in helping schools to improve safety for all students, build positive and memorable relationships with students, and provide a supportive climate for all involved.

References

- Allison, P. D. (2000). Multiple imputation for missing data: A cautionary tale.” *Sociological Methods & Research*, 28(3), 301-309.
- Almeida, A., Caurcel, M., & Machado, J. (2006). Perceived characteristics of victims according to their victimized and non-victimized peers. *Electronic Journal of Research in Educational Psychology*, 4(2), 371-396.
- Astor, R. A., Meyer, H. A., & Behre, W. J. (1999). Unowned places and times: Maps and interviews about violence in high schools. *American Education Research Journal*, 36, 3–42. doi: 10.2307/1163504
- Atlas, R. S., & Pepler, D. J. (1998). Observations of bullying in the classroom. *Journal of Educational Research*, 92(2), 86- 99.
doi:10.1080/00220679809597580
- Averdiijk, M. (2014). Methodological challenges in the study of age-victimization patterns. Can we use the accelerated design of the NCVS to reconstruct victim careers? *International Review of Victimology*, 20, 265-288. doi: 10.1177/0269758014537147
- Baly, M. W., Cornell, D. G., & Lovegrove, P. (2014). A longitudinal investigation of self and peer reports of bullying victimization across middle school. *Psychology in the Schools*, 51(3), 217-239. doi: 10.1002/pits.21747
- Bear, G. G., Gaskins, C., Blank, J., & Chen, F. F. (2011). Delaware school climate survey-student: Its factor structure, concurrent validity, and reliability. *Journal of School Psychology*, 49(2), 157-174. doi: 10.1016/j.jsp.2011.01.001.
- Bell, B. A., Ene, M., Smiley, W., & Schoeneberger, J. A. (2013). A multilevel model

- primer using SAS PROC MIXED. SAS Global Forum 2013.
- Benbenishty, R., & Astor, R. A. (2005). *School violence in context: Culture, neighbourhood, family, school, and gender*. Oxford Scholarship Online.
<http://dx.doi.org/10.1093/acprof:oso/9780195157802.001.0001>
- Beran, T., & Li, Q. (2007). The relationship between cyber bullying and school bullying. *Journal of Student Wellbeing, 1*(2), 15-33.
- Beran, T. N., & Tutty, L. (2002). Children's reports of bullying and safety at school. *Canadian Journal of School Psychology, 17*(2), 1-14.
- Biggs, B. K., Vernberg, E., Little, T. D., Dill, E. J., Fonagy, P., & Twemlow, S. W. (2010). Peer victimization trajectories and their association with children's late affect in late elementary school. *International Journal of Behavioral Development, 34*, 136-146. doi:10.1177/1065025409348560
- Blosnich, J., & Bossarte, R. (2011). Low-level violence in schools: Is there an association between school safety measures and peer victimization? *Journal of School Health, 81*, 107-113. doi:10.1111/j.1746-1561.2010.00567.x
- Booren, L. M., Handy, D. J., & Power, T. G. (2011). Examining perceptions of school safety strategies, school climate, and violence. *Youth Violence & Juvenile Justice, 9*(2), 171-187. doi:10.1177/1541204010374297
- Bosworth, K., & Judkins, M. (2014). Tapping into the power of school climate to prevent bullying: One application of schoolwide positive behavior interventions and supports. *Theory Into Practice, 1*, 1-17. doi:10.1080/00405841.2014.947224
- Boulton, M. J. (1997). Teachers' views on bullying: Definitions, attitudes and ability to cope. *British Journal of Educational Psychology, 67*, 223- 233.

- Bovaird, J. (2010). Scales and surveys: Some problems with measuring bullying behavior. In S. R. Jimerson, S. M. Swearer, & D. L. Espelage (Eds.), *Handbook of bullying in schools: An international perspective* (pp. 277-304). New York: Routledge.
- Bowes, L., Maughan, B., Ball, H., Shakoor, S., Ouellet-Morin, I., Caspi, A., ... Arseneault, L. (2013). Chronic bullying victimization across school transitions: The role of genetic and environmental influences. *Development & Psychopathology*, 25(2), doi:10.1017/S0954579412001095.
- Brand, S., Felner, R., Shim, M., Seitsinger, A., & Dumas, T. (2003). Middle school improvement and reform: Development and validation of a school-level assessment of climate, cultural pluralism, and school safety. *Journal of Educational Psychology*, 95(3), 570-588. doi: 10.1037/0022-0663.95.3.570
- Brković, I., Keresteš, G., & Puklek Levpušček, M. (2014). Trajectories of change and relationship between parent-adolescent school-related conflict and academic achievement in early adolescence. *The Journal of Early Adolescence*, 34(6), 792-815. doi: 10.1177/0272431613503213
- Brookmeyer, K. A., Fanti, K. A., & Henrich, C. C. (2006). Schools, parents, and youth violence: A multilevel, ecological analysis. *Journal of Clinical Child and Adolescent Psychology*, 35, 504-514. doi: 10.1207/s15374424jccp3504_2
- Bronfenbrenner, U. (1979). *The ecology of human development: Experiments by nature and design*. Cambridge, MA: Harvard University Press.
- Bronfenbrenner, U. & Morris, P. A. (1998). The ecology of developmental processes. In W. Damon & R. M. Lerner (Eds.), *Handbook of child psychology, Vol. 1:*

- Theoretical models of human development* (5th ed., pp. 993-1023). New York: John Wiley and Sons, Inc.
- Bronfenbrenner, U., & Morris, P. A. (2006). The bioecological model of human development. In R. M. Lerner (Ed.), *Handbook of Child Psychology, Vol. I, Theoretical models of human development* (6th edn., pp. 793–828). Hoboken, N.J.: Wiley.
- Cohen, J. (1992). A power primer. *Psychological Bulletin*, 112, 155-159.
doi:10.1037/0033-2909.112.1.155
- Cohen, J. (2006). Social, emotional, ethical, and academic education: Creating a climate of learning, participation in democracy, and well-being. *Harvard Educational Review*, 76, 201-237.
- Cohen, J. (2012). School climate and culture improvement: A prosocial strategy that recognizes, educates, and supports the whole child and the whole school community. In P. M. Brown, M. W. Corrigan, & A Higgins-D'Allesandro (Eds.), *Handbook of prosocial education* (pp. 227–270). Blue Ridge Summit, PA: Rowman and Littlefield Publishing Group.
- Cook, T. D., & Campbell, D. T. (1979). *Quasi-experimentation*. Chicago: Rand McNally.
- Cook, C. R., Williams, K. R., Guerra, N. G., Kim, T. E., & Sadek, S. (2010). Predictors of bullying and victimization in childhood and adolescence: A meta-analytic investigation. *School Psychology Quarterly*, 25(2), 65-83. doi: 10.1037/a0020149
- Craig, W. M., Henderson, K., & Murphy, J. G. (2000). Prospective teachers' attitudes toward bullying and victimization. *School Psychology International*, 21, 5–21.
- Craig, W. M., & Pepler, D. J. (1997). Observations of bullying and victimization in the

- school yard. *Canadian Journal of School Psychology*, 13, 41-59.
doi:10.1177/082957359801300205
- Crick, N. R., & Bigbee, M. A. (1998). Relational and overt forms of peer victimization: A multiinformant approach. *Journal of Consulting and Clinical Psychology*, 66, 337-347. doi:10.1037/0022-006x.66.2.337
- Crick, N. R., Bigbee, M. A., & Howes, C. (1996). Gender differences in children's normative beliefs about aggression: How do I hurt thee? Let me count the ways. *Child Development*, 67(3), 1003-1014. doi:10.2307/1131876
- Crick, N. R., Casas, J. F., & Ku, H. C. (1999). Relational and physical forms of peer victimization in preschool. *Developmental Psychology*, 35(2), 376-385.
- Crick, N. R., Casas, J. F., & Nelson, D. A. (1996). Toward a more comprehensive understanding of peer maltreatment: Studies of relational victimization. *Current Directions in Psychological Science*, 11, 98-101. doi:10.1111/1467-8721.00177
- Crick, N. R., & Grotpeter, J. (1996). Children's treatment by peers: Victims of relational and overt aggression. *Development & Psychopathology*, 8(2), 367-380.
doi:10.1017/S0954579400007148
- Crick, N. R., & Nelson, D. A. (2002). Relational and physical victimization within friendships: Nobody told me there'd be friends like these. *Journal of Abnormal Child Psychology*, 30, 599-607.
- Cronbach, L. J. (1951). Coefficient alpha and the internal structure of tests. *Psychometrika*, 16, 297-334. doi:10.1007/bf02310555
- Curran, P. J., & Bauer, D. J. (2011). The disaggregation of within-person and between-person effects in longitudinal models of change. *Annual Review of*

- Psychology*, 62, 583-619. doi:10.1146/annurev.psych.093008.100356
- Curran, P. J., Obeidat, K., & Losardo, D. (2010). Twelve frequently asked questions about growth curve modeling. *Journal of Cognitive Development*, 11, 121-136. doi: 10.1080/15248371003699969
- Cushing, L. S., Horner, R. H., & Barrier, H. (2003). Validation and congruent validity of a discreet observation tool to assess student social climate. *Journal of Positive Behavior Interventions*, 5, 225-237.
- de la Riva, S., & Ryan, T. G. (2015). Effect of self-regulating behaviour on young children's academic success. *International Journal of Early Childhood Special Education*, 7(1), 69-96.
- Demirtas, H., Freels, S.A., & Yucel, R.M. (2008). Plausibility of multivariate normality assumption when multiply imputing non-Gaussian continuous outcomes: A simulation assessment. *Journal of Statistical Computation and Simulation*, 78(1), 69-84. doi: 10.1080/10629360600903866.
- DeRosier, M. E., & Newcity, J. (2005). Student' perceptions of the school climate: Implications for school safety. *Journal of School Violence*, 4, 3-19. doi:10.1300/J202v04n03_02
- Desjardins, T. L., & Leadbeater, B. J. (2010). Relational victimization and depressive symptoms in adolescence: Moderating effects of mother, father, and peer emotional support. *Journal of Youth & Adolescence*, 40, 531-544. doi:10.1007/s10964-010-9562-1
- Desjardins, T., Yeung, R. S., Sukhawathanakul, P., Leadbeater, B., & MacDonald, S. W. S. (2013). Factor structure of the Social Experiences

- Questionnaire across time, sex, and grade among early elementary school children. *Psychological Assessment*, 25, 1058-1068. doi:10.1037/a0033006
- Dupper, D. R. (2013). An ecological systems perspective of bullying in schools. In School Bullying: New Perspectives on a Growing Problem. *Oxford Scholarship Online*. doi:10.1093/acprof:oso/9780199859597.003.0001
- Elsaesser, C., Gorman-Smith, D. & Henry, D. (2013). Role of the school environment in relational aggression and victimization. *Journal of Youth & Adolescence*, 42, 235-249. doi:10.1007/s10964-012-9839-7
- Eliot, M., Cornell, D., Gregory, A., & Fan, X. (2010). Supportive school climate and student willingness to seek help for bullying and threats of violence. *Journal of School Psychology*, 48, 533-553. doi:10.1016/j.jsp.2010.07.001
- Enders, C. K. (2010). *Applied missing data analysis*. New York, NY: The Guilford Press.
- Espelage, D., Holt, M., & Poteat, P. (2010). The school context, bullying, and victimization (pp. 146-160). In Meece, J.L. & Eccles, J.S. (Eds.), *Handbook of Research on Schools, Schooling, and Human Development*. New York, NY: Routledge.
- Espelage, D. L., & Swearer, S. M. (2009). Contributions of three social theories to understanding bullying perpetration and victimization among school-aged youth. In M. J. Harris (Ed.), *Bullying, rejection and peer victimization: A social cognitive neuroscience perspective* (pp. 151-170). New York, NY: Springer Publishing Company.
- Espinoza, G., Gonzales, N. A., & Fuligini, A. J. (2013). Daily school peer victimization

- experiences among Mexican-American Adolescents: Associations with psychosocial, physical and school adjustment. *Journal of Youth & Adolescence*, 1775-1788. doi:10.1007/s10964-012-9874-4
- Fan, W., Williams, C. M., & Corkin, D. M. (2011). A multilevel analysis of student perceptions of school climate: The effect of social and academic risk factors. *Psychology in the Schools*, 48(6), 632-647. doi:10.1002/pits.20579
- Fekkes, M., Pijper, F. I. M., & Verloove-Vanhorick, S. P. (2005). Bullying: Who does what, when, and where? Involvement of children, teachers and parents in bullying behaviour. *Health Education Research*, 20, 81–91.
- Ferguson, C. J., San Miguel, C., Kilburn, J. C., & Sanchez, P. (2007). The effectiveness of school-based anti-bullying programs: A meta-analytic review. *Criminal Justice Review*, 32(4), 401-414. doi: 10.1177/0734016807311712
- Field, A. (2009). *Discovering statistics using SPSS* (3rd ed.). Washington, DC: Sage Publications.
- Furlong, M. J., Greif, J. L., Bates, M. P., Whipple, A. D., Jimenez, T. C., & Morrison, R. (2005). Development of the California school climate and safety survey short form. *Psychology in the Schools*, 42, 137-148. doi:10.1002/pits.20053
- Furlong, M.J., Morrison, R., & Boles, S. (1991). California School Climate and Safety Survey. Paper presented at the annual meeting of the California Association of School Psychologists, Los Angeles, CA
- Gage, N. A., Larson, A., & Prykanowski, D. A. (2014). School climate and bullying victimization: A latent class growth model analysis. *School Psychology Quarterly*, 29(3), 256-261. <http://dx.doi.org/10.1037/spq0000064>

- Galbraith, S., Bowden, J., & Mander, A. (2014). Accelerated longitudinal designs: An overview of modelling, power, costs and handling missing data. *Statistical Methods in Medical Research*, 26(1), 374 - 398. doi:10.1177/0962280214547150
- Garson, G. D. (2015). Missing values analysis and data imputation. North Carolina State University. Asheboro, USA: Statistical Associates Publishers.
- Giesbrecht, G. F., Leadbeater, B. J., & MacDonald, S. W. S. (2011). Child and context characteristics in trajectories of physical and relational victimization among early elementary school children. *Development & Psychopathology*, 23, 239-252. doi:10.1017/S0954579410000763
- Glew, G. M., Fan, M.-Y., Katon, W., & Rivara, F. P. (2008). Bullying and school safety. *The Journal of Pediatrics*, 152(1), 10.1016/j.jpeds.2007.05.045. <http://doi.org/10.1016/j.jpeds.2007.05.045>
- Godleski, S. A., Kamper, K. E., Ostrov, J. M., Hart, E. J., & Blakely-McClure, S. J. (2014). Peer victimization and peer rejection during early childhood. *Journal of Clinical Child & Adolescent Psychology*, 1, 1-13. doi:10.1080/15374416.2014.940622
- Goldstein S. E., Young, A., & Boyd, C. (2008). Relational aggression at school: Associations with school safety and social climate. *Journal of Youth & Adolescence*, 37, 641–654. doi: 10.1007/s10964-007-9192-4
- Gottfredson, G. D., Gottfredson, D. C., Payne, A. A., & Gottfredson, N. C. (2005). School climate predictors of school disorder: Results from a national study of delinquency prevention in schools. *Journal of Research in Crime & Delinquency*, 42, 412-444. doi: 10.1177/0022427804271931

- Graham, S., & Juvonen, J. (1998). Self-blame and peer victimization in middle school: An attributional analysis. *Developmental Psychology, 34*, 587-599.
- Graham, J. W., Olchowski, A. E., & Gilreath, T. D. (2007). How many imputations are really needed? Some practical clarifications of multiple imputation theory. *Prevention Science, 8*, 206-213. doi:10.1007/s11121-007-0070-9
- Hardt, J., Herke, M., & Leonhart, R. (2012). Auxiliary variables in multiple imputation in regression with missing X: A warning against including too many in small sample research. *BMC Medical Research Methodology, 12*, 1-13.
<http://doi.org/10.1186/1471-2288-12-184>
- Haltigan, J. D., & Vaillancourt, T. (2014). Joint trajectories of bullying and peer victimization across elementary and middle school and associations with symptoms of psychopathology. *Developmental Psychology, 50*(11), 2426–2436. doi:10.1037/a0038030
- Hawker, D. S. J., & Boulton, M. J. (2000). Twenty years' research on peer victimization and psychosocial adjustment: A meta-analytic review of cross sectional studies. *Journal of Child Psychology & Psychiatry, 41*, 441-455.
- Haynes, N. M., Emmons, C., & Comer, J. P. (1993). *Elementary and middle school climate survey*. New Haven, CT. Yale University Child Study Center.
- Haynes, N. M., Emmons, C. & Comer, J. P. (1994). *School Climate Survey*. New Haven, CT: Yale Child Development Center, School Development Program.
- Haynes, N. M., Emmons, C., & Ben-Avie, M. (1997). School climate as a factor in student adjustment and achievement. *Journal of Educational and Psychological Consultation, 8*, 321-329. doi:10.1207/s1532768xjepc083_4

- Hodges, V. E., Boivin, M., Vitaro, F., & Bukowski, W. M. (1999). The power of friendship: Protection against an escalating cycle of peer victimization. *Developmental Psychology*, 35, 94-101. doi:10.1037//0012-1649.35.1.94
- Hoffman, D. A., & Gavin, M. B. (1998). Centering decisions in hierarchical linear models: Implications for research in organizations. *Journal of Management*, 24, 623-641. doi:10.1177/014920639802400504
- Hoffman, L. (2015). *Longitudinal Analysis: Modeling Within-person Fluctuation and Change*. New York, NY: Routledge
- Hoffman, L., & Stawski, R. S. (2009). Persons as contexts: Evaluating between-person and within-person effects in longitudinal analysis. *Human Development*, 6(2-3), 97-120. doi: 10.1080/15427600902911189
- Holfield, B., & Leadbeater, B. J. (2015). The nature and frequency of cyber bullying behaviors and victimization experiences in young Canadian children. *Canadian Journal of School Psychology*, 30(2), 116-135. doi:10.1177/0829573514556853
- Howard, A. (2015). Leveraging time-varying covariates to test within and between-person effects in the multilevel linear model. *Emerging Adulthood*, 3(6), 400-412. doi: 10.1177/2167696815592726
- Hox, J. J., & Boom, J. (2012). Growth curve modeling from a multilevel model perspective. In B. Laursen, T. D. Little, & N. A. Card (Eds.). *Handbook of Developmental Research Methods* (pp. 432-444). New York, NY: New Guilford Press.
- Huitsing, G., Snijders, T., Van Duijn, M., & Veenstra, R. (2014). Victims, bullies, and their defenders: A longitudinal study of the coevolution of positive and negative

- networks. *Development and Psychopathology*, 26(3), 645-659.
doi:10.1017/S0954579414000297
- IBM Corp. Released 2016. IBM SPSS Statistics for Windows, Version 24.0. Armonk, NY: IBM Corp.
- Jenson, J. M., & Dieterich, W. A. (2007). Effects of a skills-based prevention program on bullying and bully victimization among elementary school children. *Prevention Science*, 8, 285-296. doi:10.1007/s11121-007-0076-3
- Jeong, S., Kwak, D., Moon, B., & Miguel, C. (2013). Predicting school bullying victimization: Focusing on individual and school environmental/security factors. *Journal of Criminology*, 2013. 1-13. doi:10.1155/2013/401301
- Jiménez-Barbero, J. A., Ruiz-Hernández, J. A., Llor-Zaragoza, L., Pérez-García, M., & Llor-Esteban, B. (2016). Effectiveness of anti-bullying school programs: A meta-analysis. *Children and Youth Services Review*, 61, 165-175.
- Juvonen, J., & Graham, S. (2014). Bullying in schools: The power of bullies and the plight of victims. *Annual Review of Psychology*, 65, 159-185.
doi:10.1146/annurev-psych-010213-115030
- Khondaker, M. I., Rice, K., & Russell, B. (2010). The presence of serious gang involvement in elementary schools. *Journal of Gang Research*, 17(3), 1-9.
- Kochenderfer-Ladd, B., Ladd, G. W., & Kochel, K. P. (2009). A child and environment framework for studying risk for peer victimization. In M. J. Harris (Ed.), *Bullying, rejection and peer victimization: A social cognitive neuroscience perspective* (pp. 27-52). New York, NY: Springer Publishing Company.
- Kochenderfer-Ladd, B., & Pelletier, M. E. (2008). Teachers' views and beliefs about

- bullying: Influences on classroom management strategies and students' coping with peer victimization. *Journal of School Psychology*, 46(4), 431-453.
doi:10.1016/j.jsp.2007.07.005
- Kosciw, J. G., Greytak, E. A., Bartkiewicz, M. J., Boesen, M. J., & Palmer, N. A. (2012). *The 2011 National School Climate Survey: The experiences of lesbian, gay, bisexual and transgender youth in our nation's schools*. New York: GLSEN.
- Koth, C. W., Bradshaw, C. P., & Leaf, P. J. (2008). A multilevel study of student perceptions of school climate: The effect of classroom-level factors. *Journal of Educational Psychology*, 100, 96-104. doi:10.1037/0022-0663.100.1.96
- Kumpulainen, K., & Rasanen, E. (2000). Children involved in bullying at elementary school age: Their psychiatric symptoms and deviance in adolescence. *Child Abuse & Neglect*, 24, 1567-1577.
- Kuperminc, G. P., Leadbeater, B. J., & Blatt, S. J. (2001). School social climate and individual differences in vulnerability to psychopathology among middle school students. *Journal of School Psychology*, 39, 141-159. doi:10.1016/s0022-4405(01)00059-0
- Kuperminc, G. P., Leadbeater, B. J., Emmons, C., & Blatt, S. J. (1997). Perceived school climate and difficulties in the social adjustment of middle school students. *Applied Developmental Science*, 1, 76-88. doi: 10.1207/s1532480xads0102_2
- Ladd, G. W., Ettekal, I., & Kochenderfer-Ladd, B. (2017). Peer victimization trajectories from kindergarten through high school: Differential pathways for children's school engagement and achievement? *Journal of Educational Psychology*. Advance online publication. <http://dx.doi.org/10.1037/edu0000177>

- Ladd, G. W., & Kochenderfer-Ladd, B. (2002). Identifying victims of peer aggression from early to middle childhood: analysis of cross-informant data for concordance, estimation of relational adjustment, prevalence of victimization, and characteristics of identified victims. *Psychological Assessment, 14*(1), 74-96.
doi:10.1037//1040-3590.14.1.74
- Ladd, G. W., & Kochenderfer-Ladd, B. K. (1998). Parenting behaviors and parent-child relationships: Correlates of peer victimization in kindergarten? *Developmental Psychology, 34*, 1450-1458. doi:10.1037//0012-1649.34.6.1450
- Laurion, R. P., Feinberg, M. R., Settami, S., & Faunce, J. (2004). The importance of settings in understanding school based bullying. In T. L. Jackson & L. VandeCreek (Eds.), *Innovations in clinical practice: Focus on violence treatment & prevention* (pp. 117-134). Sarasota, FL: Professional Resource Press.
- Leadbeater, B. J., & Hoglund, W. L. G. (2009). The effects of peer victimization and physical aggression on changes in internalizing from first to third grade. *Child Development, 80*, 843-859. doi:10.1111/j.1467-8624.2009.01301.x
- Leadbeater, B., Hoglund, W., & Woods, T. (2003). Changing contexts? The effects of a primary prevention program on classroom levels of peer relational and physical victimization. *Journal of Community Psychology, 31*, 397-418.
doi:10.1002/jcop.10057
- Leadbeater, B. J., & Sukhawathanakul, P. (2011). Multicomponent programs for reducing peer victimization in early elementary school: A longitudinal evaluation of the WITS primary program. *Journal of Community Psychology, 39*(5), 606-620.
doi:10.1002/jcop.20447

- Leadbeater, B. J., Sukhawathanakul, P., Smith, D., & Bowen, F. (2014). Reciprocal associations between interpersonal and values dimensions of school climate and peer victimization in elementary school children. *Journal of Clinical Child & Adolescent Psychology*, 1-14. doi:10.1080/15374416.2013.873985
- Leadbeater, B. J., Sukhawathanakul, P., Smith, A., Yeung Thompson, R. S., Gladstone, E. J., & Sklar, N. (2013). Bullying and victimization in rural schools: Risks, reasons, and responses. *Journal of Rural and Community Development*, 8(1), 31-47.
- Leadbeater, B., Sukhawathanakul, P., Thompson, K., & Holfeld, B. (2015). Parent, child, and teacher reports of school climate as predictors of peer victimization, internalizing and externalizing in elementary school. *School Mental Health*, 7(4), 261-272. doi: 10.1007/s12310-015-9154-z
- Leff, S. S., Waasdorp, T. E., & Crick, N. R. (2010). A review of existing relational aggression programs: Strengths, limitations and future directions. *School Psychology Review*, 39, 508-535.
- Lester, L., & Cross, D. (2015). The relationship between school climate and mental and emotional wellbeing over the transition from primary to secondary school. *Psychological Well Being*, 5(1), 1-9. doi: 10.1186/s13612-015-0037-8
- Lester, L., Cross, D., Dooley, J., & Shaw, T. (2012). Developmental trajectories of adolescent victimization: Predictors and outcomes. *Social Influence*, 8(2-3), 107-130. doi:10.1080/15534510.2012.734526
- Little, R. J. A., & Rubin, D. B. (1987). *Statistical analysis with missing data*. New York: John Wiley & Sons.

- Luke, D. A. (2004). *Multilevel modeling*. Thousand Oaks, CA: Sage University Papers. doi:10.4135/9781412985147
- Martinez, S. (2009). A system gone berserk: How are zero-tolerance policies really affecting schools? *Preventing School Failure: Alternative Education for Children & Youth*, 53, 153-158. doi: 10.3200/PSFL.53.3.153-158
- McNamara, L. (2013). What's getting in the way of play? Contextual factors that hinder recess in elementary schools. *Canadian Journal of Action Research*, 12(2), 3-21.
- Merrell, K. W., Isava, D. M., Gueldner, B. A., & Ross, S. W. (2008). How effective are school bullying intervention programs? A meta-analysis of intervention research. *School Psychology Quarterly*, 23, 26-42. doi:10.1037/1045-3830.23.1.26
- Mishna, F., Scarcello, I., Pepler, D., & Wiener, J. (2005). Teachers understanding of bullying. *Canadian Journal of Education*, 28(4), 718-738.
- Miyazaki, Y., & Raudenbush, S. W. (2000). Tests for linkage of multiple cohorts in an accelerated longitudinal design. *Psychological Methods*, 5(1), 44. doi:10.1037/1082-989x.5.1.44
- Moos, R. H. (1979). Educational climates. In H. J. Walberg (Ed.), *Educational environments and effects*. McCutchan Press, Berkeley, CA.
- Moos, R. H. (1980). Evaluating classroom learning environments. *Studies in Educational Evaluation*, 6(3), 239-252. doi:10.1016/0191-491x(80)90027-9
- Murray-Harvey, R., & Slee, P. (2010). School and home relationships and their impact on school bullying. *School Psychology International*, 31(3), 271-295. doi:10.1177/0143034310366206
doi:10.1111/j.1745-9125.2005.00026.x
- Nylund, K., Nishna, A., Bellmore, A., & Graham, S. (2007). Subtypes, severity, and

- structural stability of peer victimization: What does latent class analysis say?
Child Development, 78, 1706-1722. doi:10.1111/j.1467-8624.2007.01097.x
- Olweus, D. (1993). Victimization by peers: Antecedents and long-term outcomes. In K. H. Rubin & J. B. Asendorf (Eds.), *Social withdrawal, inhibition and shyness in children* (pp. 315-341). Hillsdale, NJ: Erlbaum.
- Olweus, D. (1994). Bullying at school: Basic facts and an effective intervention programme. *Promotion and Education*, 1(4), 27-31.
doi:10.1177/102538239400100414
- Olweus, D. (1997). Bully/victim problems in school: Facts and intervention. *European Journal of Psychology of Education*, 12, 495-510.
- Olweus, D. (2003). A profile of bullying at school. *Educational Leadership*, 60, 12-19.
doi:10.1007/978-1-4757-9116-7_5
- Olweus, D. (2005). A useful evaluation design, and the effects of the Olweus bullying prevention program. *Psychology, Crime, & Law*, 11(4), 389-402. doi:
10.1080/10683160500255471
- Olweus, D. (2010). Understanding and researching bullying: Some critical issues. In S. R. Jimerson, S. M. Swearer, & D. L. Espelage (Eds.), *Handbook of bullying in schools: An international perspective* (pp. 9-33). New York, NY: Taylor & Francis.
- Osher, D., Kendziora, K., Spier, E., & Giribaldi, M. L. (2014). School influences on child and youth development. *Defining Prevention Science*, 2014, 151-169.
doi:10.1007/978-1-4899-7424-2_7
- Ostrov, J. M. (2010). Prospective associations between peer victimization and aggression.

- Child Development*, 81(6), 1670-1677. 10.1111/j.1467-8624.2010.01501.x
- Ostrov, J. M., & Kamper, K. E. (2015). Future directions for research on the development of relational and physical peer victimization. *Journal of Clinical Child & Adolescent Psychology*, 44(3), 509–519.
doi:10.1080/15374416.2015.1012723
- Pellegrini, A. D., & Bartini, M. (2000). An empirical comparison of methods of sampling aggression and victimization in school settings. *Journal of Educational Psychology*, 92, 360- 366.
- Pellegrini, A. D., & Long, J. D. (2002). A longitudinal study of bullying, dominance, and victimization during the transition from primary school through secondary school. *British Journal of Developmental Psychology*, 20, 259-280.
doi:10.1348/026151002166442
- Peterson, M. S. (2005). Peer victimization in schools: An international perspective. *Journal of Social Sciences*, 8, 37-41.
- Peugh, J. L. (2009). A practical guide to multilevel modeling. *Journal of School Psychology*, 28, 85-112. doi:10.1016/j.jsp.2009.09.002
- Posner, M. L., & Rothbart, M. K. (2000). Developing mechanisms of self-regulation. *Development & Psychopathology*, 12,(3), 427-441.
- Raudenbush, S. W., & Bryk, A. (2002). *Hierarchical linear models: Applications and data analysis methods*. Thousand Oaks, CA: Sage.
- Raudenbush, S.W., & Chan, W.S. (1992). Growth curve analysis in accelerated longitudinal designs with application to the National Youth Survey. *Journal of Research on Crime and Delinquency*, 29(4), 387- 411.

- Reavis, R. D., Keane, S. P., & Calkins, S. D. (2010). Trajectories of peer victimization: The role of multiple relationships. *Merrill-Palmer Quarterly*, 56, 303-332.
doi:10.1353/mpq.0.0055
- Reavis, C. A., Vinson, D. & Fox, R. (1999). Importing a culture of success via a strong principal. *Clearing House*, 72, 199–202.
- Rezvan, H. P., Lee, K. J., & Simpson, J. A. (2015). The rise of multiple imputation: A review of the reporting and implementation of the method in medical research. *BMC Medical Research Methodology*, 15(30), 1-14. doi:10.1186/s12874-015-0022-1
- Reijntjes, A., Kamphaus, J. H., Prinzie, P., Boelen, P. A., van der Schoot, M., & Telch, M. J. (2011). Prospective linkages between peer victimization and externalizing problems in children: A meta analysis. *Aggressive Behavior*, 37, 215-222.
doi:10.1002/ab.20374
- 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 and Neglect*, 34, 244-252. doi:10.1016/j.chiabu.2009.07.009
- Richard, J. F., Schneider, B. H. & Mallet, P. (2011). Revisiting the whole-school approach to bullying: Really looking at the whole school. *School Psychology International*, 33, 263-284. doi:10.1177/0143034311415906
- Rigby, K. (2005). Why do some children bully at school? The contributions of negative attitudes towards victims and the perceived expectations of friends, parents, and teachers. *School Psychology International*, 26, 147-161.
doi:10.1177/0143034305052910

Rigby, K., & Slee, P. T. (1998). The Peer Relations Questionnaire. Point Lonsdale, VIC:

The Professional Reading Guide for Educational Administrators.

Rigby, K. (1998). *The Manual for the Peer Relations Questionnaire (PRQ)*. Point

Lonsdale Victoria: The Professional Reading Guide for Educational

Administrators.

Rigby, K., & Slee, P. T. (1999). Suicidal ideation among adolescent school children,

involvement in bully/victim problems and perceived low social support. *Suicide and Life-threatening Behavior*, 29, 119-130.

Rosen, L. H., Beron, K. J. & Underwood, M. K. (2016). Social victimization trajectories from middle childhood through late adolescence. *Social Development*, 1-21.

doi:10.1111/sode.12185

Rudolph, K. D., Troop-Gordon, W., Hessel, E. T., & Schmidt, J. D. (2011). A latent

growth curve analysis of early and increasing peer victimization as predictors of mental health across elementary school. *Journal of Clinical and Adolescent Psychology*, 40, 111-122. doi: 10.1080/15374416.2011.533413

Sainio, M., Veenstra, G., Huitsing, C., & Salmivalli, C. (2010). Victims and their

defenders: A dyadic approach. *International Journal of Behavioral Development*, 35, 144-151. doi:10.1177/0165025410378068

Sairanen, L., & Pfeffer, K. (2011). Self reported handling of bullying among junior high school teachers in Finland. *School Psychology International*, 32(3), 330-344.

doi: 10.1177/0143034311401795

Samdal, O., Nutbeam, D., Wold, B., & Kannas, L. (1998). Achieving health and

educational goals through schools—a study of the importance of the school

- climate and the students' satisfaction with school. *Health Education Research*, 13(3), 383-397. doi:10.1093/her/13.3.383
- Salmivalli, C. (1999). Participant role approach to school bullying: implications for interventions. *Journal of Adolescence*, 22, 453-459. doi:10.1006/jado.1999.0239
- Salmivalli, C., Lagerspetz, K., Bjorkqvist, K., Osterman, K., & Kaukiainen, A. (1996). Bullying as a group process: Participant roles and their relations to social status within the group. *Aggressive Behavior*, 22, 1-15.
- Sawyer, A. L., Bradshaw, C. P., & O'Brennan, L. M. (2007). Examining ethnic, gender, and developmental differences in the way children report being a victim of "bullying" on self-report measures. *Journal of Adolescent Health*, 43, 106-114. doi: 10.1016/j.jadohealth.2007.12.011
- Schafer, J. L. (1997). Analysis of incomplete multivariate data. London, UK: Chapman and Hall.
- Schmidt, M. E., & Bagwell, C. L. (2007). The protective role of friendships in overtly and relationally victimized boys and girls. *Merrill-Palmer Quarterly*, 53, 439-460.
- Shell, M. D., Gazelle, H., & Faldowski, R. A. (2014). Anxious solitude and middle school transition: A diathesis x stress model of peer exclusion and victimization trajectories. *Developmental Psychology*, 50(5), 1569-1583. doi:10.1037/a0035528
- Silva, M. A. I., Pereira, B., Mendonça, D., Nunes, B., & de Oliveira, W. A. (2013). The involvement of girls and boys with bullying: An analysis of gender differences. *International Journal of Environmental Research and Public Health*, 10(12), 6820-6831.
- Singer, J. (1998). Using SAS PROC MIXED to fit multilevel models, hierarchical

- models, and individual growth models. *Journal of Educational and Behavioural Statistics*, 24(4), 323-355.
- Singer, J., & Willett, J. (2003). *Applied longitudinal data analysis. Modeling change and event occurrence*. New York, NY: Oxford University Press
- Skiba, R. J., & Knesting, K. (2001). Zero tolerance, zero evidence: An analysis of school disciplinary practice. *New Directions for Student Leadership*, 2001(92), 17-43.
doi: 10.1002/yd.23320019204
- Skiba, R., Simmons, A. B., Peterson, R., Forde, S. (2004). The SRS safe school survey: A broader perspective on school climate intervention. In J. Furlong, G. M. Morrison, D. G. Cornell, & R. Skiba, (Eds.), *Issues in School Violence Research* (pp. 157-169). Binghamton, NY: Haworth Press.
- Skiba, R., Simmons, A. B., Peterson, R., McKelvey, J., Forde, S., & Gallini, S. (2004). Beyond guns, drugs and gangs. *Journal of School Violence*, 3(2-3), 149-171.
doi:10.1300/J202v03n02_09
- Skinner E. A., Belmont M. J. (1993). Motivation in the classroom: Reciprocal effects of teacher behavior and student engagement across the school year. *Journal of Educational Psychology*, 85, 571-581.
- Skrzypiec, G., Slee, P., Murray-Harvey, R., & Pereira, B. (2011). School bullying by one or more ways: Does it matter and how do students cope? *School Psychology International*, 32(2) 288-311. doi:10.1177/0143034311402308
- Smith, D. J., Cousins, B., & Stewart, R. (2005). Antibullying interventions in schools: Ingredients of effective programs. *Canadian Journal of Education*, 28, 739-762.
- Smith, P. K., Madsen, K. C., & Moody, J. C. (1999). What causes the age decline in

- reports of being bullied at school? Towards a developmental analysis of risks of being bullied. *Educational Research*, 41, 267–285.
- Smith, D. J., Schneider, B. H., Smith, P. K., & Ananiadou, K. (2004). The effectiveness of whole school antibullying programs: A synthesis of evaluation research. *School Psychology Review*, 33, 548-561.
- Snyder, J., Brooker, M., Patrick, R., Snyder, A., Schrepferman, L., & Stoolmiller, M. (2003). Observed peer victimization during early elementary school: Continuity, growth, and relation to risk for child antisocial and depressive behavior. *Child Development*, 74, 1881-1898.
- Solberg, M. E., & Olweus, D. (2003). Prevalence estimation of school bullying with the Olweus Bully/Victim Questionnaire. *Aggressive Behavior*, 29, 239-268.
doi:10.1002/ab.10047
- Steffgen, G., Recchia, S., & Viechtbauer, W. (2013). The link between school climate and violence in school: A meta-analytic review. *Aggression and Violent Behavior*, 18(2), 300-309. doi: 10.1016/j.avb.2012.12.001
- Statistics Canada (2013). National Household Survey (NHS) Profile. 2011 National Household Survey. Statistics Canada (Catalogue no. 99-004-XWE). Ottawa.
Retrieved from Statistics Canada: <http://www12.statcan.gc.ca/nhs-enm/2011/dp-pd/prof/index.cfm?Lang=E>
- Tabachnick, B. G., & Fidell, L. S. (2007). *Using multivariate statistics* (5th ed.). Toronto, ON: Pearson Education.
- Thapa, A., Cohen, J., Higgins- D'Alessandro, A., & Guffey, S. (2012). School Climate Research Summary: August 2012. *School Climate Brief*, No. 3. National School

- Climate Center, New York, NY. Retrieved from: www.schoolclimate.org/climate/research.php
- Totura, C. M. W. , MacKinnon-Lewis, C., Gesten, E. L., Gadd, R., Divine, K. P., Dunham, S., & Kamboukos, D. (2009). Bullying and victimization among boys and girls in middle school: The influence of perceived family and school contexts. *The Journal of Early Adolescence*, 29, 571-609. doi: 10.1177/0272431608324190
- Ttofi, M. M., & Farrington, D. P. (2011). Effectiveness of school-based programs to reduce bullying: a systematic and meta-analytic review. *Journal of Experimental Criminology*, 7, 27-56. doi: 10.1007/s11292-010-9109-1
- Troop-Gordon, W., & Kopp, J. (2011). Teacher-child relationship quality and children's peer victimization and aggressive behavior in late childhood. *Social Development*, 20, 536-561. doi:10.1111/j.1467-9507.2011.00604.x
- Troop-Gordon, W., & Ladd, G. W. (2005). Trajectories of peer victimization and perceptions of the self and schoolmates: Precursors to internalizing and externalizing problems. *Child Development*, 76, 1072-1091. doi:10.1111/j.1467-8624.2005.00898.x
- Troop-Gordon, W., & Ladd, G. (2015). Teachers' victim-related beliefs and strategies: Associations with students' aggressive behaviour and peer victimization. *Journal of Abnormal Child Psychology*, 43(1), 45-60. doi:10.1007/s10802-013-9840-y
- Unnever, J. D., & Cornell, D. G. (2004). Middle school reports of bullying: Who reports being bullied? *Aggressive Behavior*, 30, 373-388. doi: 10.1002/ab.20030
- Vaillancourt, T., Brittain, H., Bennett, L., Arnocky, S., McDougall, P., Hymel, S., . . . & Cunningham, L. (2010). Places to avoid: Population-based study of student

- reports of unsafe and high bullying areas at school. *Canadian Journal of School Psychology*, 25, 40-54. doi:10.1177/0829573509358686
- Vaillancourt, T., McDougall, P., Hymel, S., Krygsman, A., Miller, J., Stiver, K., & Davis, C. (2008). Bullying: Are researchers and children/youth talking about the same thing? *International Journal of Behavioral Development*, 32, 486-495. doi: 10.1177/0165025408095553
- van Buuren, S. (2007). Multiple imputation of discrete and continuous data by fully conditional specification. *Statistical Methods in Medical Research*, 16(3), 219-242. doi: 10.1177/0962280206074463
- van der Ploeg, R., Steglich, C., Salmivalli, C., & Veenstra, R. (2015). The intensity of victimization: Associations with children's psychosocial well-being and social standing in the classroom. *PLoS ONE*, 10(10), 1-15. doi:10.1371/journal.pone.0141490
- Van Houtte, M. (2005). Climate or culture? A plea for conceptual clarity in school effectiveness research. *School Effectiveness & School Improvement*, 16, 71-89. <http://dx.doi.org/10.1080/09243450500113977>.
- Van Houtte, M., & Van Maele, D. (2011). The black box revelation: in search of conceptual clarity regarding climate and culture in school effectiveness research. *Oxford Review of Education*, 37, 505-524. <http://dx.doi.org/10.1080/03054985.2011.595552>.
- Veenstra, R., Lindenberg, S., Munniksma, A., & Dijkstra, J. K. (2010). The complex relation between bullying, victimization, acceptance, and rejection: Giving special attention to status, affection, and sex differences. *Child Development*, 81,

- 480-486. doi:10.1111/j.1467-8624.2009.01411.x
- Volk, A. A., Dane, A. V., & Marini, Z. A. (2014). What is bullying? A theoretical redefinition. *Developmental Review, 34*, 327-343. doi: 10.1016/j.dr.2014.09.001
- von Hippel, P. T. (2009). How to impute interactions, squares, and other transformed variables. *Sociological Methodology 39*(1), 265–291.
- Waasdorp, T. E., Pas, E. T., O'Brennan, L. M., & Bradshaw, C. P. (2011). A multilevel perspective on the climate of bullying: Discrepancies among students, school staff, and parents. *Journal of School Violence, 10*, 115-132.
doi:10.1080/15388220.2010.539164
- Wang, C., Berry, B., & Swearer, S. M. (2013). The critical role of school climate in bullying effectiveness research. *Theory Into Practice, 52*(4), 296-302.
<http://dx.doi.org/10.1080/00405841.2013.829735>
- Willett, J. B., Singer, J. D., & Martin, N. C. (1998). The design and analysis of longitudinal studies of development and psychopathology in context: Statistical models and methodological recommendations. *Development & Psychopathology, 10*, 395-426. doi:10.1017/S0954579498001667
- Wilson, D. (2004). The interface of school climate and school connectedness and relationships with aggression and victimization. *Journal of School Health, 74*, 293-299. doi:10.1111/j.1746-1561.2004.tb08286.x
- Xie, H., Swift, D. J., Cairns, B. D. & Cairns, R. B. (2002), Aggressive behaviors in social interaction and developmental adaptation: A narrative analysis of interpersonal conflicts during early adolescence. *Social Development, 11*, 205–224. doi:10.1111/1467-9507.00195

- Yeung, R., & Leadbeater, B. (2010). Adults make a difference: The protective effects of parent and teacher emotional support on emotional and behavioral problems of peer victimization. *Journal of Community Psychology*, 38, 80-98. doi: 10.1002/jcop.20353
- Young, R., & Johnson, D. R. (2015). Handling missing values in longitudinal panel data with multiple imputation. *Journal of Marriage and the Family*, 77(1), 277–294. <http://doi.org/10.1111/jomf.12144>
- Yuan, Y. (2011). Multiple imputation using SAS software. *Journal of Statistical Software*, 45(6), 1-25. doi: 10.18637/jss.v045.i06
- Zhang, A., Musu-Gillette, L., & Oudekerk, B.A. (2016). Indicators of School Crime and Safety: 2015 (NCES 2016-079/NCJ 249758). National Center for Education Statistics, U.S. Department of Education, and Bureau of Justice Statistics, Office of Justice Programs, U.S. Department of Justice. Washington, DC.
- Zhang, Z., & Wang, L. (2009). Power analysis for growth curve models using SAS. *Behavior Research Methods*, 41, 1083-1094.
- Zullig, K. J., Collins, R., Ghani, N., & Patton, J. M. (2014) Psychometric support of the school climate measure in a large, diverse sample of adolescents: A replication and extension. *Journal of School Health*, 84, 82-90. doi: 10.1111/josh.12124
- Zullig, K. J., Koopman, T. M., Patton, J. M., & Ubbes, V. A. (2010). School climate: Historical review, instrument development, and school assessment. *Journal of Psychoeducational Assessment*, 28(2), 139-152. doi:10.1177/0734282909344205

*Appendix A: Parent Consent Form for Child Participation in Control Schools***WITS PROGRAMS EVALUATION**
Children in grades 1 to 4

You are invited to participate in the evaluation of the WITS Programs. [REDACTED]

[REDACTED]

The WITS acronym stands for "Walk away", "Ignore", "Talk it out" and "Seek help." It is a simple way to give children in kindergarten to grade 3 useful skills for handling conflicts with peers and to get everyone in their homes and schools on board using one language to prevent peer victimization. It is important to know if the WITS programs are working! Your child's school does not have this program and is working with us as a comparison school. To evaluate these programs effectively, we must collect data from a few elementary schools that DO NOT use the WITS Program. Your participation helps us determine if the expense and effort that goes into delivering this program is really worth the school's time and our time. Your child's school is receiving an honorarium for participating. At the end of the 2 ½ year study, we will assist in implementing the programs in your child's school if they are interested.

All information that you or your child provide on the questionnaires is confidential. Only the research team will see it. Names do not appear on the questionnaires and all data is stored in a locked research office.

If you agree to participate, please sign this form and complete the attached short questionnaire that gives us information about your family's demographics, your perceptions of school safety and school climate, and your children's behaviours and experiences with bullying. If you give permission by signing below, your child will also be asked to answer some questions that are appropriate for his/her age about their experiences with bullying. Your teachers will also be asked to fill out a class report about victimization and leadership. You, your child, and his/her teachers will be asked to complete these questionnaires each year for the next 2 ½ years; specifically, in April 2011 (Time 1), Fall of 2011 (Time 2), Spring of 2012 (Time 3), Fall of 2012 (Time 4), and Spring of 2013 (Time 5). It will take approximately 30 minutes for parents to complete the questionnaire at each time point, and 30 minutes for children to complete their surveys at each time point.

Teachers are given a list of children who have received parent consent, so they will know who should answer the victimization questionnaire. No child names are put on these forms. Instead, an ID for your child will be used. All forms are placed in a sealed

envelope that is picked up from the school office by the research team. The questionnaire asks about children's perceptions on school climate and their experiences with peers who help them and with peers who may be hurting them by hitting or teasing them or excluding them from activities. Some children may experience emotional discomfort from filling out these questionnaires. Children are told to contact a parent or teacher if they have problems with victimization, and school policies for addressing children's reports of distress from victimization will be followed up by the teachers. There are no known or anticipated risks in participating in this research beyond what is experienced in the school classrooms and playgrounds. The potential benefits of your participation in this research may be increased knowledge about how to reduce peer victimization in schools.

Your participation in this evaluation is voluntary. You are free to refuse to participate and there are no negative consequences for this. If you decide NOT to participate, please circle "I DO NOT" give consent and complete your child's information below, and return it to your child's school sealed in the envelope provided. Students who do not have parent consent to participate will continue with their regular classroom work when questionnaires are administered to the other children.

If you decide to participate, you or your child may withdraw at any time without consequences or explanation. If you withdraw from the study, you will be asked whether you would like prior data collected to be destroyed or if you would consent to earlier data being used anonymously in the ongoing analysis.

To protect your anonymity, all data are coded with ID numbers. We store master lists linking these ID numbers and children's names at the university research office in locked filing cabinets. All master lists are stored separately from the questionnaires. Only the research team has access to this information and master lists are destroyed in five years.

The ethics of this study have been approved by ethics review committees at the University of Victoria, the University of Ottawa, Carleton University and your school district. You may verify the ethical approval of this study, or raise any concerns you might have by contacting the Human Research Ethics Office at t

[REDACTED]

This study has been approved by [REDACTED]

Your signature below indicates that you understand the above conditions of participation in this study and that you have had the opportunity to have your questions answered by the researchers.

I DO / I DO NOT (please circle one) GIVE CONSENT FOR MY CHILD

_____ (PRINT NAME) to
participate in the evaluation of the WITS programs for the school year. My child is in
grade _____ at _____ school and my child's teacher's name
is _____.

I also agree to complete the questionnaire enclosed in this package.

Name of Parent/Guardian

Signature

Date

*Please put this signed consent form and completed questionnaire in the envelope
provided, and return to your child's class teacher as soon as possible.*

PLEASE KEEP THIS COPY FOR YOUR RECORDS

*Appendix B: Parent Consent Form for Child Participation in Program Schools***WITS PROGRAMS EVALUATION**
Children in grades 1 to 4

You are invited to participate in the evaluation of the WITS Programs. [REDACTED]

[REDACTED]

The WITS acronym stands for "Walk away", "Ignore", "Talk it out" and "Seek help." It is a simple way to give children in kindergarten to grade 3 useful skills for handling conflicts with peers and to get everyone in their homes and schools on board using one language to prevent peer victimization. It is important to know if the WITS programs are working!

The purpose of this research project is to evaluate the effectiveness of the WITS and WITS LEADS programs and how well they are implemented. These programs are used in many elementary schools to reduce peer victimization. The WITS program is for grade 1 to 3 students. The new WITS LEADS program is among the first to address social forms of victimization (e.g., teasing, social exclusion, vindictive gossip) as well as physical victimization (hitting, pushing, intimidating) for 4th to 6th grade students. This evaluation will tell parents, schools, and community liaisons about the effects of the WITS Programs on peer victimization and it will provide feedback to the research and development team to refine the programs.

All information that you or your child provide on the questionnaires is confidential. Only the research team will see it. Names do not appear on the questionnaires and all data is stored in a locked research office.

If you agree to participate, please sign this form and complete the attached short questionnaire that gives us information about your family's demographics, your perceptions of school safety and school climate, and your children's behaviours and experiences with bullying. If you give permission by signing below, your child will also be asked to answer some questions that are appropriate for his/her age about their experiences with bullying. Your teachers will also be asked to fill out a class report about bullying and leadership and about how they are using the WITS programs. You, your child, and his/her teachers will be asked to complete these questionnaires each year for the next 2 ½ years; specifically, in April 2011 (Time 1), Fall of 2011 (Time 2), Spring of 2012 (Time 3), Fall of 2012 (Time 4), and Spring of 2013 (Time 5). It will take approximately 30 minutes for parents to complete the questionnaire at each time point.

and 30 minutes for children to complete their surveys at each time point.

Teachers are given a list of children who have received parent consent, so they will know who should answer the victimization questionnaire. No child names are put on these forms. Instead, an ID for your child will be used. All forms are placed in a sealed envelope that is picked up from the school office by the research team. The questionnaire asks about children's perceptions on school climate and their experiences with peers who help them and with peers who may be hurting them by hitting or teasing them or excluding them from activities. Some children may experience emotional discomfort from filling out these questionnaires. Children are told to contact a parent or teacher if they have problems with victimization, and school policies for addressing children's reports of distress from victimization will be followed up by the teachers. There are no known or anticipated risks in participating in this research beyond what is experienced in the school classrooms and playgrounds. The potential benefits of your participation in this research may be increased knowledge about how to reduce peer victimization in schools. Resources for implementing the WITS Programs (books, training, support, etc.) have been provided to schools that are participating in this evaluation as an incentive.

Your participation in this evaluation is voluntary. You are free to refuse to participate and there are no negative consequences for this. If you decide NOT to participate, please write 'NO THANKS' on the next page and return it to your child's school sealed in the envelope provided. Students who do not have parent consent to participate will continue with their regular classroom work when questionnaires are administered to the other children.

If you decide to participate, you or your child may withdraw at any time without consequences or explanation. If you withdraw from the study, you will be asked whether you would like prior data collected to be destroyed or if you would consent to earlier data being used anonymously in the ongoing analysis.

To protect your anonymity, all data are coded with ID numbers. We store master lists linking these ID numbers and children's names at the university research office in locked filing cabinets. All master lists are stored separately from the questionnaires. Only the research team has access to this information and master lists are destroyed in five years.

This study has been approved by ethics review committees at the [REDACTED]

This study has been approved by the [REDACTED]

Your signature below indicates that you understand the above conditions of participation in this study and that you have had the opportunity to have your questions answered by the researchers.

I agree to complete the questionnaire enclosed in this package and

I GIVE CONSENT FOR MY CHILD _____
(PRINT NAME) to participate in the evaluation of the WITS programs for the school
year. MY CHILD IS IN GRADE _____ AT
_____ SCHOOL AND MY CHILD'S
TEACHER IS _____.

_____ <i>Name of Parent/Guardian</i>	_____ <i>Signature</i>	_____ <i>Date</i>
---	---------------------------	----------------------

NO, I DO NOT GIVE CONSENT FOR MY CHILD _____ TO
PARTICIPATE.

*Please put this signed consent form and completed questionnaire in the envelope
provided, and return to your child's class teacher as soon as possible.*

Appendix C: Child Assent and Debriefing Instructions

(Please read the following out loud to students):

1. (Assent)

Your class is helping with a research project that will help us all learn more about bullying. Your parents gave permission for you to complete this questionnaire.

2. (Explain Consent)

Your answers on the questionnaire are **PRIVATE**. This means that they will **NOT** be shared with **ANYONE**, not even your parents and teachers. Your name is **NOT** on the questionnaire, and a code number is used so that no one will know who gave the answers. Before we begin, tear off the first page of the questionnaire that has your name on it. When you have finished the questionnaire, I will pass around an envelope for you to put it in.

3. (Demonstration)

Now I will show you how to answer the questions[demonstrate to students how to answer the questions by putting a check in the box]. Try to get your answer marks right inside the box.

We will use the coloured sheet of paper to cover up the questions that we aren't working on. Place the sheet of paper to cover up the second question.

Let us start with a couple of practice questions I will read out the questions twice and give you time to answer. There are no right or wrong answers to the questions. Please do not talk.

4. (Debriefing) TO READ AFTER SURVEY IS COMPLETED:

If you are bothered by a question you should ask your teacher or parents about it privately. If you think you have problems with bullying, SEEK HELP from your teacher or parents!

Appendix D: Family Information Questionnaire

Child ID:

School:

Child Initials:

Family Information Questionnaire

Please answer the following questions about your family demographics.

This information will be used in summary form only to describe the overall demographic backgrounds of the students who participated in the WITS Programs Evaluation.

This information is needed to inform others who might want to use the program.

All information you provide will be kept **confidential in locked files**. Your name is not on this form and only the researchers at the University will see your answers.

You may omit any question(s) that you don't want to answer

1. What is your **child's date of birth**?
(month/day/year)
2. What is your relationship to the child in this study? **Please check (✓) one:**
☐ Mother ☐ Father
☐ Other (please specify)
3. What **grade** is your child in? Grade
4. Sex of child. **Please check one:**
☐ Boy ☐ Girl
5. What is your **child's ethnicity**?
☐ Aboriginal ☐ Hispanic or Latino
☐ Asian or Asian Canadian ☐ East Indian or Indo-Canadian
☐ Black or African Canadian ☐ White
☐ Other (please specify)

6. What is the highest level of education completed by child's mother or maternal guardian?

Please check (✓) one:

☐ Grade 8 or less	☐ Some university
☐ Some high school	☐ Bachelor's degree
☐ High school graduation diploma	☐ Some graduate work
☐ College, vocational or technical training
beyond high school	☐ Graduate degree

7. What is the highest level of education completed by child's father or paternal guardian?

Please check (✓) one:

☐ Grade 8 or less	☐ Some university
☐ Some high school	☐ Bachelor's degree
☐ High school graduation diploma	☐ Some graduate work
☐ College, vocational or technical training
beyond high school	☐ Graduate degree

8. Including yourself, how many people live in your household?

Adults (19yrs & older) Children (under 19yrs)

10. Who does your child live with most of the time? Please check (✓) one:

☐ Both parents in the <u>same</u> house	☐ Dad only
☐ Both parents in <u>different</u> houses	☐ Other Adult
☐ Mom only	

11. How many different houses has your child lived in since birth?

of houses

THANK YOU FOR COMPLETING THIS SURVEY!

Appendix E: Social Experiences Questionnaire and Your School Experiences Questionnaire

School ID: Child ID: Teacher ID:

Grade:

THINGS THAT HAPPEN TO ME - Wave 5 Child Survey

Directions to research assistants for administering this confidential questionnaire:

1. Ensure each student has privacy for his or her answers.
2. Please say: "Here is a list of things that sometimes happen to kids your age at school. How often do they happen to you at school?"
3. So they understand what "confidential" means, have students place their own completed questionnaires in the envelope provided by circulating it around the class and seal the envelope in front of them.

A and B are practice questions to teach students how to respond. Explain that they should only check one box for their answer. Younger students should use a blank sheet of paper to isolate the question that they are answering, and then move it down before answering the next question.

- a) How often do you eat lunch at school?
- ☐ NEVER ☐ SOMETIMES ☐ ALMOST ALL THE TIME
- b) How often does your class go outside to play?
- ☐ NEVER ☐ SOMETIMES ☐ ALMOST ALL THE TIME

Please check (✓) ONE answer that BEST describes what you do:

1. How often does another kid help you when you need it?
- ☐ NEVER ☐ SOMETIMES ☐ ALMOST ALL THE TIME
2. How often are you hit by another kid at school?
- ☐ NEVER ☐ SOMETIMES ☐ ALMOST ALL THE TIME

School I D:

Child I D:

Teacher I D:

Grade:

3. How often do other kids leave you out on purpose when it is time to play or do an activity?
☐ NEVER ☐ SOMETIMES ☐ ALMOST ALL THE TIME
4. How often does another kid yell at you or call you mean names?
☐ NEVER ☐ SOMETIMES ☐ ALMOST ALL THE TIME
5. How often does another kid try to cheer you up when you feel sad or upset?
☐ NEVER ☐ SOMETIMES ☐ ALMOST ALL THE TIME
6. How often does a kid who is mad at you try to get back at you by not letting you be in their group anymore?
☐ NEVER ☐ SOMETIMES ☐ ALMOST ALL THE TIME
7. How often do you get pushed or shoved by another kid at school?
☐ NEVER ☐ SOMETIMES ☐ ALMOST ALL THE TIME
8. How often does another kid do something that makes you feel happy?
☐ NEVER ☐ SOMETIMES ☐ ALMOST ALL THE TIME
9. How often does another kid make fun of you because of the way you look?
☐ NEVER ☐ SOMETIMES ☐ ALMOST ALL THE TIME
10. How often does another kid tell lies about you to make other kids not like you anymore?
☐ NEVER ☐ SOMETIMES ☐ ALMOST ALL THE TIME
11. How often does another kid kick you or pull your hair?
☐ NEVER ☐ SOMETIMES ☐ ALMOST ALL THE TIME

School ID:

Child ID:

Teacher ID:

Grade:

12. How often does another kid say they won't like you unless you do what they want you to do?

☐ NEVER☐ SOMETIMES☐ ALMOST ALL THE
TIME

13. How often does another kid say something nice to you?

☐ NEVER☐ SOMETIMES☐ ALMOST ALL THE
TIME

14. How often does a kid try to keep others from liking you by saying mean things about you?

☐ NEVER☐ SOMETIMES☐ ALMOST ALL THE
TIME

15. How often does another kid make fun of you because of the way you speak?

☐ NEVER☐ SOMETIMES☐ ALMOST ALL THE
TIME

16. How often does another kid say they will beat you up if you don't do what they want you to do?

☐ NEVER☐ SOMETIMES☐ ALMOST ALL THE
TIME

17. How often do other kids let you know that they care about you?

☐ NEVER☐ SOMETIMES☐ ALMOST ALL THE
TIME

Your School Experience (for grades 3-6 students)					
--	--	--	--	--	--

	At No Time	Sometimes	Few Times	Many Times	All the Time
1. How often do you feel safe at school	☐	☐	☐	☐	☐
2. How often are you bullied, teased, or picked on at school?	☐	☐	☐	☐	☐

Appendix F: School Climate Survey

Not available in the public domain.

Please visit: <https://medicine.yale.edu/childstudy/comer/evaluation/surveys/scs/>

Appendix G: Physical and Relational Victimization Means and Standard Deviations by Cohort

	Grade 3 Spring	Grade 4 Fall	Grade 4 Spring	Grade 5 Fall	Grade 5 Spring	Grade 6 Fall	Grade 6 Spring
Physical, M	2.79	2.60	2.44	2.16	2.12	1.91	1.65
SD	2.44	2.33	2.35	2.16	2.16	2.02	1.85
N	383	394	797	759	703	374	343
Range	0-10	0-10	0-10	0-10	0-10	0-10	0-9
Cohort 1, M	2.79	2.60	2.39	2.02	1.96		
SD	2.44	2.33	2.34	2.09	2.07		
N	383	394	388	343	300		
Range	0-10	0-10	0-10	0-9	0-10		
Cohort 2, M			2.48	2.28	2.24	1.91	1.65
SD			2.35	2.22	2.23	2.02	1.85
N			409	416	403	374	343
Range			0-10	0-10	0-10	0-10	0-9
Relational, M	2.93	2.83	2.83	2.37	2.43	2.09	2.02
SD	2.46	2.48	2.47	2.36	2.44	2.31	2.24
N	383	394	796	759	703	374	343
Range	0-10	0-10	0-10	0-10	0-10	0-10	0-10
Cohort 1, M	2.93	2.83	2.80	2.32	2.32		
SD	2.46	2.48	2.52	2.34	2.39		
N	383	394	387	343	300		
Range	0-10	0-10	0-10	0-10	0-10		
Cohort 2, M			2.85	2.40	2.51	2.09	2.02
SD			2.42	2.37	2.48	2.31	2.24
N			409	416	403	374	343
Range			0-10	0-10	0-10	0-10	0-10

Appendix H: School Climate Means and Standard Deviations by Cohort

School Climate	Grade 3 Spring	Grade 4 Fall	Grade 4 Spring	Grade 5 Fall	Grade 5 Spring	Grade 6 Fall	Grade 6 Spring
Teacher, M	1.76	1.82	2.17	2.05	2.62	2.73	2.84
SD	2.82	3.06	3.45	3.13	3.75	3.95	3.82
N	383	392	795	759	703	374	343
Range	0-16	0-18	0-18	0-17	0-18	0-18	0-18
Cohort 1, M	1.76	1.82	2.07	1.96	2.33		
SD	2.82	3.06	3.51	3.12	3.48		
N	383	392	386	343	300		
Range	0-16	0-18	0-16	0-16	0-18		
Cohort 2, M			2.26	2.12	2.84	2.73	2.84
SD			3.40	3.14	3.95	3.95	3.82
N			409	416	403	374	343
Range			0-18	0-17	0-18	0-18	0-18
Peers, M	4.07	4.41	4.52	4.73	4.90	5.09	4.86
SD	3.28	3.48	3.56	3.50	3.67	3.61	3.71
N	383	392	795	759	703	374	343
Range	0-14	0-14	0-14	0-14	0-14	0-14	0-14
Cohort 1, M	4.07	4.41	4.53	4.68	4.67		
SD	3.28	3.48	3.69	3.54	3.62		
N	383	392	386	343	300		
Range	0-14	0-14	0-14	0-14	0-14		
Cohort 2, M			4.52	4.77	5.07	5.09	4.86
SD			3.43	3.46	3.71	3.61	3.71
N			409	416	403	374	343
Range			0-14	0-14	0-14	0-14	0-14
Fairness, M	2.83	2.96	2.99	2.97	2.98	2.84	2.74
SD	2.58	2.71	2.72	2.70	2.83	2.83	2.80
N	383	392	795	758	702	374	343
Range	0-10	0-10	0-10	0-10	0-10	0-10	0-10
Cohort 1, M	2.83	2.96	2.81	2.87	2.69		
SD	2.58	2.71	2.68	2.72	2.74		
N	383	392	386	343	300		
Range	0-10	0-10	0-10	0-10	0-10		
Cohort 2, M			3.16	3.05	3.20	2.84	2.74
SD			2.76	2.69	2.89	2.83	2.80
N			409	415	402	374	343
Range			0-10	0-10	0-10	0-10	0-10

Note. Total N at shared time points = 886; Cohort 1 (Grade 3) = 433; Cohort 2 (Grade 4) = 453; Teacher = Teacher-Child Relationships,

Appendix I: School Safety Percentages and Frequencies by Cohort

School safety	Grade 3 Spring	Grade 4 Fall	Grade 4 Spring	Grade 5 Fall	Grade 5 Spring	Grade 6 Fall	Grade 6 Spring
Total N	383	389	793	775	694	370	340
Cohort 1, N	383	389	384	341	297		
Cohort 2, N			409	434	397	370	340
Always, %	73.89	74.04	76.55	81.03	78.10	83.24	83.24
N	283	288	607	628	542	308	283
Cohort 1	73.89	74.04	74.22	80.06	79.80		
	283	288	285	273	237		
Cohort 2			78.73	80.92	76.83	83.24	83.24
			322	355	305	308	283
Sometimes, %	21.93	21.59	20.55	15.35	18.87	13.79	14.11
N	84	84	163	119	131	51	48
Cohort 1	21.93	21.59	22.40	15.84	17.17		
	84	84	86	54	51		
Cohort 2			18.83	15.70	20.15	13.79	14.11
			77	65	80	51	48
Never, %	4.18	4.37	2.98	3.61	3.02	2.97	2.65
N	16	17	23	28	21	11	9
Cohort 1	4.18	4.37	3.39	4.11	3.03		
	16	17	13	14	9		
Cohort 2			2.44	3.38	3.02	2.97	2.65
			10	14	12	11	9

Appendix J: Imputation Description

In this sample, both physical and relational victimization followed a censored normal distribution, where victimization has been typically positively skewed with the majority of children reporting minimal or infrequent victimization experiences (Pellegrini & Long, 2002; Rudolph et al., 2011). The independent variables of school safety and school climate (fairness, teacher child relationships and child interpersonal relationships) and the log transformed dependent variables of relational and physical victimization (Rezvan, Lee, & Simpson, 2015) were all included in the imputation model. The dependent variables were log transformed for the imputation only, and were transformed back to the original distribution for easier interpretation of the imputed parameter estimates. Since the data followed an arbitrary missing data pattern and data were missing on both continuous (victimization, original school climate) and ordinal (school safety) variables, a Markov Chain Monte Carlo (MCMC) imputation method was used with a Fully Conditional Specification (van Buuren, 2007; Yuan, 2011) under the assumption that values were missing at random (MAR). Fully Conditional Specification was used to relax the distributional assumptions and to allow for the ordinal variable of school safety to be imputed (van Buuren, 2007). Imputed means and standard errors were similar to the raw estimates, and therefore impute estimates were used in the analyses.

Appendix K: Centering Time, School Climate, and School Safety

The time variable and each predictor variable were centered to give each parameter a meaningful intercept when the parameter is equalled to 0. In this study, grade was used as a time indicator, to reflect changes in victimization over time from fall to spring of each school year. For example, if time was left as 0, the intercept in the model would indicate a mean victimization score for children in grade 0. Grade level has been used as a time indicator in previous studies of change (Brkovic, Kerestes, & Puklek Levpuscek, 2014; Raudenbush & Bryk, 2002). For the cohort sequential design, children in the grade 3 cohort were centered at grade 5 fall to reflect the average change in victimization from grade 3 to 5, where time was coded from $T1 = 0$, $T2 = 1$, $T3 = 2$, $T4 = 3$, $T5 = 4$ to $T1 = -3$, $T2 = -2$, $T3 = -1$, $T4 = 0$, $T5 = 1$. Children in the Grade 4 cohort were also centered at grade 5 fall to reflect the change in victimization from grade 4 to 6, and their time values were re-coded to $T1 = -1$, $T2 = 0$, $T3 = 1$, $T4 = 2$, $T5 = 3$. The cohort-sequential design centered at grade 5 fall included the total number of participants at the overlapping time points ($n = 886$). Therefore, the overall cohort sequential trajectory centered at grade 5 fall reflected an average change in victimization from grades 3 to 6.

School climate and safety variables were also centered in two ways to provide a meaningful intercept value when equalled to 0. Since school climate and school safety changed over time, two forms of centering were required to separate the variance into two distinct components: (1) variables that were within person centered reflected deviations relative to the child's overall experiences, whereas (2) variables that were between-person centered reflected deviations relative to all children in the sample (Curran &

Bauer, 2011; Hoffman, 2015; Hoffman, & Gavin, 1998; Howard, 2015; Raudenbush & Bryk, 2002). Table 12 demonstrated the centering of the three time varying school climate variables of teacher-child relationships, peer relationships, and fairness.

Since school safety was a single item ordinal variable, it was within person centered by creating a dummy variable, and grand mean centered by creating a proportion variable (Hoffman, 2015). The three-category school safety variable was re-coded as two separate dummy variables: for those who felt sometimes safe and for those who never felt safe. A Sometimes safe dummy variable was coded as 1 to reflect feeling safe sometimes (vs. always feeling safe = 0). A never feeling safe dummy variable was coded as 1 (vs. always feeling safe = 0) at that specific moment in time. For example, if a child always felt safe at time points 1-2, and felt safe sometimes at time points 3-4, their dummy variable for sometimes would be scored as 0, 0, 1, 1, 0. For the same child who never felt safe at time point 5, and their dummy variable for never would be scored as 0, 0, 0, 0, 1 (see Table 13). Two proportion variables were calculated to represent the between person safety variable of the overall percentage each child reported feeling safe sometimes and how often each child reported never feeling safe across all time points. One variable reflected the proportion of waves in which a child felt safe sometimes (0-100%) and the second variable reflected the proportion of waves in which a child never felt safe (0-100%; Hoffman, 2015). For example, if a child always felt safe at time points 1-2, sometimes safe at time points 3 and 4, and never felt safe at point 5, their proportion of feeling safe sometimes over five time points was scored as $2/5 = 40\%$ feeling safe sometimes. Their proportion for never feeling safe over five time points was $1/5$, which reflected never feeling safe 20% of the time.

Table 12

Centering of Three Time Varying School Climate Predictor Variables													
ID	Cohort	Time	Teacher			Peers			Fairness				
			Original	Centered	GM	Original	Centered	GM	Original	Centered	GM		
1	1	-3	1	4	-3	6	4.6	1.40	-0.07	2	4.2	-2.2	1.28
1	1	-2	11	4	7	8	4.6	3.40	-0.07	7	4.2	2.8	1.28
1	1	-1	3	4	-1	2	4.6	-2.60	-0.07	5	4.2	0.80	1.28
1	1	0	5	4	1	7	4.6	2.40	-0.07	6	4.2	1.80	1.28
1	1	1	0	4	-4	0	4.6	-4.60	-0.07	1	4.2	-3.2	1.28
2	2	-1	0	0.4	-0.4	6	7	-1	2.33	8	5.2	2.8	2.28
2	2	0	0	0.4	-0.4	7	7	0	2.33	5	5.2	-0.2	2.28
2	2	1	0	0.4	-0.4	6	7	-1	2.33	4	5.2	-1.2	2.28
2	2	2	2	0.4	1.6	8	7	1	2.33	5	5.2	-0.2	2.28
2	2	3	0	0.4	-0.4	8	7	1	2.33	4	5.2	-1.2	2.28
...	Grand mean		2.28	0	0	4.67	0	0	2.92	0	0	0	0

Note. Cohort 1 = Grade 3; Cohort 2 = grade 4; Time = centered on grade 5 fall; Raw = raw total score; M = person mean from T1-T5; PM = deviation from person mean from T1-T5; GM = person mean deviation from grand mean

Table 13

Person Mean and Grand Mean Centering School Safety as Sometimes Safe and Never Safe

ID	Gr.	Time Gr. 5	Raw	Dummy coded variables (PMC)		Proportion variables (GMC)	
			School Safety	Sometime	Never	Sometime	Never
1	3	-1	0	0	0	0.4	0.2
1	3	0	0	0	0	0.4	0.2
1	3	1	1	1	0	0.4	0.2
1	3	2	1	1	0	0.4	0.2
1	3	3	2	0	1	0.4	0.2
2	4	-3	1	1	0	0.2	0
2	4	-2	0	0	0	0.2	0
2	4	-1	0	0	0	0.2	0
2	4	0	0	0	0	0.2	0
2	4	1	0	0	0	0.2	0

...
Note. Raw scores 0 = always, 1 = sometimes, 2 = never.