

**Peer Experiences and Depression Symptoms: Conditions of Association in Preschool,
Childhood, and Adolescence**

Amanda Lynn Krygsman

Faculty of Education

University of Ottawa

Date of submission: April 19, 2018

Thesis submitted to the Faculty of Graduate and Postdoctoral Studies in partial fulfillment of the
requirements for Doctorate of Philosophy degree in Educational Counselling

Abstract

Depression is one of the most disabling mental disorders with respect to years living with symptoms and life lost prematurely. Understanding the development of depression symptoms in childhood and adolescence is important considering the increase in prevalence in adolescence and the substantial continuity of depression symptoms over time. Interpersonal perspectives on depression emphasize the interpersonal environment in the development, and remission of symptoms. In the present dissertation, the interpersonal environment focus was *peer experiences*. Specifically, the conditions under which peer experiences and depression symptoms were associated concurrently and longitudinally were examined in preschool, childhood, and adolescence.

Different types of peer experiences were associated with depression symptoms in specific ways. In Study 1, the type of aggression and informant mattered where relational peer victimization and depression symptoms were associated in the presence of relational aggression when data were reported by teachers. In Study 2, informant and type of peer experience mattered such that when examining competing models of directional association of peer experiences and depression symptoms, depression symptoms predicted peer rejection across reporters and depression predicted peer victimization when data were self-reported. In Study 3, the type of aggression mattered again but peer-reported peer victimization was associated with self-reported depression symptoms in the presence of overt aggression for girls concurrently and over time. The effect was stronger for those who transitioned to high school. The conditions under which peer experiences and depression symptoms were associated depended on type of aggression (i.e., relational peer victimization and relational aggression in preschool and overt aggression for girls

in late childhood and adolescence), type of relationship disturbance (i.e., peer victimization and peer rejection), informant, and whether individuals transitioned to high school.

Acknowledgments

First and foremost, I thank my supervisor Dr. Tracy Vaillancourt. Thank you for your encouragement and pushing me to appreciate rigorous science. You were one of the first people who recognized my strengths and I have done so many remarkable things that I never thought I could do as a result of your encouragement. The trajectory of my life has undoubtedly changed for the better because of who you are. I could not and would not have done this without you. Thank you.

I would like to thank Dr. Vaillancourt's lab members, past and present, for their support throughout this process and their contributions to the knowledge I have gained over the years. Many students and colleagues from McMaster University to the University of Ottawa have changed me as a result of our conversations and friendships. In particular, I thank Heather Brittain: I really appreciate always being able to talk with you about statistics, research, and life. I owe you a tremendous debt of gratitude for all you have done to help me throughout this degree. I thank Irene Vitoroulis and Jennifer Hepditch for their invaluable support, friendship, and for their thoughtful conversations about research and statistics. I thank my mother Judy and step-father Horst for their unconditional support throughout this degree. Finally, I especially thank my husband, Eric, for listening when I need to talk, encouraging me when I needed it, and making me feel like the sacrifices I made to try to maintain a balance between this degree, work and home were always worth it.

Finally I would like to thank the parents and youth of the McMaster Teen Study for their continued support and participation. I have really enjoyed working with all of you over the past decade of the study.

TABLE OF CONTENTS

Title Page.....	i
Abstract.....	ii
Acknowledgements.....	iv
Table of Contents.....	v
List of Tables.....	vii
List of Figures.....	viii
List of Appendices.....	ix
Preface.....	x
Dedication.....	xiii
Chapter 1 – General Introduction.....	1
Depression Symptoms.....	2
Peer Experiences and their Associations to Depression Symptoms.....	6
Overview of Studies	9
Chapter 2 – Paper 1: Peer Victimization, Aggression, and Depression Symptoms in Preschoolers.....	12
Chapter 3 – Paper 2: Longitudinal Associations between Depression Symptoms and Peer Experiences: Evidence of Symptoms-driven Pathways.....	62
Chapter 4 – Paper 3: Peer Victimization and Depression Symptoms: The Moderating Role of Gender Non-normative Aggression and School Transition	77
Chapter 5 – General Discussion.....	115
Summary of Research Findings.....	115

Integration of Findings and Implications.....	118
Contributions to Knowledge.....	121
Intervention and Prevention Implications.....	122
Limitations.....	124
Conclusion.....	128
References for Introduction and General Discussion.....	129

List of Tables

Paper 1

Table 1. Bivariate correlations, means, standard deviations and gender differences of study variables.....	58
--	----

Paper 2

Table 1. Bivariate correlations, means and standard deviations of study variables.....	67
Table 2. Model fit indices for self-reported depression symptoms model.....	68
Table 3. Model fit indices for parent-reported depression symptoms model.....	69

Paper 3

Table 1. Bivariate correlations, means and standard deviations of study variables.....	112
--	-----

List of Figures

Paper 1

Figure 1. Results of the Statistical Model of Moderation of Relational Aggression on the Relation between Relational Victimization and Depression Symptoms in Preschool (unstandardized).....	59
Figure 2. Moderation of Teacher-reported Relational Aggression on the Relation between Teacher-reported Relational Peer Victimization and Depression Symptoms.....	60

Paper 2

Figure 1. Cascade Model of Self-reported Depression Symptoms, Peer Victimization and Perceived Peer Rejection.....	69
Figure 2. Cascade Model of Parent-reported Depression Symptoms, Self-Reported Peer Victimization and Perceived Peer Rejection.....	70

Paper 3

Figure 1. Graph of Peer Victimization (T1) Predicting Depression Symptoms (T2) with Moderator of Overt Aggression (T1) for Girls who Did Not Transition and Controlling for T1 Depression Symptoms	113
Figure 2. Graph of Peer Victimization (T1) Predicting Depression Symptoms (T2) with Moderator of Overt Aggression (T1) for Girls who Transitioned to High School and Controlling for T1 Depression Symptoms.....	114

List of Appendices

Paper 2

Appendix A. Unstandardized path coefficients: Self-reported depression symptoms model..... 73

Appendix B. Unstandardized path coefficients: Parent-reported depression symptoms model... 73

Preface

Academic Contributions

Amanda Krygsman was the first author of the paper entitled “Peer Victimization, Aggression, and Depression Symptoms in Preschoolers”. As the first author contributions included: literature review; writing of the manuscript; selected and performed statistical analyses; incorporated changes related to feedback from her supervisor and from reviewers. As part of previous research assistant/coordinator positions: provided assistance with grant applications, grant reports, participant recruitment, some data collection, data entry and data cleaning. Dr. Tracy Vaillancourt was the second author, primary investigator of the project entitled “Early trajectories of social functioning and affiliation: Phase 1” (McMaster University REB#2007 021) and thesis supervisor. Dr. Vaillancourt’s contributions included: wrote ethics and grant applications, selection of measures, participant recruitment, data collection and storage, provided the data set, provided expertise and feedback through each phase of the preparation of the manuscript, reviewed and provided final approval for submission for publication. This article has been accepted (April 7, 2018) for publication in the journal *Early Childhood Research Quarterly* and was presented as a poster at the 2017 Society for Research in Child Development Biennial Meeting, Austin, Texas.

Amanda Krygsman was the first author of the paper entitled “Longitudinal Associations between Depression Symptoms and Peer Experiences: Evidence of Symptoms-driven Pathways”. First author contributions included: literature review; writing of the manuscript; selected and performed statistical analyses; incorporated changes related to feedback from her supervisor and from reviewers. As part of current and previous research assistant/coordinator positions: assisted with grant applications, organized meetings related to grant preparation; assisted with ethics

applications most years of the study; conducted parent interviews and coordinated research assistants and employees who performed parent interviews during years 2, 4, 5, 6, 7, and 8; participant recruitment during most years; coordinated participant compensation most years; supervised and coordinated students in data collection, data entry and data cleaning and data entry clerks in data entry and data cleaning. Dr. Tracy Vaillancourt was the second author, primary investigator of the project entitled “McMaster longitudinal study for adolescents and young adults” (University of Ottawa REB# 08-11-03B) and thesis supervisor. Dr. Vaillancourt’s contributions include: conceptualization the study in collaboration with a national team of researchers with expertise in their respective fields; wrote ethics applications; wrote grant applications; wrote grant reports; selected measures annually; hired research assistants and data entry clerks; managed employees; organized participant recruitment; data collection and storage; provided the data set; provided expertise and feedback through each phase of the preparation of the manuscript; reviewed and provided final approval of final and revised manuscripts for publication. This article has been published in the [*Journal of Applied Developmental Psychology*](#) and was presented as part of a symposium at the 2017 Society for Research in Child Development Biennial Meeting, Austin, Texas.

Amanda Krygsman was the first author of the paper entitled “Peer Victimization and Depression Symptoms: The Moderating Role of Gender Non-normative Aggression and School Transition”. As the first author contributions included: literature review; writing of the manuscript; selected and performed statistical analyses; incorporated changes related to feedback from her supervisor and from reviewers. As part of previous research assistant/coordinator positions: data cleaning was conducted. Dr. Tracy Vaillancourt was the second author, co-investigator of the project entitled “Children’s Social Relationships (Evaluating School-based

Interventions)” (University of British Columbia REB#B97-0207) and thesis supervisor. Dr. Vaillancourt’s contributions included: wrote ethics and grant applications, selection of measures, participant recruitment, data collection and storage, provided the data set, provided expertise and feedback through each phase of the preparation of the manuscript, reviewed and provided final approval for submission for publication. This article was accepted (March 20, 2018) for publication in the *Journal of Child and Family Studies*.

*To my mother Judy, step-father Horst,
husband Eric, step-daughter Jayden, and late mother-in-law Patricia*

Chapter 1 – General Introduction

The associations between peer experiences and depression symptoms and the conditions under which these associations are present is the common theme that shaped this dissertation. Specifically, the associations between peer experiences and depression symptoms were examined from the perspective of different informants and different developmental periods (i.e., preschool, childhood, and adolescence). A developmental psychopathology and an interpersonal perspective on depression symptoms were used to examine the aforementioned associations.

Developmental psychopathology has been defined as “the study of the origins and course of individual patterns of behavioral maladaptation, whatever the age of onset, whatever the causes, whatever the transformations in behavioral manifestation, and however complex the course of the developmental pattern may be” (Sroufe & Rutter, 1984, p. 18). Developmental psychopathology is a “macroparadigm” that aims to integrate multiple knowledge bases across disciplines with the perspective that one theory will not explain all of development (Cicchetti & Rogosch, 2002). A key principle of developmental psychopathology is that the individual is active in creating their own developmental experiences in addition to the environment shaping the development of the individual. Early experiences, whether positive or negative for development, do not necessarily fate nor protect individuals from future problems. Even in the case of poor early experiences, later experience may alter the course of development.

Development consists of age- and stage-related tasks that may wax and wane in their salience but nonetheless have an impact on development over time. For example, a task relevant to the period of adolescence (13-18 years; American Psychological Association, 2010) is psychological autonomy which can be broken down into emotional, behavioural, and cognitive autonomy (Cicchetti & Rogosch, 2002). Adolescents become more independent in terms of

regulating their own emotions (emotional autonomy), organizing and being responsible for their own behaviour (behavioural autonomy), along with gaining confidence in the decisions they make (cognitive autonomy). Relationships with parents may transform during the process of becoming independent, relationships with peers gain salience, and adolescents begin to engage in romantic relationships. Adolescence is also a period during which depression symptoms begin to emerge more frequently (APA, 2013; Cole, 2006).

Depression Symptoms

Depression symptoms¹ and not the clinical disorder are examined throughout the dissertation. Individuals with subclinical depression symptoms have been shown to not differ from individuals meeting diagnostic criteria in severity, treatment rates, and self-harming behaviour (Angold, Costello, Farmer, Burns, & Erkanli, 1999; Fergusson, Horwood, Ridder, & Beautrais, 2005; Rutter, Kim-Cohen, & Maughan, 2006). Leaving the measurement of depression symptoms as a continuous variable takes advantage of all the data collected including those with subclinical symptoms. In a recent meta-analysis comparing continuous and discrete measurement, the use of continuous measures in the assessment of psychopathology was recommended due to increased reliability and power (Markon, Chmielewski, & Miller, 2011). Depression symptoms are expected to present differently at different developmental periods (Cicchetti & Rogosch, 2002). For example, depressed mood may present as crying in early childhood and irritability in adolescence.

There is a strong body of research supporting the assertion that problems with mood such as depression can occur in children as early as the preschool age (Domènech-Llaberia et al.,

¹ The term “depression symptoms” was used to reflect the continuous nature of the measurement used in the dissertation and in the research studies discussed. The terms “depression” and “depressive disorder” are used in reference to research studies examining the dichotomous category of meeting diagnostic criteria for the major depressive disorder.

2009; Ferrari et al., 2013; Gibb, 2014; Luby et al., 2002). Indeed, epidemiological studies have shown depressive disorders occur as early as three years of age (Ferrari et al., 2013). Depressive disorders are rare in childhood and increase in adolescence (Merikangas et al., 2010; Rohde, Lewinsohn, Klein, Seeley, & Gau, 2013; Thapar, Collishaw, Pine, & Thapar, 2012). Depression symptoms in preschool can predict a depressive disorder in childhood (Mesman & Koot, 2000), and childhood symptoms can also predict depression symptoms later in life (Aalto-Setälä, Marttunen, Tuulio-Henriksson, Poikolainen, & Lönngqvist, 2002; Weissman et al., 1999). This suggests more research is needed on the correlates of depression symptoms during early childhood and on the risk factors and consequences of depression symptoms during childhood and adolescence.

From a developmental psychopathology perspective, it is the balance of risk and protective factors that can change the course of development (Cicchetti & Rogosch, 2002). Late childhood and adolescence is a time of multiple transitions that can upset the balance of risk and protective factors. Indeed, large alterations in this balance can change the course of developmental to produce maladaptive behaviour. Prior to the emergence of a disorder, there can be deviations from a path of normal development that predict later psychopathology. Some of these deviations from normality may not predict psychopathology but the deviations that do predict psychopathology may be useful to investigate as they may be early signs of development going awry that can be incorporated into prevention efforts (Cicchetti & Rogosch, 2002; Yates, Burt & Troy, 2011).

Both competence and maladaptation are rooted in previous experiences (Yates et al., 2011). Adaption in the present is an outgrowth of current experiences and previous development. Early experiences do not dictate or necessitate future maladaptation rather they constrain the

likelihood of future experiences and adaptation. Disorder then becomes an outcome of adaptation to the environment with the resources available that depend on developmental history.

Normative behaviour has been described as occurring when intervention would not be suggested and non-normative when intervention may be suggested in relation to the risk the behaviour poses for concurrent and future psychopathology (Costello & Angold, 2006).

One of the goals of developmental psychopathology is to identify processes that lead to a diversification of pathways (Cicchetti & Rogosch, 2002). It is useful to identify diversification because it can elucidate different outcomes where some individuals develop symptoms of a disorder whereas for others, the same starting point is unrelated to symptom development, a process called multifinality. Toward that end, the diversification of the associations between peer experiences and depression symptoms was examined in this dissertation with attention to normative and non-normative maladaptive behaviour, developmental period, and informant perspective. An interpersonal approach to viewing depression symptoms was used as a base from which to form hypotheses and to which theories were added to complete the predictions.

An interpersonal approach to depression symptoms acknowledges the interpersonal environment of depression symptoms in the development, maintenance, and remission of symptoms (Joiner, Coyne, & Blalock, 1999). Negative interpersonal experiences accruing over time can lead to generalization of negative social attributions into a style or worldview which has been linked to depression symptoms (Haines, Metalsky, Cardamone, & Joiner, 1999). In this dissertation, the interpersonal experiences in relation to peers were of interest. The developmentally-based interpersonal model of depression (Rudolph, 2009; Rudolph, Flynn, & Abaied, 2008) integrated a developmental psychopathology perspective with interpersonal

approaches to produce a model that allowed predictions to be made regarding the risks and consequences of depression symptoms.

The developmentally-based interpersonal model of depression predicts that interpersonal dysfunctions foretell depression symptoms (Rudolph, 2009; Rudolph et al., 2008). These dysfunctions can be broken down into social-behavioural deficits and relationship disturbances (Rudolph et al., 2008). Social-behavioural deficits are defined as “maladaptive self-regulatory responses to interpersonal stress” (Rudolph, Lansford, & Rodkin, 2016, “Integrative Interpersonal Theories of Depression” para. 8). Aggression perpetration toward peers is an example of a social-behavioural deficit (Rudolph et al., 2008). Relationship disturbances can include responses from others that are negative and interpersonal stressors (Rudolph et al., 2016). Experiencing peer victimization is an example of a relationship disturbance (Rudolph et al., 2008). Social-behavioural deficits and relationship disturbances each contribute to the development of depression symptoms concurrently and over time. Relationship disturbances can lead to depression symptoms but not for everyone, suggesting that some individuals may be more at risk (Rudolph, 2009). Understanding the conditions under which relationship disturbances (e.g., peer victimization and peer rejection) are associated with concurrent and prospective depression symptoms is important for understanding the development of depression symptoms and for highlighting groups that may be more at risk than others (Rudolph et al., 2008). Social-behavioural deficits can increase risk for depression symptoms especially when relationship disturbances are present (Rudolph, 2009). The conditions when social-behavioural deficits impact the association between relationship disturbances and depression symptoms may relate to the nature or type of deficit or disturbance. These deficits and disturbances may also differ across developmental period and informant. The nature or types of social-behavioural

deficits (e.g., types of aggression), types of relationship disturbances (e.g., peer victimization and peer rejection) and the conditions under which deficits or disturbances heighten risk were examined in association with depression symptoms.

Peer Experiences and their Associations to Depression Symptoms

The peer experiences of the related but distinct constructs of peer victimization and peer rejection have been uniquely associated with depressive symptoms (Choukas-Bradley & Prinstein, 2014; Nolan, Flynn, & Garber, 2003; Schwartz, Gorman, Nakamoto, & Toblin, 2005; Zimmer-Gembeck, Waters, & Kindermann, 2010). Peer victimization occurs when an individual is the recipient of aggression and peer rejection occurs when there is an active dislike of a child on the part of peers (Alsaker & Valkanover, 2001; Choukas-Bradley & Prinstein, 2014; Coie, Dodge, & Coppotelli, 1982). Peer rejection involves group-level *attitudes* whereas peer victimization relates to the more dyadic- or small group-level *behaviour* (Choukas-Bradley & Prinstein, 2014). Bullying victimization by peers occurs when the intentional aggression is repeated and a power imbalance is present (Olweus, 2001). Peer victimization and peer rejection can be classified as relationship disturbances within the developmentally-based interpersonal model of depression (Rudolph et al., 2008).

Peer Victimization. Peer victimization can take different forms such as overt victimization (i.e., physical victimization and verbal victimization), relational victimization, and cyber-victimization (Dempsey, Sulkowski, Nichols, & Storch, 2009). Relational victimization occurs when relationships are used to harm another and cyber-victimization is victimization occurring in electronic or digital form (Crick & Grotpeter, 1995; Tokunaga, 2010). The different forms of victimization have all been linked to depression symptoms (Hamilton et al., 2016;

Landoll, La Greca, Lai, Chan, & Herge, 2015; Marshall, Arnold, Rolon-Arroyo, & Griffith, 2015; Schwartz et al., 2005).

In early childhood, both physical and relational victimization have been associated with depression symptoms (Kamper-DeMarco & Ostrov, 2017; Blakely-McClure & Ostrov, 2017). Peer victimization in preschool predicts later peer victimization in childhood (Barker et al., 2008). Girls tend to be more relationally victimized and boys tend to be physically victimized more than girls (Ostrov & Goldeski, 2010). In childhood and adolescence, peer victimization has also been linked to depression symptoms, concurrently (Hawker & Boulton, 2000; Moore et al., 2017) and over time (i.e., an interpersonal risk model; Schwartz et al., 2005; Schwartz, Lansford, Dodge, Pettit, & Bates, 2015; Moore et al., 2017; Ttofi, Farrington, Lösel, & Loeber, 2011). There is also evidence that depression symptoms predict later peer victimization (i.e., a symptoms-driven model; Kochel, Ladd, & Rudolph, 2012; Sourander, Helstelä, Helenius, & Piha, 2000; Vaillancourt, Brittain, McDougall, & Duku, 2013). Finally, other research has supported a transactional model where peer victimization predicts depression symptoms and depression symptoms also predict peer victimization (Kaltiala-Heino, Fröjd, & Marttunen, 2010; Sweeting, Young, West, & Der, 2006). Peer rejection has shown a similar pattern where multiple models have been supported in the research literature.

Peer Rejection. The examination of peer rejection and depression symptoms over time has also shown support for multiple models of the interpersonal risk (Nolan et al., 2003; Zimmer-Gembeck et al., 2010), symptoms-driven (Agoston & Rudolph, 2013) and transactional models (Platt, Kadosh, & Lau, 2013). In childhood and adolescence, peer rejection has often been measured using peer reports and less often, self-reported peer rejection has been examined (Choukas-Bradley & Prinstein, 2014; Zimmer-Gembeck, Hunter, & Pronk, 2007). Peer-reported

and self-reported peer rejection has been associated with depression symptoms (Zimmer-Gembeck et al., 2007). Peer rejection shows continuity over time where being rejected in one context also tends to occur in new groups of peers (Choukas-Bradley & Prinstein, 2014). Another peer experience linked to depression symptoms is the perpetration of aggression.

Aggression. Aggression can also take multiple forms, similar to peer victimization. Overt/physical aggression and relational aggression are often distinguished (Little, Jones, Henrich, & Hawley, 2003) and have different associations with age and gender. Physical aggression and verbal aggression are common in early childhood, particularly for boys and decrease as children age (Côté, Vaillancourt, Leblanc, Nagin, & Tremblay, 2006; Tremblay et al., 1999). Relational aggression is just beginning to emerge during preschool and is more overt in early childhood and becomes covert as children age (Crick, Ostrov, Appleyard, Jansen, & Casas, 2004; Ostrov, Kamper, Hart, Godleski, & Blakely-McClure, 2014) until it becomes common for boys and girls in middle childhood (Underwood, 2003). Girls tend to use only relational aggression and boys tend to use multiple forms of aggression by middle childhood (Vaillancourt, Miller, & Sharma, 2010; Vaillancourt, 2013).

The use of aggression and experience of peer victimization can also occur together and when this occurs, these individuals tend to be more impaired in terms of internalizing problems (Kumpulainen & Räsänen, 2000). Specifically, the co-occurrence of the experience of peer victimization and aggression perpetration has been associated with depression symptoms when reported by parents, teachers, or the children themselves (Kumpulainen et al., 1998). The co-occurrence of peer victimization and aggression occurs both in young children and in childhood and adolescence (Alsaker & Valkanover, 2001; Crick, Casas, & Ku, 1999; Olweus, 2001). Further, interpersonal dysfunctions (e.g., peer victimization, peer rejection, and aggression) have

been associated with depression symptoms concurrently and longitudinally, and normative developmental transitions such as the transition to high school can worsen depression symptoms and problems with peers (Rudolph et al., 2008). Said differently, the link between interpersonal dysfunctions and depression symptoms may become stronger during the transition to high school. Indeed, transitions have been described as critical periods during which there is potential to alter development (Cicchetti & Rogosch, 2002).

Overview of Studies

Study 1 involved preschool children and examined how aggression perpetration type (i.e., physical aggression and relational aggression) influenced the association between different types of peer victimization experiences (i.e., physical victimization and relational victimization) and the experience of depression symptoms from the perspectives of daycare teachers and trained observers. The developmentally-based interpersonal model of depression (Rudolph et al., 2008; Rudolph, 2009; Rudolph et al., 2016), specificity hypothesis (Crick et al., 1999; Ostrov, 2008), and gender-linked model of aggression (Ostrov & Goldeski, 2010) were used to form predictions. The primary aim of the study was to test whether aggression would moderate the association between peer victimization and depression symptoms in preschool-aged children and whether the form victimization and aggression took mattered. Aggression and victimization tend to become coupled by type— physical victimization and physical aggression occur together and relational victimization and relational aggression occur together and each predicts maladaptive outcomes (Crick et al., 1999; Ostrov, 2008). In gender-segregated groups such as the preschool environment, girls tend to interact with girls and boys tend to interact with boys (Ostrov & Goldeski, 2010). Girls also tend to engage in relational victimization and relational aggression and boys tend to engage in physical victimization and physical aggression. Thus physical

aggression was expected to moderate the association between physical peer victimization and depression symptoms and relational aggression was expected to moderate the association between relational peer victimization. A secondary aim was to examine the impact of gender on the moderation of aggression on the association between peer victimization and depression symptoms. Analyses were conducted within and across reporters to examine if continuity would be noted across reporters and to allow for different effects to emerge (Offord et al., 1996).

Study 2 examined depression symptoms and the separate but related constructs of peer victimization and peer rejection. Increased research attention toward the longitudinal associations between peer problems (i.e., peer victimization and peer rejection) and depression symptoms has created evidence for multiple models. The models include; (1) the interpersonal risk model where peer problems predict depression symptoms; (2) the symptoms-driven model where depression symptoms predict peer problems; and (3) the transactional model where peer problems and depression symptoms share a bi-directional association over time. Most studies examining the longitudinal associations between depression symptoms and peer experiences have been short-term, have not used the same measures at each time point, have relied on one informant source, have not examined multiple forms of peer experiences in the same model, and have not directly tested or compared all competing models. A cascade model approach was used where stability, within time associations, and cross-lagged paths were examined together in one model. Data were collected on depression symptoms, peer victimization, and peer rejection across eight years of development beginning in grade 5 and ending in grade 12. The interpersonal risk, symptoms-driven, and transactional models were compared statistically using path analysis and model building in order to ascertain which of the three competing models best fit the data. To determine whether similar patterns would emerge using different reporters,

models were examined using all self-reported data and using parent-reported depression symptoms. Given the length of the study, developmental trends were also of interest. Stability estimates of depression symptoms were expected to be more consistent in adolescence than at younger ages. Associations between peer problems and depression symptoms were expected to be stronger during the transition to high school given that individuals are more susceptible to problems with peers during the time of the normative transition to high school. The directional associations between peer problems and depression symptoms, and influences of stability and within-time associations, informant, developmental period, and normative transition on the associations between peer problems and depression symptoms were examined in this study.

Study 3 involved the influence of aggression type (i.e., overt aggression and relational aggression) on the association between peer victimization and depression symptoms over 4 years of development from grades 6 to grade 9 and over two time points. The influence of aggression type and gender were examined concurrently and over time. Examining these constructs over two time points allowed for the examination of influences of normative school transition, gender, and form of aggression on peer victimization and depression symptoms. Peer informants were used for victimization and aggression and self-reports were used for depression symptoms. This study is unique from study one in terms of it being a longitudinal study of older children that included the additional moderator of normative school transition. The developmentally-based interpersonal model of depression in youth (Rudolph et al., 2008; Rudolph, 2009) was used to make predictions about the influence of gender non-normative aggression (i.e., social-behavioural deficits) during the developmental period of late childhood and adolescence.

Chapter 2 – Paper 1:

Peer Victimization, Aggression, and Depression Symptoms in Preschoolers

Abstract

Our primary aim was to test the developmentally-based interpersonal model of depression in preschool-age children. Socio-behavioural deficits (i.e., non-normative use of physical and relational aggression) were expected to interact with relationship disturbances (i.e., physical and relational peer victimization) in relation to depression symptoms in preschool-age children. We tested this theory in a sample of 198 preschool children using a multi-informant approach. As a secondary aim, we examined the moderating role of gender. Results supported the application of the developmentally-based interpersonal model of depression in preschool-aged children. When children were relationally victimized by peers, engaging in high relational aggression was related to depression symptoms in the teacher-reported model; whereas physical aggression use was related to depression symptoms when reported by teachers but did not moderate the relation between physical peer victimization and depression symptoms. These findings were not replicated across reporters. No gender differences were found.

Peer Victimization, Aggression, and Depression Symptoms in Preschoolers

Depression, the leading cause of disability worldwide (Whiteford et al., 2013), can begin in childhood (Insel & Fenton, 2005; Roza, Hofstra, van der Ende, & Verhulst, 2003), and even as early as the preschool age (Domènech-Llaberia et al., 2009; Gibb, 2014; Luby et al., 2002). Indeed, 1-2% of preschool-age children are diagnosed with depression (Domènech-Llaberia et al., 2009; Wichstrøm et al., 2012), which is characterized by an absence of being joyful and being preoccupied with play themes of a negative nature, along with possible non-normative changes in activity, appetite, and sleep (Luby, 2010). Considering that depression in childhood predicts depression in adolescence (Luby, Gaffrey, Tillman, April, & Belden, 2014; Mesman & Koot, 2000), which in turn predicts depression in adulthood (Aalto-Setälä, Marttunen, Tuulio-Henriksson, Poikolainen, & Lönnqvist, 2002; Weissman, Wolk, & Goldstein, 1999), it is important to understand the *early* development of this disorder.

Rudolph, Flynn, and Abaied (2008) proposed a developmentally-based interpersonal model of youth depression in which social-behavioural deficits and relationship disturbances increase the risk of depression symptoms. Social-behavioural deficits are interpersonal interactions that are maladaptive which can impact relationship disturbances. Overall, the model emphasizes that children respond to, and contribute to, relationship problems. The model also predicts that depression symptoms early in life disrupt the development of normative trajectories. The model incorporates development in that normative behaviour and experiences are contrasted to non-normative behaviour and experiences when considering social-behavioural deficits at a particular period of development (e.g., preschool, childhood, adolescence). According to the model, one example of a social-behavioural deficit is aggression perpetration and an example of a relationship disturbance is being victimized by peers. Experiencing peer victimization may

interfere with the development of self-regulation skills by increasing reactivity to peer victimization. The child may become overwhelmed in the face of being victimized by peers and respond with aggression. If these experiences occur in quick succession, then victimization and aggression may appear as concurrently associated. Victimization, aggression, or the combination of victimization and aggression may increase the risk for depression symptoms (Rudolph, 2009; Rudolph et al., 2008; Rudolph, Lansford, & Rodkin, 2016). Although depression symptoms were conceptualized as an outcome in this study, the developmentally-based interpersonal model could also predict that depression symptoms may be a predictor of aggression perpetration and peer victimization (Rudolph et al., 2008; Rudolph, 2009; Rudolph et al., 2016). In the present study we were interested in risks associated with depression symptoms in early childhood thus depression symptoms were viewed as an outcome.

Interpersonal theories of depression suggest that interpersonal factors may influence the development of depression symptoms (Joiner, Coyne, & Blalock, 1999). Negative interpersonal experiences (e.g., experiencing peer victimization) may lead to negative attributions about peers, which could, in time, contribute to a pessimistic worldview (Haines, Metalsky, Cardamone, & Joiner, 1999). According to social-information-processing theory (SIP), children store peer experiences in memory and these peer experiences may be recalled at a later point in time when an interaction with peers occurs (Crick & Dodge, 1994). The more frequently particular peer experiences occur (e.g., experiencing victimization by peers), the quicker the processing of a particular response to peer provocation in the future. For example, experiencing peer victimization on multiple occasions, an individual may recall what was done to them during previous experiences and select this as a response to peer provocation. As children begin to interact with peers during the preschool period they form a database of peer experiences that

form the basis of later attribution styles (Crick & Dodge, 1994; Haines et al., 1999). The pessimistic explanatory style is linked to depression symptoms later in childhood and negative life events are associated with depression symptoms in early childhood (Nolen-Hoeksema, Girgus, & Seligman, 1992). Peer victimization has been conceptualized as a life stress that can disrupt the development of self-regulation skills necessary for healthy interpersonal interactions with peers (Rudolph et al., 2016). Children experiencing peer victimization may have less opportunity to develop positive interpersonal interactions and the self-regulation learned in interpersonal interactions. Those expecting aggression from peers in relation to previous interactions may become sensitized to cues of threat, further heightening their reactivity. Although much of this theory and supporting research has occurred in childhood, peer experiences begin to accumulate in preschool and those with accruing interpersonal experiences that are based in peer victimization may conceivably have more examples of aggressive responses in their mental databases and opt for such a response. Thus, peer victimization and aggression would appear concurrently associated.

The developmentally-based interpersonal model of youth depression also assumes that the origins of some social-behavioural deficits are the result of a disturbed family environment; however, there has been a call to “expand on early origins of interpersonal vulnerability to depression other than insecure attachment and parental depression” (Rudolph et al., 2008, p.98). Thus, the primary purpose of this study was to examine Rudolph et al.’ interpersonal model of youth depression in early childhood. Specifically, we examined the interpersonal vulnerability of *peer experiences* (i.e., peer victimization and aggression perpetration) in relation to depression symptoms in 3-year-old children.

Peer Victimization in Preschool

Peer victimization has been defined as being the recipient of aggressive behaviour (Alsaker & Valkanover, 2001). The study of peer victimization in middle childhood and adolescence has been more frequent than its study in early childhood (Hanish et al., 2004; Perren & Alaskar, 2006). Nevertheless, young children do experience peer victimization and this experience is linked to problems with depression. For example, in one of the first studies to examine the link between peer victimization and adjustment in preschool, Crick, Casas, and Ku (1999) found that physically victimized (i.e., harmed or threat of harm by physical aggression) and relationally victimized (i.e., harmed by manipulation of relationships) preschoolers (ages 3-5.5 years) were more likely to be rated by teachers as being high on internalizing symptoms (i.e., depression and anxiety) than non-victimized preschoolers. In another study, a relation between internalizing symptoms at age 5 and experiencing peer victimization between ages 5-7 was found (Arsenault et al., 2006). The association between internalizing symptoms like depression and peer victimization is consistent with cross-sectional meta-analytic work of school-age children (Hawker & Boulton, 2000; Moore et al., 2017).

There has been research support for separating the constructs of physical and relational victimization in early childhood (Crick et al., 1999; Ostrov, 2008). Relational victimization has been related to internalizing symptoms in preschoolers over and above the effects related to physical victimization (Crick et al., 1999). Physical peer victimization has also been uniquely related to internalizing problems in preschoolers.

As is the case with depression symptoms (e.g., Mesman & Koot, 2000), peer victimization in preschool predicts peer victimization in childhood (e.g., Barker et al., 2008). Given this continuity, it is important to understand under what conditions peer victimization and depression symptoms are associated in the preschool years. Rudolph et al.'s (2008; 2009; 2016)

interpersonal theory suggests that aggression may also play a role in influencing depression symptoms.

Physical and Relational Aggression toward Peers in Preschool

Aggression takes many different forms across the lifespan. In early childhood, most children use physical aggression (e.g., hitting, kicking, taking away an object, or threat of use of physical force) and show declining use after 3 years of age and into the elementary school years (Alink et al., 2006; Côté, Vaillancourt, Leblanc, Nagin, & Tremblay, 2006; Tremblay et al., 1999). A smaller group of children (16.6%), mostly boys, use physical aggression at high frequencies which persists into elementary school (Côté et al., 2006). Although physical aggression in early childhood has been found to not be concurrently related to internalizing problems (3.5-5.5 years; Crick, Casas, & Mosher, 1997), physical aggression has also been shown to predict high childhood internalizing symptoms that decrease over time and the development of internalizing symptoms in adolescence in a large sample of Canadian children ages 2-15 (Weeks et al., 2014). Normative has been defined as “a state in which intervention is not indicated” whereas non-normative or abnormal has been defined as “a state in which intervention is indicated” (Costello & Angold, 2006). This view of normative and non-normative behaviour requires consideration of the developmental period during which the behaviour occurs. In the case of physical aggression in early childhood, moderate use of physical aggression is common and typically declines as children age. Conversely, high physical aggression is less common but tends to continue into elementary school and predicts internalizing symptoms in childhood and adolescence (Crick et al., 1997; Weeks et al., 2014), suggesting some form of intervention may be desirable. Thus, the use of physical aggression at high levels during the preschool period can be viewed as non-normative in comparison to same-age peers.

Relational aggression has been defined as harming others through the use of relationships such as exclusion, spreading rumours, or withdrawal or threat of withdrawal of friendship (Crick & Grotpeter, 1995). Relational aggression emerges in early childhood and can be measured through observations as early as 2.5 years of age (Crick et al., 2006). The expression of relational aggression changes at different developmental periods such that in early childhood, the behaviour tends to be more direct and in older children, more covert (Crick, Ostrov, Appleyard, Jansen, & Casas, 2004; Ostrov, Kamper, Hart, Godleski, & Blakely-McClure, 2014). Relational aggression is linked to depression and depression symptoms, an association that begins in preschool-age children (Belden, Gaffrey, & Luby, 2012; Crick et al., 1997), and becomes stronger over time (ages 5-17; Marshall, Arnold, Rolon-Arroyo, & Griffith, 2015). Because relational aggression is beginning to emerge in preschool, some children will begin to use relational aggression, while most will not yet use this form of aggression; therefore its use by preschoolers is likely to be non-normative in comparison to same-age peers (Vaillancourt, Miller, Fagbemi, Côté, & Tremblay, 2007). Although relational aggression will not be used frequently by children in preschool, the concurrent links to depressing symptoms that grow stronger as children age, and the link with preschool-onset major depression, suggests that early use may be non-normative and intervention may be warranted (Belden et al., 2012; Crick et al., 1997; Marshall et al., 2015).

Physical aggression and relational aggression show a strong co-relation (Crick et al., 2006) and both are associated with depression symptoms (Crick et al., 1997; Weeks et al., 2014). Nevertheless, there has been research support for the separation of physical and relational aggression in early childhood (e.g., Murray-Close & Ostrov, 2009), as their developmental courses are different. Physical aggression peaks in early childhood and decreases as children

increase in age over 1.5 to 5 years of age (Côté et al., 2006), whereas relational aggression increases as children age over 2 to 10 years of age (Vaillancourt et al., 2007), and has been described as normative during middle childhood (Alink et al., 2006; Murray-Close & Ostrov, 2009; Tremblay et al., 1999; Underwood, 2003). This suggests that at least during early childhood, separation of the form aggression takes (i.e., physical aggression and relational aggression) may reveal different associations with outcomes (e.g., Murray-Close & Ostrov, 2009). For example, in preschoolers, relational aggression has been shown to be more strongly linked to concurrent symptoms of depression than physical aggression (Crick et al., 1997). The developmentally-based interpersonal model suggests non-normative and maladaptive use of aggression may confer a risk of developing depression symptoms (Rudolph et al., 2008). We were interested in whether this was the case as early as preschool.

Aggression Perpetration and Peer Victimization

Most of the research on provocative-victims (also called aggressive-victims) has been conducted with those in middle childhood, although there is some research examining this group in early childhood (Alsaker & Valkanover, 2001; Kochenderfer-Ladd, 2003; Perren & Alaskar, 2006). In middle childhood (e.g., age 11-15; Olweus, 2001), passive-victims may outnumber aggressive-victims; however, in preschool, aggressive-victims have been found to be more common (Alsaker & Valkanover, 2001; Crick et al., 1999). For example, those identified as physically victimized and physically aggressive in preschool comprised 41% of those involved in victimization or aggression (Crick et al., 1999); whereas at ages 11-15, provocative victims make up about 10-20% of those who are victimized (Olweus, 2001). This may not be surprising given the less developed social skills of young children.

Aggression perpetration has been linked to experiences with victimization. For example, examining the trajectories of peer victimization across early childhood (3.4-6.2 years), Barker et al. (2008) found that 25% of young children followed a moderate increasing trajectory and 4% followed a high chronic trajectory. Importantly, physical aggression best predicted moderate/increasing and high/chronic peer victimization trajectories (relational aggression was not examined in this study). Researchers have also examined relational aggression and relational peer victimization in association with diagnoses of disruptive behaviour, anxiety, or depression in early childhood (Belden et al., 2012). Children diagnosed with depression in preschool were more likely to be relationally aggressive-victims at school-age than children who were not aggressive or victimized. Although interpersonal theory also suggests that both aggression and peer victimization may impact depression symptoms (Rudolph et al., 2008), it is unclear if the form aggression takes matters. For example, does peer victimization relate to depression symptoms in the presence of non-normative use of aggression in early childhood? The “specificity hypothesis” predicts that aggression and victimization are coupled by form where relational peer victimization and relational aggression co-occur and physical peer victimization and physical aggression co-occur and all are predictive of psychopathology (Crick et al., 1999; Ostrov, 2008). Relational peer victimization and aggression are just beginning to emerge (Vaillancourt et al., 2007), making this age non-normative compared to same-age peers and similarly, high physical aggression is likely to occur in combination with physical peer victimization and is age non-normative in comparison to moderately physically aggressive peers. Physical and relational aggression have shown associations with depression symptoms suggesting intervention may be implicated (Belden et al., 2012; Crick et al., 1997; Marshall et al., 2015; Weeks et al., 2014). However, some preschoolers use both aggressive and prosocial

strategies to achieve social goals, and are well liked by their peers, whereas those who are only aggressive are not well liked by their peers (Hawley, 2003). Ratings of social competence have also been shown to have associations with negative engagement, a construct that included aggressive and coercive strategies (Vaughn et al., 2009). This means that aggressive behaviour may not be uniformly linked to psychopathology but rather, the combination of peer victimization and aggression, may be linked to maladaptive outcomes such as depression symptoms. The primary aim of the present study was to examine the degree of influence that type of aggression had on the association between peer victimization and depression symptoms in preschool children.

Gender Differences

A secondary aim of the study was to examine gender differences in peer victimization and aggression in relation to depression symptoms. Ostrov and Goldeski (2010) developed an integrated gender-linked model of aggression in early and middle childhood from which hypotheses about gender can be formed. The model integrates previous theories of the “social information-processing model” and the “schematic-processing model of sex role stereotypes”. The experiences related to gender and peers have been stored in memory and form the beginnings of self- and gender-schemas. The model assumes that gender-related experiences with peers are recalled when an ambiguous peer situation presents itself. Experiences consistent with these schemas are assumed to be more readily recalled in situations where children are provoked by peers. Possible responses are generated and more likely to be selected based on the information from previous experiences contained in the relevant self- and gender-schemas. The model predicts that within contexts where children are segregated by gender (by choice), such as in preschool: (1) girls will tend to display more relational aggression and will be victimized

more by relational means whereas boys will display more physical aggression and will experience more physical peer victimization; (2) girls will display more relational aggression than physical aggression and boys will display more physical aggression than relational aggression; and (3) gender will moderate the relation between aggression and adjustment (Ostrov & Goldeski, 2010). If physical victimization and physical aggression occur more frequently among boys, the experiences that are accruing for boys are likely to be physical in nature especially since they also primarily interact with other boys. For girls, more relational victimization experiences and relational aggression perpetration occur for girls who also primarily interact with other girls. The peer group being segregated by gender and differences in mean levels of victimization and aggression implies that both boys and girls will be experiencing more of the same form of victimization and aggression within gender. The occurrence of the combination victimization and aggression is more frequent in preschool children thus the associations of victimization and aggression to depression symptoms may at least partially be accounted for by the interaction of victimization and aggression.

Considering the tendency of relational peer victimization and relational aggression to co-occur (Crick et al., 1999; Ostrov, 2008); and that young girls tend to engage in more relational aggression than boys (Murray-Close & Ostrov, 2009; Ostrov et al., 2014); and that relational peer victimization and aggression have been linked to poor mental health (Belden et al., 2012), it is possible that relational peer victimization and relational aggression and their association with depression symptoms may be more likely to occur with girls. The coupling of physical peer victimization and physical aggression (Ostrov & Goldeski, 2010), and the tendency of boys to experience physical peer victimization suggest that physical peer victimization and physical aggression may be more likely to occur in boys (Rose & Rudolph, 2006). The integrated gender-

linked model of aggression suggests that physical aggression and peer victimization are likely to occur in boys and be linked to adjustment problems (Ostrov & Goldeski, 2010). Physical victimization and physical aggression are more likely to occur in boys (Ostrov & Goldeski, 2010; Rose & Rudolph, 2006), and physical victimization and physical aggression have been linked to depression symptoms (Crick et al., 1999; Weeks et al., 2014) so we may expect that physical aggression will moderate the association of physical peer victimization and depression symptoms for boys. In the present study, a secondary aim was to examine the moderation of gender on the interactions of peer victimization and aggression in association with depression symptoms.

Current Study

Our purpose in conducting the present study was to test Rudolph et al.'s (2008; 2009; 2016) developmentally-based interpersonal model which posits that social-behavioural deficits (i.e., aggression) are associated with relationship disturbances (i.e., peer victimization) and each impact symptoms of depression. We tested this model in preschool-aged children attending high quality licenced child care centres in Canada using a multiple-informant approach and examining physical aggression and physical peer victimization and relational aggression and relational peer victimization separately, while controlling for their shared associations.

In early childhood, a multiple-informant approach has been recommended given that correlations between informants tend to be low, suggesting that individuals hold different perspectives on children's behaviour depending on the context in which they are observing the children (Alsaker & Valkanover, 2001; Vlachou, Botsoglou & Andreou, 2013). In the present study, we used daycare teacher reports (TR) and direct observations (OBS) of children's aggression and peer victimization because teacher ratings of physical aggression and relational

aggression have been shown to have low to moderate relations to observation measures (McNeilly-Choque, Hart, Robinson, Nelson, & Olsen, 1996; Ostrov, 2008; Ostrov, 2010) and therefore the use of both informants may provide unique perspectives in association with depression symptoms. We used teacher reports of depression symptoms, rather than parent reports of depression symptoms because they have been shown to be related to future self-reported depression symptoms (Mesman & Koot, 2000). Previous research has found links between internalizing and externalizing disorders and the socioeconomic indicators of household income and parental education (Reiss, 2013). Child age is commonly accounted for in early childhood research and has been associated with the form of aggression (Murray-Close & Ostrov, 2009). Child age, household income, and parental education were used as covariates in the current study.

The first aim of our study was to examine the degree to which aggression in preschool impacted the relation between peer victimization and depression symptoms. Specifically, relational aggression was expected to amplify the strength of the relation between relational peer victimization and depression symptoms at moderate and high levels of relational aggression, while accounting for the association of physical peer victimization and physical aggression. Physical aggression was expected to amplify the strength of the relation between physical peer victimization and depression symptoms at high levels of physical aggression and accounting for relational peer victimization and relational aggression. Previous research has shown different associated characteristics dependent on who is reporting on the characteristics, thus leaving informants separate allows different patterns to emerge (Offord et al., 1996). We were interested in whether a model with all teacher-reported data would differ from the perspective of observations of peer victimization and aggression in association with depression symptoms so

two models were conducted for each moderation hypothesis: one with all teacher-reported data and one with observations of peer victimization and aggression and teacher-reports of depression symptoms.

A second aim was to examine gender differences of: (1) girls being involved in more relational peer victimization and relational aggression than boys, and boys being involved in more physical peer victimization and physical aggression than girls, (2) girls displaying more relational aggression than physical aggression than boys and boys displaying more physical aggression than relational aggression than girls, and (3) the interaction effect where the relational peer victimization and relational aggression interaction was expected to emerge for girls, but not boys, in association with depression symptoms and the physical peer victimization and physical aggression interaction in association with depression symptoms was expected to be present for boys, but not girls.

Methods

Participants

Participants included 198 preschool aged children ($M_{\text{age}} = 33.61$ months, $SD_{\text{age}} = 5$ months; 50.76% girls) from 19 childcare facilities located in southern Ontario. In order to participate in the study, the child care centers had to be licenced, based in a centre, and serve children within the ages of two to three years of age and have at least five children in this age range. Of the eligible centres and classrooms, 74.33% of parents provided consent for their children to participate in the study. The majority of children lived in a two-parent home (89.6%), in a home with a median household income of \$70,000 or more (77.6%) and most families spoke only English in the home (84.14%) as reported by parents. The ethnicity of the majority of children (84%) was Caucasian.

One hundred and eleven teachers agreed to participate in the eligible centres contacted and the teachers decided amongst themselves who was the person most knowledgeable for each consented child. This resulted in seventy-three daycare teachers that participated and provided daycare teacher reports. Only 2.4% of teachers reported that they did not know the child very well. The median age of teachers was 26-30 years and all were women.

The number of participating children per center ranged from 5-19, and the number of participating teachers per centre ranged from one to nine and the number of classrooms per centre ranged from one to three. Data were collected between March and December and 85.4% of teacher-reports and the first observation session occurred within one month of each other. The classroom quality scores were found to be high quality² and were not correlated to any of the variables of interest in this study. Since all the centres were licenced, this resulted in the majority of centres being of high quality. In Canada child care centres are licenced by the provincial government which dictates minimum standards for care such as the standard ratios of teacher and children in the facilities. For toddler groups of children 18 months to under 30 months, one teacher for five children is required with a maximum of 15 children and for preschool children 30 months or older (up to six years of age), one teacher is required for every 8 children with a maximum of 16 children per group (Queen's Printer for Ontario, 2012-17).

Procedures

Parents provided consent for daycare teachers to answer questions on their child and for their child to be observed by trained researchers during periods of indoor free play (i.e., periods of time where there are unstructured activities). Teachers provided consent for participation in

² Classroom quality was measured with the Infant/Toddler Environment Rating Scale-Revised (ITERS-R; ages 0-2.5 years; Harms, Cryer, & Clifford, 2003) and the Early Childhood Environment Rating Scale-Revised (ECERS-R; ages 2-5 years; Harms, Clifford, & Cryer, 1998). The classrooms were found to be high quality ($M=6.21$; $SD=0.51$; scale maximum = 7) and were not related to any of the variables of interest in this study.

completing child surveys for the children under their care and for research assistants to observe their classrooms. Teachers received \$5 per child report and children received a book for compensation for participation.

Measures

Depression symptoms. Symptoms of depression were measured using teacher-reports of the Caregiver-Teacher Report Form (C-TRF; Achenbach & Rescorla, 2000). The affective problems subscale includes seven items (e.g., “Shows little interest in things around him/her”; “cries a lot”) with response options 0 = *Not true*; 1 = *Somewhat true*; 2 = *Very true*. Scores on items in the subscale are typically summed (Achenbach & Rescorla, 2000). The affective problems subscale items have been rated on a 3-point scale (i.e., not consistent, somewhat consistent, very consistent) to be consistent with DSM-IV diagnostic categories of major depressive disorder and dysthymic disorder by experienced child psychologists and psychiatrists from different cultures (Rescorla, 2005). Ratings of *very consistent* by 63% or more raters warranted inclusion in the DSM oriented subscale. Therefore, the affective problems subscale is referred to as depression symptoms throughout this paper. The teacher-reported depression symptoms scale showed adequate internal consistency ($\alpha=.73$).

Teacher-reports of aggression. Aggression was measured by teacher-reports of the C-TRF for physical aggression (Achenbach & Rescorla, 2000) and selected items from the Preschool Social Behaviour Scale/Teacher form for relational aggression subscale (PSBS-T; Crick et al., 1997). The aggressive behaviour subscale of the C-TRF includes multiple items of socially undesirable behaviour; however, selected items can be identified as physically aggressive behaviour (Tremblay, 2000). In order to obtain a composite comparable to the observational data, three items on physical aggression were selected from the TRF. These items

were: “gets into many fights”; “hits others”, and “physically attacks people” and were rated along a 3-point scale (0 = *Not true (as far as you know)*; 1 = *Somewhat or Sometimes true*; 2 = *Very True or Often True*). The items were averaged to create a composite score of physical aggression. Cronbach’s alpha was .88 for the three items related to physical aggression. Three items from the PSBS-T on relational aggression (i.e., “tells others not to play with or be a peer’s friend when he/she is mad at a peer”; “tells a peer that he/she won’t play with them unless the peer does what this child wants”; “will keep a peer from being in the play group if he/she is mad at them”) were rated along a 5-point scale (0 = *Never or Not at all true* to 4 = *Always or very true*). The items were averaged to form a composite score of relational aggression. Cronbach’s alpha was .82 for the relational aggression subscale.

Direct observations of aggression. Trained research assistants collected observational data on physical and relational aggression using the Early Childhood Play Project observation system (ECPPOS; Ostrov & Keating, 2004). Research assistants participated in a full day training session with an observation system developer to learn the procedures and definitions consistent with previous research. Research assistants then watched practice videos and coded observations were reviewed for accuracy and completeness and feedback was provided. Practice sessions also occurred in day care centres with senior research assistants where observation coding was reviewed for accuracy and completeness and feedback was provided.

The observational measures of physical and relational aggression were collected by observing each child for 10 minute intervals on up to five occurrences. Observations were scheduled according to the times the child attended the facility so there was variation in the length of time between the first and last observation of between 3 to 26 days. Observers recorded the number of occasions the focal child engaged in relational aggression (e.g., child excluded

another child from the group; ignored another child) or physical aggression (e.g., hitting; kicking; taking a toy away). Reliability has been replicated and concurrent validity demonstrated for the ECPPOS in young preschool children aged 2.5 years and above (Crick et al., 2006). Of the children that were observed a minimum of three occasions and a maximum of five occasions, the average number of observations was 4.43. For children observed on at least three occasions, observations were averaged across displayed physical aggression and displayed relational aggression to create observer-reported physical and relational aggression scores. Observations of children that occurred over one to two occasions (10-20 mins total observation time) were deemed to not be enough data points to be included in the average score and became missing data. Interclass correlation coefficients (ICC) for inter-observer reliability were high for physical aggression (ICC=.94) and relational aggression (ICC=.88). For 23.40% of observations, two research assistants observed the same focal child in order to provide reliability estimates. The proportion of agreement was calculated as the number of agreements over the number of observations. The proportion agreement was high for physical aggression (87.56%) and relational aggression (94.30%).

Teacher-reports of peer victimization. Physical and relational peer victimization were measured by teacher-reports using an adapted version of the Preschool Peer Victimization Measure - Teacher Report (PPVM-TR; Crick et al., 1999; Ostrov, 2008) which included seven items answered along a 5-point scale ranging from 0 = *Never or Not at all true* to 4 = *Always or very true*. Subscales contained three items on physical peer victimization (e.g., “gets pushed or shoved by their peers”) and three items on relational peer victimization (e.g., “gets ignored by peers when they are mad at him/her”). The three items measuring physical peer victimization were averaged to form a composite of physical peer victimization and showed good internal

consistency ($\alpha=.83$). The three items measuring relational peer victimization were averaged and also showed adequate internal consistency ($\alpha=.74$). Since physical victimization was of interest and not overt aggression (which would include verbal victimization) the item on verbal victimization was not used in the victimization composites.

Direct observations of peer victimization. Similar to displayed aggression, observed peer victimization was assessed using the ECPPOS (Ostrov & Keating, 2004). Observers recorded the occasions that the focal child was the recipient of physical or relational aggression from peers. For children who had three or more observations, physical and relational peer victimization were each averaged to form composites of physical and relational peer victimization. Inter-observer reliability was high for physical peer victimization ($ICC=.90$) and relational peer victimization ($ICC=.87$). The proportion agreement was high for physical (88.08%) and relational peer victimization (96.89%).

Demographic characteristics. Child age was calculated from the date the observations were completed and the date of birth of the child. Household income and the education of the person most knowledgeable (PMK) of the child (72.70% mothers) were obtained from the parent-reported demographic items. PMK household income was reported using categories ranging from less than \$20,000 to more than \$80,000. The highest level of education for the PMK was reported using categories of: did not complete high school; completed high school; college diploma or trades certificate; university undergraduate degree; university graduate degree.

Analytic Plan

A saturated multiple regression model was conducted in MPlus version 6.12 (Muthén & Muthén, 2011) to examine the moderating role of physical aggression and relational aggression

in the association between physical peer victimization and relational peer victimization respectively and depression symptoms. Maximum likelihood robust (MLR) estimation was used to account for potential deviations in normality and full information maximum likelihood (FIML) estimation was used to handle missing data. The association between peer victimization (i.e., physical peer victimization and relational peer victimization) and depression symptoms, along with the relation between moderators (i.e., physical and relational aggression) and depression symptoms, the interaction terms of physical peer victimization and physical aggression along with relational peer victimization and relational aggression were entered into the model with an effect of moderation indicated by the significance of the interaction term. Simultaneous entry has been described as appropriate for research questions regarding interactions (Hayes, 2013). Significant interactions were probed by running the model with high and low values of the moderator (1 standard deviation above and below the mean) and depicted graphically at high, moderate and low levels of the moderator (Aiken & West, 1991). Two separate models were tested: one with all teacher-reported variables and one using observations of physical aggression and relational aggression along with observations of physical peer victimization and relational peer victimization and teacher-reported depression symptoms.

Missing Data

Participants with data on one or more variables (depression symptoms, physical peer victimization, relational peer victimization, physical aggression, and relational aggression) and one or more reporters (teacher or observation) were included in the analyses. Missing data of predictors and outcome ranged from 0 to 8.6% and 0.5 to 27.80% for control variables (see Table 1 for the percentage of missing data for each variable). Little's (1988) missing completely at random (MCAR) test was conducted on all variables used in the current study and the non-

significant finding indicated that the data were assumed to be missing completely at random, $\chi^2(18, N = 198) = 19.74, p = .62$. Since data were MCAR, pairwise deletion could be used for descriptive data and correlations conducted in SPSS.

Results

Data were examined for assumptions of multivariate analyses. Skewness and kurtosis were under recommended limits of < 3 and < 10 respectively indicating deviations from normality were not extreme (Kline, 2011). However, since some values approached the limit of 10 for kurtosis, MLR estimation was used to account for potential deviations from normality. For the teacher-reported model, one individual had no data yielding a sample of 197. The sample for observations of peer victimization and aggression model was selected if at least one data point was present from either reporter resulting in a sample of 198. Descriptive statistics were calculated using all available data.

Descriptive Statistics

Pearson correlations were used to examine relations between study variables. Bivariate correlations, means, and standard deviations and gender differences of study variables are found in Table 1. Teacher-reported (TR) physical aggression was significantly related to depression symptoms. Relational peer victimization (TR) was statistically significantly associated with depression symptoms. Depression symptoms were also statistically significantly negatively correlated to PMK education and household income.

Relational peer victimization (TR) was related to observed (OBS) relational peer victimization; however, physical peer victimization was not statistically significantly related across informants. Teacher-reported physical aggression was related to observer-reported

physical aggression as was teacher-reported relational aggression related to observational measures.

Physical peer victimization was related to relational peer victimization with teacher-reports and observations. Physical aggression and relational aggression were statistically significantly related within teacher-reports and not within observations. Teacher-reported relational aggression was associated with observed physical aggression. Physical peer victimization and physical aggression were related within teacher-reports and observations, and relational peer victimization and aggression were related within teacher-reports, and not observations. Physical peer victimization (TR) was related to teacher-reported relational aggression, but not observed relational aggression. Relational peer victimization (TR) was related to physical aggression (TR), but not observed physical aggression.

Boys were more likely to be rated as physically aggressive by teachers ($t(154.27)=3.24$, $p=.001$; $d=.46$) than girls and girls were more likely to be rated as more relationally aggressive by both teachers ($t(170.77)=-2.03$, $p=.044$; $d=.29$) and observers ($t(140.88)=-2.11$, $p=.037$; $d=.31$) than boys. No other gender differences were found. To test whether girls were more relationally aggressive than physically aggressive and boys were more physically aggressive than relationally aggressive, paired samples t-tests were conducted. Physical aggression was rescaled to be within the same range as relational aggression. Girls were more relationally aggressive than physically aggressive toward peers ($t(99)=-2.41$, $p=.018$; $d=-.24$) and boys were more physically aggressive than relationally aggressive when aggression was reported by teachers ($t(95)=3.56$, $p=.001$; $d=.36$). However, a different pattern of results arose from observation data. Both boys and girls were more physically aggressive than relationally aggressive when aggression was reported by observations (boys: $t(90)=6.46$, $p<.001$; $d=.68$; girls: $t(89)=4.03$, $p<.001$; $d=.42$).

Teacher-reported Aggression Model Estimation

A saturated multiple regression model was conducted with depression symptoms as the outcome, physical peer victimization, relational peer victimization, physical aggression and relational aggression as predictors, and the interactions of physical peer victimization and physical aggression along with relational peer victimization and relational aggression. Child age, parent education, and household income were controlled for in the model. All predictor and outcome variables were teacher-reported and all predictor and control variables were mean centered prior to model estimation. In order to determine whether clustering by teacher reporting on children should be taken into account, the design effect was calculated for each of the variables in the model. The design effect is calculated by $1 + (\text{average cluster size} - 1) \times \text{intraclass correlation}$; values greater than two indicate clustering should be attended to (McNeish, 2014). We did not find that design effect scores were greater than two for the predictors; therefore accounting for clustering by teacher was not necessary.

The overall model accounted for 20.10% of the variance in the outcome of depression symptoms ($R^2=.20, p=.003$)³. The interaction of relational peer victimization and relational aggression in association with depression symptoms was statistically significant ($b= 0.52, p=.003$) and the interaction of physical peer victimization and physical aggression was not statistically significant ($b=-0.40, p=.271$). The relation of physical aggression to depression symptoms was statistically significant ($b=1.67, p<.001$). The statistical model can be viewed in Figure 1. In order to determine the effect size of the interaction, a saturated regression model without the interaction terms was conducted which resulted in the model accounting for 17% of the variance in the outcome of depression symptoms ($R^2=.17, p=.008$). The proportion of

³ Two outliers were detected using mahalanobis distance. Analyses were conducted with and without the identified outliers; the significance of the variance accounted for in the model was similar and the same paths were statistically significant with and without the outliers.

variance associated with the interaction over the unexplained variance (f^2) as defined by Aiken and West (1991) is a good measure of effect size (Dawson, 2014). The effect size of the interaction was .04 which corresponds to a small effect size (around $f^2=.02$ is small and $f^2=.15$ is moderate; Aiken & West, 1991).

In order to investigate the relational peer victimization and relational aggression interaction, models were conducted one standard deviation above and below the mean of relational aggression (Aiken & West, 1991). Given that one standard deviation below the mean was not within the range of the data, the lowest value of relational aggression was substituted for 1 standard deviation below the mean (Hayes, 2013). The high relational aggression model showed a statistically significant relation between relational peer victimization and depression symptoms ($b=0.60, p=.018$). At average levels the interaction was significant ($b=0.52, p=.003$) but the relation between relational peer victimization and depression symptoms was not statistically significant at average levels of relational aggression ($b=-0.35, p=.143$). The model with low relational aggression did not show a statistically significant relation between relational peer victimization and depression symptoms ($b=-0.02, p=.947$). Figure 2 displays the moderation of relational aggression on the association between relational peer victimization and depression symptoms graphically.

Gender differences: A multi-group analysis was conducted in order to examine whether the interaction of relational peer victimization and relational aggression differed by gender. The relational peer victimization and relational aggression interaction was statistically significant for girls ($b=0.44, p=.027$) and not for boys ($b=-0.36, p=.629$); however, the difference between the association for girls and for boys was not statistically significant ($Wald \chi^2=1.09, p=.296$). The

physical peer victimization and physical aggression interaction was not significant for girls ($b=0.98, p=.338$) nor for boys ($b=-0.54, p=.203$).

Observer-reported Aggression Model Estimation

Similar to the teacher-reported model, a saturated multiple regression model was conducted. This model used a different reporter for the predictor than the outcome as it has been recommended (e.g., Hawker & Bolton, 2000; Podsakoff, MacKenzie, Lee, & Podsakoff, 2003) to take into account common method variance. The observer-reported aggression model included observations of physical peer victimization, relational peer victimization, physical aggression, and relational aggression along with the physical peer victimization and physical aggression and the relational peer victimization and relational aggression interaction terms in predicting teacher-reported depression symptoms. Although the overall variance accounted for was statistically significant ($R^2=.08, p=.032$)⁴, the interaction of physical peer victimization and physical aggression ($b=-0.20, p=.620$) and the interaction of relational peer victimization and relational aggression ($b=3.48, p=.107$) were not statistically significant. Observed relational aggression ($b=-1.00, p=.003$) and PMK education ($b=-0.36, p=.026$) were statistically significant and negatively associated with teacher-reported depression symptoms. Child age was related to depression symptoms ($b=0.06, p=.040$).

Gender differences: To examine whether gender influenced the interaction, a multi-group model was conducted. The relational peer victimization and relational aggression interaction was not statistically significant for girls ($b=5.34, p=.053$) or boys ($b=-1.06, p=.795$). The physical peer victimization and physical aggression interaction was not statistically significant for girls ($b=-0.23, p=.856$) nor for boys ($b=-0.57, p=.267$).

⁴ Two outliers were detected using mahalanobis distance. Analyses were conducted with and without outliers. The variance accounted for was similar and the significance of the paths were similar for models with and without outliers.

Discussion

The primary goal of the present study was to test Rudolph et al.'s (2008; 2009; 2016) developmentally-based interpersonal model. The model suggests that social-behavioural deficits (i.e., aggression) interact with relationship disturbances (i.e., peer victimization) in relation to symptoms of depression. We were interested in whether peer victimization was associated with depression symptoms in the presence of aggression and whether this model also applied to preschool-aged children. We found support for the developmentally-based interpersonal model of depression in preschool children— relational aggression moderated the relation between relational peer victimization and depression symptoms in preschool when relational aggression was reported by teachers, but not when direct observations of relational aggression were examined. Specifically, when children engaged in high relational aggression, being relationally victimized by peers was related to depression symptoms. At moderate and low levels of relational aggression, the relation between relational peer victimization and depression symptoms was not significant. Since relational aggression is just beginning to emerge at the age of the children in the study, it may not be surprising that the magnitude of the size of this effect was small. Effect sizes of small to moderate are common in the social sciences (Aiken & West, 1991) and small effect sizes are common for moderation analyses (Dawson, 2014). In the teacher-reported aggression model and the observer-reported aggression model, the associations between peer victimization (i.e., physical peer victimization and relational victimization) and depression symptoms were not significant when the interactions were considered. However, the path that remained significant when considering interactions was the relation between physical aggression and depression symptoms in the teacher-reported model. In the model without interaction terms used to estimate the effect size of the interactions, we also found physical

aggression to be related to depression symptoms. This finding is consistent with research showing a relation between physical aggression and internalizing problems in early childhood (Weeks et al., 2014). The association between physical aggression and depression symptoms also supported the developmentally-based interpersonal model of depression in early childhood (Rudolph et al., 2008). The use of physical aggression was related to depression symptoms when aggression and depression symptoms were reported by teachers.

The relation between physical aggression and depression symptoms was not significant when physical aggression was assessed through observation. This may relate to the different perspectives that teachers and observers have on child behaviour. Teachers have a longer period of time in which to observe and make generalizations about children, whereas observers have shorter intervals to observe behaviour (Juliano, Werner, & Cassidy, 2006). Observers are typically trained to notice specific types of aggression, while teachers may draw upon impressions over time and possibly across contexts. These differences suggest that in any specific sample variation among reporters can be expected. Previous research has found there may or may not be relations among reporters, particularly in early childhood (Juliano et al., 2006; McEvoy, Estrem, Rodriguez, & Olson, 2003). Although teacher-reported physical aggression and observations of physical aggression were correlated in this study, there was a gender difference favoring boys in the teacher-reported data, but not the observations, indicating that something was different about the perceptions of teachers and perceptions of observers.

Teacher-reported physical aggression was associated with observations of physical aggression. Similarly, teacher-reported relational aggression was associated with observations of relational aggression. Other researchers have found relations between teacher and observation-reports of physical aggression and relational aggression (Ostrov, 2006; Ostrov & Keating, 2004).

Relational peer victimization was positively associated across informants, whereas physical peer victimization was not. In a prospective study, relational aggression was found to predict relational peer victimization but physical aggression did not predict similar relations to physical peer victimization (Ostrov et al., 2014).

Peer victimization and aggression were associated within form of aggression for teacher-reports and observers with the exception of relational peer victimization and relational aggression in observations. The exception may relate to the low frequencies at which relational peer victimization and aggression are observed at the age of three. Overall, the relations among peer victimization and aggression in teacher-reports and the relation of physical peer victimization and aggression in observations support the coupling of form of peer victimization and aggression in early childhood, where children tend to retaliate in the same form in which they were victimized and become victimized by the same form of aggression in which they engage (Ostrov, 2008). The present study demonstrated the importance of considering physical peer victimization and relational peer victimization, as well as physical aggression and relational aggression as separate constructs in early childhood research as each type of peer victimization and aggression was linked to depression symptoms in unique ways. Relational peer victimization was associated with depression symptoms in the presence of *high levels* of teacher-reported relational aggression, whereas teacher-reported physical aggression did not moderate the relation between physical peer victimization and depression symptoms. Merging the forms of peer victimization and aggression could have obscured these findings.

In the model with observations of peer victimization and aggression, there was a negative relation between relational aggression and depression symptoms. This finding was unexpected and highlights the possibility of relational aggression also being associated with strengths as well

as deficits. For example, relational aggression in preschoolers has also been linked to more mutual friends and better expressive language skills (Burr, Ostrov, Jansen, Cullerton-Sen, & Crick, 2005; Estrem, 2005). It may be that once other types of peer victimization and aggression are accounted for in their relation to depression symptoms, those who show observable features of relational aggression over short intervals may also demonstrate some social skills. Moderate and high levels of social skills have been related to relational aggression use in preschoolers (Carpenter & Nangle, 2006). Indeed, relational aggression in preschoolers has also been associated with controversial social status (i.e., being both well liked and not well liked) suggesting that relational aggression may be related to social advances for some preschoolers (Nelson, Robinson, & Hart, 2005).

A second aim was to test several predictions from the integrated gender-linked model of aggression (Ostrov & Goldeski, 2010). Specifically, we wanted to test whether: (1) girls display more relational peer victimization and relational aggression than boys and boys experience more physical peer victimization and display more physical aggression than girls; (2) girls display more relational aggression than physical aggression and boys display more physical aggression than relational aggression; and (3) gender moderated the interaction of victimization and aggression in association with depression symptoms.

We found gender differences in reporting on physical aggression and relational aggression. Mean differences were found favoring boys for teacher-reported physical aggression and there were no differences in observations of physical aggression between boys and girls. Teachers have more opportunity to witness events of physical aggression in the classroom setting. Teachers may also recall behaviour consistent with their belief system if they believe boys engage in physical aggression more than girls. Girls were rated as more relationally

aggressive on average than boys by both teachers and observers. This is consistent with previous research examining teacher-reports and observations of relational aggression (e.g., Crick et al., 1997; Ostrov & Keating, 2004). Although there were mean differences, the effect sizes of these differences were small. We did not find support for any gender differences in type of victimization.

Comparing physical and relational aggression within gender, we found that boys used more physical aggression than relational aggression as reported by teachers and observers. For girls, as expected girls used more relational aggression than physical aggression as reported by teachers. When aggression was measured through observation, similar to boys, girls used more physical aggression than relational aggression however the magnitude of the effect was small for girls and medium for boys. This may be because relational aggression is just beginning to emerge at this time and may not have occurred when the observers were assessing the children's interactions in the 10 minute intervals. Alternatively, if teachers believe girls tend not to be physically aggressive, they may have more difficulty recalling the information on physical aggression in girls at a later time.

Although the interaction of relational peer victimization and relational aggression in association with depression symptoms was significant for girls, and not statistically significant for boys, there was no statistical difference between girls and boys. Therefore, we did not have evidence of a gender-specific relation. This may have been due to low power to detect the effect.

Limitations

The first limitation was the cross-sectional nature of the data which precludes assumptions about causality. The *early development* of depression symptoms was of interest in the present study, thus the model of peer victimization and aggression as risks for depression

symptoms. However, longitudinally, peer victimization and aggression are likely reciprocally related to depression symptoms where peer victimization and aggression lead to depression symptoms and depression symptoms lead to peer victimization and aggression. Three or more data points, measuring all variables at all time points would allow for the examination of which pattern of directionality best fit the data. However, conceptualizing aggression as a moderator, limits the examination of the outcome to depression symptoms because as a mathematical term in a structural model, a construct predicted by an interaction term is illogical (Little, 2013). The data in the present study were cross-sectional and as such we cannot determine whether children who are relationally victimized, react with aggression when experiencing heightened depression symptoms. Nor that engaging in relational aggression leads to later heightened depression symptoms only when relational victimization also occurs whereas relational aggression in isolation may not lead to later heightened depression symptoms. These will be important questions to address in future longitudinal research.

Although the sample size was large for a study in early childhood with observational data, we likely lacked the power to be able to detect differences between boys and girls as a three-way interaction (McClelland, 2014; Whisman & McClelland, 2005). Future studies should aim to examine gender differences as girls tend to use relational aggression and boys use more physical aggression in early childhood (Ostrov et al., 2014). Similarly, given that relational aggression and relational peer victimization often occur together, as do physical peer victimization and aggression (Ostrov et al., 2014), it follows that there tends to be gender-specific couplings with relational aggression and peer victimization occurring with girls and physical aggression and peer victimization occurring with boys.

Although we found an interaction of relational peer victimization and relational aggression when all variables were reported by teachers, we did not find the same interaction when peer victimization and aggression were measured by observations. This may raise concerns about common method variance; however, with regression equations including interaction terms, common method variance has been mathematically demonstrated to *deflate* interaction effects, making them more difficult to detect (Siemsen, Roth, & Oliveira, 2010). This means that while the interaction was strong enough to emerge in the presence of common method variance, the interaction effect may not have been strong enough to replicate across reporters. Alternatively, as discussed, the generalized view of teachers acquired after witnessing many interactions may be different than information observers had the opportunity to witness across up to five 10 minute intervals. Additional observation periods may better approximate the behaviour teachers' witness, especially if the behaviour does not occur frequently. Finally, childcare facilities in the present study were of high quality so our findings may not generalize to childcare facilities of lower quality.

Our predicted interaction of relational aggression on relational victimization was supported, but the other regarding physical aggression moderating the association between physical peer victimization and depression symptoms was not. This may relate to the developmental context of physical aggression being more common at this age and thus even high physical aggression is not as starkly aberrant than at later age groups where the majority of the peer group no longer engage in such behaviour. However this also suggests that more explicit defining features of the categories of what determines a social-behavioural deficit or relationship disturbance may be warranted in order for more evidence for Rudolph et al.'s (2008; 2009; 2016) developmentally-based interpersonal model to accumulate.

Primary prevention of the development of depression symptoms requires research on associated features of early depression symptoms to determine those who may be at risk *prior* to the development of a negative attributional style which typically occurs later in childhood during the early school years (Haines et al., 1999). During preschool, the foundational experiences related to peer experiences are beginning to accumulate, forming the database of experiences from which children choose response options and forming the basis of later developing attributional styles (Crick & Dodge, 1994; Haines et al., 1999). The results of the present study suggest that preschoolers who experience relational victimization and engage in relational aggression (as reported by teachers) may be at risk for heightened concurrent depression symptoms. These heightened symptoms can disrupt development of self-regulatory capacities in the context of peer relations and also foretell risk of future depression symptoms in childhood (Mesman & Koot, 2000; Rudolph et al., 2016). The benefit of working with this age group is that relational victimization and relational aggression are relatively direct and observable in comparison to the more covert nature of relational aggression later in childhood. This means that intervening on instances of relational aggression and relational victimization may be easier at this age and assisting young children in adding varied prosocial interpersonal experiences to children's accumulating database of peer experiences may support the development of more balanced attributions later in childhood.

Conclusion

We found that the association between relational peer victimization and depression symptoms was moderated by relational aggression when relational aggression was reported by teachers. Specifically, relational peer victimization and depression symptoms were related at high levels of teacher-reported relational aggression scores. Teacher-reported physical

aggression was also related to depression symptoms but not moderated by physical peer victimization. Similar to older children and adolescents, preschool-age children show a similar pattern of results consistent with the developmentally-based interpersonal model of depression symptoms. These findings lend support for the application of the developmentally-based interpersonal model of depression symptoms in preschool-aged children.

References

- Aalto-Setälä, T., Marttunen, M., Tuulio-Henriksson, A., Poikolainen, K., & Lönqvist, J. (2002). Depressive symptoms in adolescence as predictors of early adulthood depressive disorders and maladjustment. *The American Journal of Psychiatry*, 159(7), 1235–1237.
doi:10.1176/appi.ajp.159.7.1235
- Achenbach, T. M., & Rescorla, L. A. (2000). *Manual for the ASEBA preschool forms & profiles*. Burlington, VT: University of Vermont, Research Center for Children, Youth, and Families.
- Aiken, L. S., & West, S. G. (1991). *Multiple regression: Testing and interpreting interactions*. Thousand Oaks, CA: Sage Publications, Inc.
- Alink, L. R. A., Mesman, J., Van Zeijl, J., Stolk, M. N., Juffer, F., Koot, H. M., ... Van Ijzendoorn, M. H. (2006). The early childhood aggression curve: Development of physical aggression in 10- to 50-month-old children. *Child Development*, 77, 954–966.
doi:10.1111/j.1467-8624.2006.00912.x
- Alsaker, F. D. & Valkanover, S. (2001). Early diagnosis and prevention of victimization in kindergarten. In J. Juvonen & S. Graham (Eds.), *Peer harassment in school: The plight of the vulnerable and victimized* (pp.175-195). New York, NY: Guilford Press.
- Arseneault, L., Walsh, E., Trzesniewski, K., Newcombe, R., Caspi, A., & Moffitt, T. E. (2006). Bullying victimization uniquely contributes to adjustment problems in young children: A nationally representative cohort study. *Pediatrics*, 118, 130 – 138. doi:10.1542/peds.2005-2388
- Barker, E. D., Boivin, M., Brendgen, M., Fontaine, N., Arseneault, L., Vitaro, F., ... Tremblay, R. E. (2008). Predictive validity and early predictors of peer-victimization trajectories in

preschool. *Archives of General Psychiatry*, 65(10), 1185–1192.

doi:10.1001/archpsyc.65.10.1185

Belden, A. C., Gaffrey, M. S., & Luby, J. L. (2012). Relational aggression in children with preschool-onset psychiatric disorders. *Journal of the American Academy of Child and Adolescent Psychiatry*, 51(9), 889–901. doi:10.1016/j.jaac.2012.06.018

Burr, J. E., Ostrov, J. M., Jansen, E. A., Cullerton-Sen, C., & Crick, N. R. (2005). Relational aggression and friendship during early childhood: "I won't be your friend!". *Early Education & Development*, 16(2), 161-184. doi:10.1207/s15566935eed1602_4

Carpenter, E. M., & Nangle, D. W. (2006). Caught between stages: Relational aggression emerging as a developmental advance in at-risk preschoolers. *Journal of Research in Childhood Education*, 21(2), 177-188.

Costello, E. J., & Angold, A. (2006). Developmental epidemiology. In D. Cicchetti, & D. J. Cohen (Eds.), *Developmental psychopathology* (2nd ed.; Vol. 1; pp. 41-75). Hoboken, NJ: John Wiley & Sons, Inc.

Côté, S., Vaillancourt, T., LeBlanc, J. C., Nagin, D. S., & Tremblay, R. E. (2006). The development of physical aggression from toddlerhood to pre-adolescence: A nation wide longitudinal study of Canadian children. *Journal of Abnormal Child Psychology*, 34(1), 68–82. doi:10.1007/s10802-005-9001-z

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. doi:10.1037/0012-1649.35.2.376

Crick, N. R., Casas, J. F., & Mosher, M. (1997). Relational and overt aggression in preschool. *Developmental Psychology*, 33(4), 579–588. doi:10.1037/0012-1649.33.4.579

- Crick, N. R., & Dodge, K. A. (1994). A review and reformulation of social information-processing mechanisms in children's social adjustment. *Psychological Bulletin*, 115(1), 74-101. doi:10.1037/0033-2909.115.1.74
- Crick, N. R., & Grotpeter, J. K. (1995). Relational aggression, gender, and social-psychological adjustment. *Child Development*, 66, 710-722. doi:10.1111/j.1467-8624.1995.tb00900.x
- Crick, N. R., Ostrov, J. M., Appleyard, K., Jansen, E. A., & Casas, J. F. (2004). Relational aggression in early childhood: "You can't come to my birthday party unless..." In M. Putallaz, & K. L. Bierman, (Ed.). *Aggression, antisocial behaviour, and violence among girls: A developmental perspective*. New York, NY: Guilford Press.
- Crick, N. R., Ostrov, J. M., Burr, J. E., Cullerton-Sen, C., Jansen-Yeh, E., & Ralston, P. (2006). A longitudinal study of relational and physical aggression in preschool. *Journal of Applied Developmental Psychology*, 27(3), 254-268. doi:10.1016/j.appdev.2006.02.006
- Dawson, J. F. (2014). Moderation in management research: What, why, when, and how. *Journal of Business and Psychology*, 29(1), 1-19. doi:10.1007/s10869-013-9308-7
- Domènech-Llaberia, E., Viñas, F., Pla, E., Jané, M. C., Mitjavila, M., Corbella, T., & Canals, J. (2009). Prevalence of major depression in preschool children. *European Child and Adolescent Psychiatry*, 18(10), 597-604. doi:10.1007/s00787-009-0019-6
- Estrem, T. L. (2005). Relational and physical aggression among preschoolers: The effect of language skills and gender. *Early Education & Development*, 16(2), 207-232. doi:10.1207/s15566935eed1602_6
- Gibb, B.E. (2014). Depression in children. In I. H. Gotlib & C. L. Hammen, *Handbook of depression* (3rd ed.; pp. 374-390). New York, NY: Guildford Press.

- Haines, B. A., Metalsky, G. I., Cardamone, A. L., & Joiner, T. (1999). Interpersonal and cognitive pathways into the origins of attributional style: A developmental perspective. In T. Joiner & J. C. Coyne (Eds.), *The interactional nature of depression: Advances in interpersonal approaches*. (pp. 65–92). Washington, DC: American Psychological Association.
- Hanish, L. D., Eisenberg, N., Fabes, R. A., Spinrad, T. L., Ryan, P., & Schmidt, S. (2004). The expression and regulation of negative emotions: Risk factors for young children's peer victimization. *Development and Psychopathology*, 16, 335-353.
doi:10.1017/S0954579404044542
- Harms, T., Clifford, R. M., & Cryer, D. (1998). *Early Childhood Environment Rating Scale-Revised edition* (ECERS-R). New York, NY: Teachers College Press.
- Harms, T., Cryer, D., & Clifford, R. M. (2003). *Infant/Toddler Environment Rating Scale-Revised edition* (ITERS-R). New York, NY: Teachers College Press.
- Hawker, D. S., & Boulton, M. J. (2000). Twenty years' research on peer victimization and psychosocial maladjustment: a meta-analytic review of cross-sectional studies. *Journal of Child Psychology and Psychiatry*, 41(4), 441-455. doi:10.1111/1469-7610.00629
- Hawley, P. H. (2003). Strategies of control, aggression, and morality in preschoolers: An evolutionary perspective. *Journal of Experimental Child Psychology*, 85(3), 213-235.
doi:10.1016/S0022-0965(03)00073-0
- Hayes, A. F. (2013). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*. New York, NY: Guilford Press.
- Insel, T. R., & Fenton, W. S. (2005). Psychiatric epidemiology: It's not just about counting anymore. *Archives of General Psychiatry*, 62(6), 590-592.

- Joiner, T., Coyne, J. C., & Blalock, J. (1999). On the interpersonal nature of depression: Overview and synthesis. In T. Joiner & J. C. Coyne (Eds.), *The interactional nature of depression: Advances in interpersonal approaches*. (pp. 3–19). Washington: American Psychological Association.
- Juliano, M., Werner, R. S., & Cassidy, K. W. (2006). Early correlates of preschool aggressive behavior according to type of aggression and measurement. *Journal of Applied Developmental Psychology*, 27(5), 395-410. doi:10.1016/j.appdev.2006.06.008
- Kline, R. B. (2011). *Principles and practice of structural equation modelling*. New York, NY: Guilford Press.
- Kochenderfer-Ladd, B. (2003). Identification of aggressive and asocial victims and the stability of their peer victimization. *Merrill-Palmer Quarterly*, 49(4), 401-425.
- Little, R. (1988). A test of missing completely at random for multivariate data with missing values. *Journal of the American Statistical Association*, 83, 1198–1202. doi:10.1080/01621459.1988.10478722.
- Little, T. D. (2013). *Longitudinal structural equation modeling*. New York, NY: Guilford Press.
- Luby, J. L. (2010). Preschool depression: The importance of depression early in development. *Current Directions in Psychological Science*, 19(2), 91–95. doi:10.1177/0963721410364493
- Luby, J. L., Gaffrey, M. S., Tillman, R., April, L. M., & Belden, A. C. (2014). Trajectories of preschool disorders to full DSM depression at school age and early adolescence: Continuity of preschool depression. *American Journal of Psychiatry*, 171(7), 768–776. doi:10.1176/appi.ajp.2014.13091198

- Luby, J. L., Heffelfinger, A. K., Mrakotsky, C., Hessler, M. J., Brown, K. M., & Hildebrand, T. (2002). Preschool major depressive disorder: preliminary validation for developmentally modified DSM-IV criteria. *Journal of the American Academy of Child and Adolescent Psychiatry*, 41(8), 928–937. doi:10.1097/00004583-200208000-00011
- McClelland, G. H. (2014). Nasty data: Unruly, ill-mannered observations can ruin your analysis. In H. T. Reis & C. M. Judd (Eds.), *Handbook of research methods in social and personality psychology* (2nd ed., pp. 608–626). New York, NY: Cambridge University Press. Retrieved from <http://ebooks.cambridge.org/ref/id/CBO9780511996481>
- McEvoy, M. A., Estrem, T. L., Rodriguez, M. C., & Olson, M. L. (2003). Assessing relational and physical aggression among preschool children: Intermethod agreement. *Topics in Early Childhood Special Education*, 23(2), 51–61. doi:10.1177/02711214030230020101
- McNeilly-Choque, M. K., Hart, C. H., Robinson, C. C., Nelson, L. J., & Olsen, S. F. (1996). Overt and relational aggression on the playground: Correspondence among different informants. *Journal of Research in Childhood Education*, 11, 37–41. doi:10.1080/02568549609594695
- McNeish, D. M. (2014). Analyzing clustered data with OLS regression: The effect of a hierarchical data structure. *Multiple Linear Regression Viewpoints*, 40, 11–16.
- Marshall, N. A., Arnold, D. H., Rolon-Arroyo, B., & Griffith, S. F. (2015). The association between relational aggression and internalizing symptoms: A review and meta-analysis. *Journal of Social and Clinical Psychology*, 34(2), 135-160.
- Mesman, J., & Koot, H. M. (2000). Child-reported depression and anxiety in preadolescence: II. Preschool predictors. *Journal of the American Academy of Child and Adolescent Psychiatry*, 39(11), 1379–1386. doi:10.1097/00004583-200011000-00012

- Moore, S. E., Norman, R. E., Suetani, S., Thomas, H. J., Sly, P. D., & Scott, J. G. (2017). Consequences of bullying victimization in childhood and adolescence: A systematic review and meta-analysis. *World Journal of Psychiatry*, 7(1), 60. doi:10.5498/wjp.v7.i1.60
- Murray-Close, D., & Ostrov, J. M. (2009). A longitudinal study of forms and functions of aggressive behavior in early childhood. *Child Development*, 80(3), 828–842.
- Muthén, L. K., & Muthén, B. (2011). *Mplus 6.12 for Windows*. Los Angeles: Author.
- Nelson, D. A., Robinson, C. C., & Hart, C. H. (2005). Relational and physical aggression of preschool-age children: Peer status linkages across informants. *Early Education & Development*, 16(2), 115–140. doi:10.1207/s15566935eed1602_2
- Nolen-Hoeksema, S., Girgus, J. S., & Seligman, M. E. P. (1992). Predictors and consequences of childhood depressive symptoms: A 5-year longitudinal study. *Journal of Abnormal Psychology*, 101(3), 405–422. doi:10.1037/0021-843X.101.3.405
- Offord, D. R., Boyle, M. H., Racine, Y., Szatmari, P., Fleming, J. E., Sanford, M., & Lipman, E. L. (1996). Integrating assessment data from multiple informants. *Journal of the American Academy of Child & Adolescent Psychiatry*, 35(8), 1078–1085. doi:10.1097/00004583-199608000-00019
- Olweus, D. (2001). Peer harassment: a critical analysis and some important issues. In J. Juvonen, & S. Graham (Eds.) *Peer harassment in school: The plight of the vulnerable and victimized* (pp.3-20). New York, NY: Guilford Press.
- Ostrov, J. M. (2006). Deception and subtypes of aggression during early childhood. *Journal of Experimental Child Psychology*, 93(4), 322–336. doi:10.1016/j.jecp.2005.10.004
- Ostrov, J. M. (2008). Forms of aggression and peer victimization during early childhood: A short-term longitudinal study. *Journal of Abnormal Child Psychology*, 36(3), 311–322. doi:10.1007/s10802-007-9179-3
- Ostrov, J. M. (2010). Prospective associations between peer victimization and aggression. *Child Development*, 81(6), 1670–1677. doi:10.1111/j.1467-8624.2010.01501.x

- Ostrov, J. M., & Godleski, S. A. (2010). Toward an integrated gender-linked model of aggression subtypes in early and middle childhood. *Psychological Review*, 117(1), 233-242. doi:10.1037/a0018070
- Ostrov, J. M., Kamper, K. E., Hart, E. J., Godleski, S. A., & Blakely-McClure, S. J. (2014). A gender-balanced approach to the study of peer victimization and aggression subtypes in early childhood. *Development and Psychopathology*, 26(3), 575–587. doi:10.1017/S0954579414000248
- Ostrov, J. M., & Keating, C. F. (2004). Gender differences in preschool aggression during free play and structured interactions: An observational study. *Social Development*, 13(2), 255-277.
- Perren, S., & Alaskar, F. D. (2006). Social behaviour and peer relationships of victims, bully-victims, and bullies in kindergarten. *Journal of Child Psychology and Psychiatry*, 47(1), 45-57. doi:10.1111/j.1469-7610.2005.01445.x
- Podsakoff, P. M., MacKenzie, S. B., Lee, J.-Y., & Podsakoff, N. P. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology*, 88(5), 879–903. doi:10.1037/0021-9010.88.5.879
- Queen's Printer for Ontario (2012-17). *Child care rules under the Child Care and Early Years Act, 2014 (CCEYA)*. Retrieved from: <https://www.ontario.ca/page/child-care-rules-child-care-and-early-years-act>
- Reiss, F. (2013). Socioeconomic inequalities and mental health problems in children and adolescents: A systematic review. *Social Science & Medicine*, 90, 24–31. doi:10.1016/j.socscimed.2013.04.026

- Rescorla, L. A. (2005). Assessment of young children using the Achenbach System of Empirically Based Assessment (ASEBA). *Mental Retardation and Developmental Disabilities Research Reviews*, 11(3), 226–237. doi:10.1002/mrdd.20071
- Rose, A. J., & Rudolph, K. D. (2006). A review of sex differences in peer relationship processes: Potential trade-offs for the emotional and behavioral development of girls and boys. *Psychological Bulletin*, 132(1), 98–131. doi:10.1037/0033-2909.132.1.98
- Roza, S. J., Hofstra, M. B., van der Ende, J., & Verhulst, F. C. (2003). Stable prediction of mood and anxiety disorders based on behavioral and emotional problems in childhood: A 14-year follow-up during childhood, adolescence, and young adulthood. *American Journal of Psychiatry*, 160(12), 2116–2121. doi:10.1176/appi.ajp.160.12.2116
- Rudolph, K. D. (2009). The interpersonal context of adolescent depression. In S. Nolen-Hoeksema, & L. M. Hilt (Eds.) *Handbook of depression in adolescents* (pp.377-417): New York, NY: Routledge.
- Rudolph, K.D., Flynn, M., & Abaied, J.L. (2008). A developmental perspective on interpersonal theories of youth depression. In J. R. Z. Abela & B. L. Hankin (Eds.), *Handbook of depression in children and adolescents* (pp. 79-102). New York, NY: Guilford.
- Rudolph, K.D., Lansford, J.E., & Rodkin, P.C. (2016). Interpersonal theories of developmental psychopathology. In D. Cicchetti (Ed.), *Developmental psychopathology, maladaptation and psychopathology* (pp. 243-311). Hoboken, NJ: John Wiley & Sons, Inc.
- Siemens, E., Roth, A., & Oliveira, P. (2010). Common method bias in regression models with linear, quadratic, and interaction effects. *Organizational Research Methods*, 13(3), 456–476. doi:10.1177/1094428109351241

- Tremblay, R. E. (2000). The development of aggressive behaviour during childhood: What have we learned in the past century? *International Journal of Behavioral Development*, 24(2), 129-141. doi:10.1080/016502500383232
- Tremblay, R. E., Japel, C., Perusse, D., McDuff, P., Boivin, M., Zoccolillo, M., & Montplaisir, J. (1999). The search for the age of “onset” of physical aggression: Rousseau and Bandura revisited. *Criminal Behavior and Mental Health*, 9, 8-23. doi:10.1002/cbm.288
- Underwood, M. K. (2003). *Social Aggression in Girls*. New York: Guilford Press.
- Vaillancourt, T., Miller, J. L., Fagbemi, J., Côté, S., & Tremblay, R. E. (2007). Trajectories and predictors of indirect aggression: Results from a nationally representative longitudinal study of Canadian children aged 2–10. *Aggressive Behavior*, 33(4), 314–326. doi:10.1002/ab.20202
- Vaughn, B. E., Shin, N., Kim, M., Coppola, G., Krzysik, L., Santos, A. J., ... & Elphick, E. (2009). Hierarchical models of social competence in preschool children: A multisite, multinational study. *Child Development*, 80(6), 1775-1796. doi:10.1111/j.1467-8624.2009.01367.x
- Vlachou, M., Botsoglou, K., & Andreou, E. (2013). Assessing bully/victim problems in preschool children: A multimethod approach. *Journal of Criminology*, 2013, 1-8. doi:10.1155/2013/301658
- Weeks, M., Cairney, J., Wild, T. C., Ploubidis, G. B., Naicker, K., & Colman, I. (2014). Early-life predictors of internalizing symptom trajectories in Canadian children. *Depression and Anxiety*, 31, 608–616. doi:10.1002/da.22235

Weissman, M., Wolk, S., Goldstein, R., Moreau, D., Adams, P., Greenwald, S. ...

Wickramaratne, P. (1999). Depressed adolescents grown up. *JAMA*, 281(18), 1707–1713.

doi:10.1001/jama.281.18.1707

Whisman, M. A., & McClelland, G. H. (2005). Designing, testing, and interpreting interactions and moderator effects in family research. *Journal of Family Psychology*, 19(1), 111–120.

doi:10.1037/0893-3200.19.1.111

Whiteford, H. A., Degenhardt, L., Rehm, J., Baxter, A. J., Ferrari, A. J., Erskine, H. E., ...

others. (2013). Global burden of disease attributable to mental and substance use disorders:

Findings from the Global Burden of Disease Study 2010. *The Lancet*, 382(9904), 1575–1586.

Wichstrøm, L., Berg-Nielsen, T. S., Angold, A., Egger, H. L., Solheim, E., & Sveen, T. H.

(2012). Prevalence of psychiatric disorders in preschoolers. *Journal of Child Psychology and Psychiatry and Allied Disciplines*, 53(6), 695–705. doi:10.1111/j.1469-

7610.2011.02514.x

Table 1. *Bivariate correlations, means, standard deviations and gender differences of study variables*

	PV (TR)	RV (TR)	PV (OBS)	RV (OBS)	PA (TR)	RA (TR)	PA (OBS)	RA (OBS)	Child age	PMK education	Household income	Total		Boys		Girls		Test	% Missing	Range
												<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>t</i>		
DEP	0.14	0.20	-0.02	-0.02	0.37	0.10	0.06	-0.05	0.11	-0.19	-0.17	1.51	2.03	1.78	2.25	1.25	1.76	<i>1.84</i>	1.01%	0-9
PV (TR)		0.42	0.03	0.07	0.43	0.14	0.10	0.02	-0.18	0.05	-0.04	0.52	0.72	0.61	0.81	0.44	0.60	<i>1.69</i>	.5%	0-3.33
RV (TR)			0.14	0.25	0.33	0.48	0.01	0.13	0.22	-0.03	-0.22	0.64	0.73	0.67	0.75	0.61	0.72	<i>0.58</i>	.5%	0-3.33
PV (OBS)				0.19	0.02	-0.06	0.17	-0.07	0.00	-0.10	-0.09	0.47	0.52	0.46	0.52	0.48	0.52	-.33	8.59%	0-2.8
RV (OBS)					0.08	0.00	-0.03	0.13	0.33	-0.15	-0.05	0.09	0.18	0.08	0.14	0.11	0.21	<i>-1.16</i>	8.59%	0-1.8
PA (TR)						0.19	0.24	0.01	0.07	-0.07	-0.19	0.27	0.49	0.38	0.59	0.16	0.35	3.24	.5%	0-2
RA (TR)							0.20	0.21	0.19	-0.03	-0.25	0.42	0.75	0.32	0.57	0.53	0.88	-2.03	.5%	0-4
PA (OBS)								0.14	0.00	-0.09	-0.16	0.48	0.55	0.5	0.55	0.47	0.55	<i>0.33</i>	8.59%	0-3.2
RA (OBS)									0.33	-0.10	-0.18	0.16	0.32	0.12	0.22	0.21	0.38	-2.11	8.59%	0-1.2
Child age										-0.10	-0.19	33.62	5.00	33.71	4.84	33.53	5.18	0.25	.5%	21-43
PMK education											0.57	-	-	-	-	-	-	-	23.23%	1-5
PMK Household income												-	-	-	-	-	-	-	27.78%	1-10

Note. DEP= Teacher-reported depression symptoms; PV = Physical peer victimization; RV = Relational peer victimization; PA = Physical aggression; RA = Relational aggression; TR = Teacher-report; OBS = Observations; PMK=Person most knowledgeable; values in bold are statistically significant at $p<.05$.

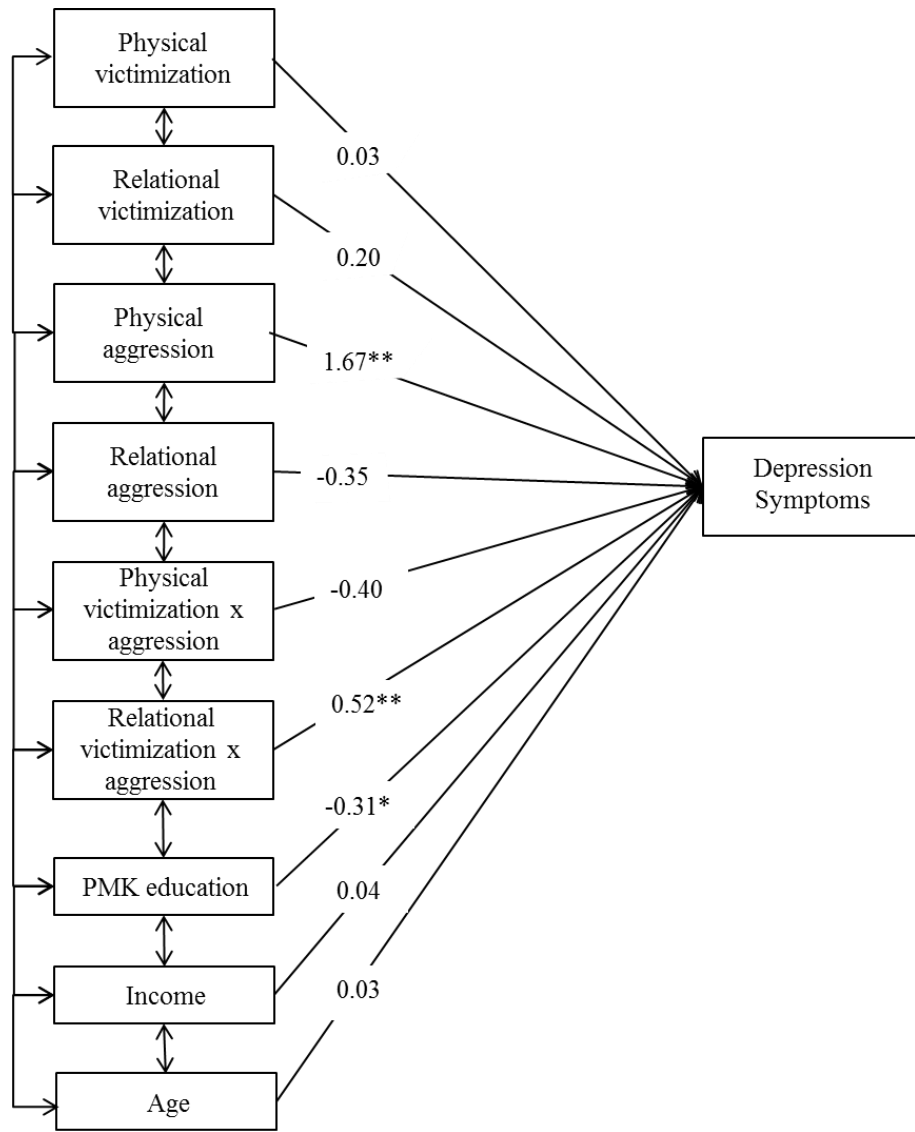


Figure 1. Results of the statistical model of moderation of relational aggression on the relation between relational victimization and depression symptoms in preschool (unstandardized). PMK=Person Most Knowledgeable; All variables were teacher-reported and allowed to correlate, correlations not shown for simplicity. * $p < .05$, ** $p < .01$

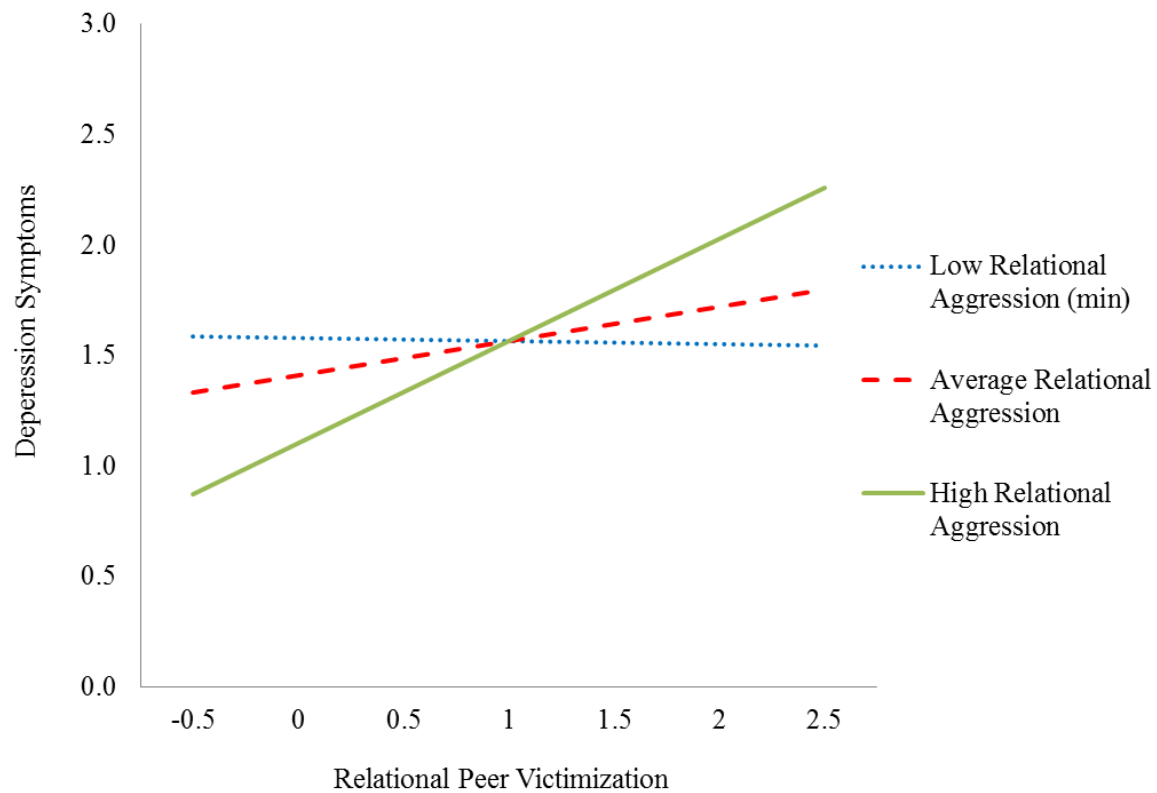


Figure 2. Moderation of teacher-reported relational aggression on the relation between teacher-reported relational peer victimization and depression symptoms. The minimum value of relational aggression was substituted for one standard deviation below the mean as this was in the range of the data.

Chapter 3 – Paper 2:

**Longitudinal Associations between Depression Symptoms and Peer Experiences: Evidence
of Symptoms-driven Pathways**



Contents lists available at ScienceDirect

Journal of Applied Developmental Psychology

journal homepage: www.elsevier.com/locate/jappdp

Longitudinal associations between depression symptoms and peer experiences: Evidence of symptoms-driven pathways



Amanda Krygsman, Tracy Vaillancourt*

Counselling Psychology, Faculty of Education, 145 Jean-Jacques-Lussier, University of Ottawa, Ottawa, ON, K1N 6N5, Canada

ARTICLE INFO

Keywords:

Peer victimization
Peer rejection
Depression symptoms
Multi-informant

ABSTRACT

Although most studies suggest that depression is a consequence of poor treatment by peers, these studies have often failed to consider alternative models. We compared the *interpersonal risk model* (poor peer relations leading to depression), the *symptoms-driven model* (depression leading to poor peer relations), and the *transactional model* (depression and poor peer relations sharing a bidirectional association) using a multi-informant cascade modelling approach. Data were collected annually from 703 youth and their parents beginning in grade 5 (age 10–11) and concluding in grade 12 (age 17–18). Accounting for within and across time associations, a symptoms-driven model was replicated across parent- and self-reported depression symptoms in predicting later perceived peer rejection. This relation was stronger during school transition than later years. Self-reported depression symptoms also predicted self-reported peer victimization. This study adds to a growing literature demonstrating the need to consider different models as depression symptoms can precede peer relations difficulties.

Depression is one of the most common mental disorders in adolescence with a 1-year prevalence of approximately 4–5% and a lifetime prevalence of 19% (Merikangas et al., 2010; Thapar, Collishaw, Pine, & Thapar, 2012). The developmental progression of depression suggests that it is relatively rare in childhood but increases substantially during adolescence following puberty (Birmaher et al., 1996; Costello, Erkanli, & Angold, 2006; Thapar et al., 2012; Wade, Cairney, & Pevalin, 2002). Considering that prevalence rates of depression increase during adolescence (APA, 2013; Birmaher et al., 1996) and that depression symptoms show strong stability over time (Cole, 2006; Rudolph, Flynn, Abaied, Groot, & Thompson, 2009), it is important to focus on developmental periods during which symptoms of depression are emerging (Cole, 2006), and to examine risk factors or consequences associated with its development and maintenance (Rudolph et al., 2009). In this study, we were interested in how peer relations influence or are influenced by symptoms of depression across late childhood to late adolescence. Specifically, we examined self- and parent-reports of depression symptoms, self-reports of peer victimization (i.e., being bullied), and perceived peer rejection in a randomly drawn non-clinical sample of Canadian youth assessed yearly on eight occasions. We focused on symptoms of depression and not on the clinical diagnosis of depression because adolescents with subthreshold levels of depression have been shown to not differ from adolescents diagnosed with major depressive disorder in terms of their risk for self-harming behaviour, level of

impairment, depression in adulthood, and rate of treatment for the disorder (Angold, Costello, Farmer, Burns, & Erkanli, 1999; Rutter, Kim-Cohen, & Maughan, 2006).

1. Depression symptoms and poor peer experiences

Depression and symptoms of depression in childhood and adolescence are strongly linked to two separate but related constructs: peer victimization and peer rejection (Choukas-Bradley & Prinstein, 2014). Peer victimization occurs when an individual is the repeated recipient of intentional aggression, in the presence of a power imbalance (Olweus, 2001). Peer rejection is defined as being actively disliked by peers (Coie, Dodge, & Coppotelli, 1982). Although peer victimization and peer rejection are moderately correlated (e.g., $r = 0.57$; Knack, Tsar, Vaillancourt, Hymel, & McDougall, 2012), they do differ conceptually. Peer victimization occurs with one other person or a small group of individuals, typically in dyadic interactions, whereas peer rejection is usually related to a group-level phenomenon (Choukas-Bradley & Prinstein, 2014). Peer rejection has been often measured using peer reports, but has also been measured using self-reports. Both peer- and self-reported peer rejection have been linked to depression symptoms (Zimmer-Gembeck, Hunter, & Pronk, 2007).

Longitudinal studies suggest that peer rejection normally precedes peer victimization (e.g., Buhs & Ladd, 2001; Buhs, Ladd, & Herald,

* Corresponding author at: Counselling Psychology, Faculty of Education and School of Psychology, Faculty of Social Sciences, University of Ottawa, Canada.
E-mail address: tracy.vaillancourt@uottawa.ca (T. Vaillancourt).

<http://dx.doi.org/10.1016/j.appdev.2017.05.003>

Received 1 July 2016; Received in revised form 8 May 2017; Accepted 16 May 2017

Available online 12 August 2017

0193-3973/ © 2017 Elsevier Inc. All rights reserved.

2006; Ostrov, 2008; Serdiouk, Rodkin, Madill, Logis, & Gest, 2015), which is consistent with the idea that rejected youth are more likely to be victimized by peers than non-rejected youth because of their low social status (Boivin & Hymel, 1997; Buhs & Ladd, 2001). Experiencing peer victimization may also lead to low peer acceptance (Kochel, Ladd, & Rudolph, 2012). The relation between peer victimization and peer rejection has been described as reciprocal in nature where peer victimization can lead to peer rejection and vice versa (Card & Hodges, 2008; Hodges & Perry, 1999).

There are multiple ways individuals can be victimized by their peers. Some research has shown support for the categories of overt (i.e., verbal and physical) victimization, relational/social victimization, and cyber-victimization (Dempsey, Sulkowski, Nichols, & Storch, 2009) and each have been related to depression symptoms (Hamilton et al., 2016; Landoll, La Greca, Lai, Chan, & Herge, 2015; Marshall, Arnold, Rolon-Arroyo, & Griffith, 2015; Schwartz, Gorman, Nakamoto, & Toblin, 2005). Previous research on children's definitions of bullying has indicated that children refer to physical aggression, verbal aggression, and general harassing behaviour the most and social aggression the least (Vaillancourt et al., 2008). This suggests that asking a general question about bullying (e.g., "How often have you been bullied?") may elicit answers relating to only physical and verbal types of aggression and not social aggression, thus underestimating the prevalence of bullying (Vaillancourt et al., 2010). Indeed, asking questions about multiple forms of bullying has been shown to be a more sensitive measure of victimization experiences, yielding more accurate prevalence rates than the general question alone (Vaillancourt et al., 2008; Vaillancourt et al., 2010).

Interpersonal theories related to the development of depression symptoms have emphasized previously adolescents' reactions to their interpersonal environment instead of the influence of the adolescents on their interpersonal environment (Rudolph, 2009). During adolescence, the need for affiliation with peers becomes stronger. This need arises amidst changing relationships involved in the transition to middle school and/or secondary school, negotiating independence from parents, and beginning to date. Most adolescents successfully navigate these challenges. Disturbances in relationships such as peer victimization and perceived peer rejection can add to the interpersonal stress of the already fluctuating interpersonal environment of adolescence, which may lead to symptoms of depression (i.e., *interpersonal risk model*: poor peer relations leading to depression symptoms). For those already experiencing symptoms of depression, the changing interpersonal environment may be an especially vulnerable time where disturbances in relationships may be difficult to manage (i.e., *symptoms-driven model*: depression symptoms leading to poor peer relations). These peer problems, in turn, may further exacerbate symptoms of depression (i.e., *transactional model*: depression symptoms and poor peer relations sharing a bidirectional association).

2. Interpersonal risk model

Research on the link between peer victimization, peer rejection, and depression symptoms has tended to focus on the interpersonal risk model in which the stressor of poor peer relations confers a risk for increased symptoms of depression (Cole, 1990; Nolan, Flynn, & Garber, 2003; Schwartz, Lansford, Dodge, Pettit, & Bates, 2015; Schwartz et al., 2005; Ttofi, Farrington, Lösel, & Loeber, 2011; Zimmer-Gembeck, Waters, & Kindermann, 2010). For example, Schwartz et al. (2005) found that peer victimization (peer- and teacher-reported) was linked to depression symptoms (self-reported) concurrently and over time. Peer rejection (self-, parent- and teacher-reported) has also been linked to depression symptoms (self- and parent-reported) concurrently and over time (Nolan et al., 2003). The dominant assumption in the interpersonal risk model was that problems with peers lead to maladaptive outcomes. This assumption may have dissuaded some researchers from examining both variables at both time points. The cross-lagged path

from one variable to another (e.g., peer problems to depression symptoms) can be accounted for by within- and across-time relations among constructs (e.g., between peer problems and depression symptoms within time point, and the stability of peer problems and depression symptoms; Masten & Cicchetti, 2010). Said differently, the relations from peer problems to later depression symptoms may be attenuated by within- and across-time relations among constructs. Thus, these relations can be controlled for.

3. Symptoms-driven model

Less research attention has been paid to a *symptoms-driven* pathway in which the reverse relation is observed (i.e., depression symptoms conferring a risk for maladaptive interpersonal outcomes, particularly in the area of peer relations; Agoston & Rudolph, 2013; Kochel et al., 2012; Rudolph, 2009; Sourander, Helstelä, Helenius, & Piha, 2000; Vaillancourt, Brittain, McDougall, & Duku, 2013). The scar hypothesis predicts that those who have experienced an episode of depression (or symptoms of depression) will experience long-lasting effects (Lewinsohn, Steinmetz, Larson, & Franklin, 1981; Nolen-Hoeksema, Girgus, & Seligman, 1992; Rohde, Lewinsohn, & Seeley, 1990). This hypothesis has been incorporated into interpersonal theories of depression in children and adolescents where symptoms of depression interfere with the development of skills associated with initiating and maintaining interpersonal relations (Rudolph, 2009). For example, Kochel et al. (2012) demonstrated support for a symptoms-driven model of depression and peer relations where parent- and teacher-reported depression symptoms predicted self-, peer-, and teacher-reported victimization (grade 4 to 5 and grade 5 to 6) and low peer-reported acceptance (grade 4 to 5). Self-reported depression symptoms at age 8 have also been shown to be associated with peer victimization at age 16 (parent-, teacher- and self-report; Sourander et al., 2000). This relation between depression symptoms and peer victimization was found when accounting for prior experiences with victimization; however, the stability of depression symptoms was not accounted for. In these studies, problems with mood preceded problems with peers.

4. Transactional model

There is also evidence supporting a *transactional model* (Sameroff, 2009) in which qualities of the individual (i.e., depression symptoms) and the environment (i.e., peer relations) share a bidirectional relation over time (Kaltiala-Heino, Fröjd, & Marttunen, 2010; Platt, Kadosh, & Lau, 2013; Sweeting, Young, West, & Der, 2006). The transactional model emphasizes the changing nature of the environment and the changing nature of the individual where the individual influences the environment and their own development (Sameroff, 2009). For example, Sweeting et al. (2006) found bidirectional relations between depression symptoms and peer victimization at ages 11 to 13, and that depression symptoms at age 13 predicted victimization at age 15. Kaltiala-Heino et al. (2010) found that, for girls and boys aged 15–17, depression symptoms predicted being left alone by peers (not by choice) and peer victimization predicted later depression symptoms for boys only. For girls but not for boys, depression symptoms predicted subsequent victimization by peers.

The increased attention to the longitudinal associations between depression symptoms and peer relation difficulties has produced evidence supporting an *interpersonal risk model* (poor peer relations leading to depression symptoms), a *symptoms-driven model* (depression symptoms leading to poor peer relations), and a *transactional model* (depression symptoms and poor peer relations sharing a bidirectional association). The temporal priority is particularly difficult to assess because most of the studies conducted to date share notable substantive problems including: (1) being short in duration (i.e., 1–2 years; e.g., Kaltiala-Heino et al., 2010; Schwartz et al., 2005), (2) having long time periods between assessments (i.e., 8–9 years) that lack consistent

measurements of each variable over time (e.g., Schwartz et al., 2015; Sourander et al., 2000), (3) relying on one source of informant (typically self-reports) which can inflate associations (e.g., Kaltiala-Heino et al., 2010; Sweeting et al., 2006), (4) not including multiple constructs of peer relations in the same study (e.g., Nolan et al., 2003; Sweeting et al., 2006; Vaillancourt et al., 2013), and (5) only examining one direction of association, and thus not testing for all three possible models (e.g., Schwartz et al., 2015; Tiofi et al., 2011).

5. Present study

In the present study, we addressed these limitations by examining the relations between symptoms of depression and two types of peer relations difficulties (i.e., peer victimization and perceived peer rejection) across 8 years of development beginning in grade 5 and ending in grade 12 in a large cohort of Canadian youth and using multiple informants (i.e., youth and parents). Moreover, we examined the direction of association between these constructs by comparing three different theoretical models that have each received empirical support, although they have not been compared in a study of this length with annual assessments. Specifically, we compared the *interpersonal risk*, *symptoms-driven*, and *transactional models* using a developmental cascade modelling approach in which the directional and bidirectional relations among variables were examined in consort.

Developmental cascade models that account for relations within and across time points and replicate cascade effects found in previous research provide strong empirical support for temporal patterns (Masten & Cicchetti, 2010). Considering within- and across-time relations is important because an effect of one variable to another over time may be attenuated by other associations among variables within and across time points. Using model building, we could test whether cross-lagged effects significantly contribute to the model after accounting for the stability and within-time relations. Importantly, we could also determine which model best fits our data by testing differences between the fit of the different models under investigation.

Peer victimization and peer rejection have been shown to be stable over time (Nolan et al., 2003; Pouwels, Sorens, Lansu, & Cillessen, 2016; Rudolph et al., 2009) and across developmental periods (Pouwels et al., 2016). Depression has also been shown to be stable over time (Cole et al., 2002); however, different patterns of stability have been reported based on age. For example, in one study, self-reported depression symptoms showed more variability across time in childhood (10–12 years) and less variability across time in adolescence (14–16 years; Cole et al., 2002). In this study, parent-reported depression symptoms did not vary across different ages. Considering this research, we examined whether the stability of depression symptoms would be different across age and predicted there would be greater stability in late adolescence compared to late childhood when using self-reports and not parent reports. We also considered the effects of school transition on peer victimization, peer rejection, and depression symptoms because times of transition appear to be periods where youth are more vulnerable to problems with peers (Rudolph, 2009) and depression symptoms (Barber & Olsen, 2004; Newman, Newman, Griffen, O'Connor, & Spas, 2007). We predicted that the cross-lagged paths would be stronger during the transition to secondary school.

We also considered whether peer victimization mediated the relation between depression symptoms and peer rejection. For those experiencing depression symptoms, a negative perception of others may heighten the perception of being victimized by peers. The experience of peer victimization may then strengthen the perception of dislike by others (i.e., perceived peer rejection). Support for this relation has been found with children in grades four to six where the association between depression and low peer acceptance was accounted for by the relations between depression symptoms to peer victimization and peer victimization to low peer acceptance (Kochel et al., 2012).

Previous research suggests mental health problems have different

associated features that are dependent on reporter (Offord et al., 1996). Keeping informants separate allows for different patterns to emerge. We were interested in whether similar temporal patterns with depression symptoms would emerge when depression symptoms were reported by parents or children so we chose to run the models separately—one with self-reported depression symptoms and the other with parent-reported depression symptoms.

Researchers have found that family income and parental education have the strongest associations with mental health problems in childhood and adolescence when examining socioeconomic status indicators (Reiss, 2013). For example, a large study examining the public health impact of family income and parental education on depression in adolescence showed that after adjusting for gender and ethnicity, the proportion of attributable risk of depression was 40% for parental education and 26% for household income (Goodman, Slap, & Huang, 2003). Considering this research, parental education and income were used as control variables in the present study. Participant's sex was also used as a control variable because post-puberty girls are two times more likely to be depressed than boys (Hyde, Mezulis, & Abramson, 2008). Girls tend to be more vulnerable interpersonally during adolescence due in part to their increased attention and value of close relationships, which in turn heightens sensitivity to peer problems (see Rose & Rudolph, 2006 for review). There are also notable sex differences in peer victimization rates with a meta-analysis showing that boys reported being bullied more than girls across childhood and adolescence (Cook, Williams, Guerra, Kim, & Sadek, 2010).

Finally, directional hypotheses about the sequential priority were not made considering that the research to date has been equivocal, with studies supporting the *interpersonal risk model* (Cole, 1990; Nolan et al., 2003; Schwartz et al., 2005; Schwartz et al., 2015; Tiofi et al., 2011; Zimmer-Gembeck et al., 2010), the *symptoms-driven model* (Agoston & Rudolph, 2013; Kochel et al., 2012; Rudolph, 2009; Sourander et al., 2000; Vaillancourt et al., 2013) and the *transactional model* (Kaltiala-Heino et al., 2010; Platt et al., 2013; Sweeting et al., 2006).

6. Method

6.1. Participants and procedures

Participants were drawn from the McMaster Teen Study, a large longitudinal study examining the stability and change of social experiences and mental health from childhood into adolescence. Data collection began in the spring of 2008 when youth were in grade 5 and continued annually until the spring of 2015, when youth were in grade 12. Grade 5 classrooms were selected from a random sample of 51 schools. Parents and youth were asked for consent and assent respectively each year and the study has maintained annual university ethics board approval. Participants were compensated for their time with incremental increases in payment each year (e.g., grade 5 = \$5 (CAN) to grade 12 = \$50 (CAN)). Youth survey data were collected in school in grade 5 and then from grade 6 to grade 12, were collected through online or paper questionnaires completed in the home along with parent telephone interviews. When youth were in grade 11 and grade 12, parents were given the option of completing interviews online or on the telephone.

In grade 5, 875 youth participants agreed to participate and 703 (80%) participated in at least one other time point from grade 6–12 which was the sampling frame for the present study. For the analytic sample, participants with at least two data points across any time point were selected. The self-reported depression symptoms model included 701 participants and the parent-reported depression symptoms model included 703 participants. Youth were on average 10.91 years of age ($SD_{age} = 0.36$) in grade 5. There were approximately a similar number of girls (52.8%) and boys in grade 5. However, by grade 12, the percentage of participating girls was 56.8%. Although student

participation was related to student's biological sex at grade 8 and grades 10–12, all Cramer's V values were weak in magnitude, ranging from 0.09 to 0.11 (McHugh, 2013). Those participating in the study for at least two time points ($N = 703$) were compared to those who participated at only one time point. Those who participated in the longitudinal portion of the study who had data at two or more time points had higher parental education ($\chi^2(1) = 23.38, p < 0.001$) and higher family income ($\chi^2(1) = 23.57, p < 0.001$).

Parents (87% mothers) were interviewed about their child's health, behavior, mental health and demographic information. When youth were in grade 5, parents were predominantly over 40 years of age (58.3%) and median income was \$70,000–\$80,000 for the household. This was comparable to the demographic information related to the area of data collection in 2008 (<http://www.statcan.gc.ca>). The majority (74.2%) of the participating parents attained post-secondary education. Youth were predominantly European-Canadian (71.2%).

6.2. Measures

6.2.1. Depression symptoms

Youth-reported depression symptoms were measured using the depression subscale of the Behavioural Assessment System for Children-2 (BASC-2), the self-report of personality child version (SRP-C; grades 5–6) and adolescent version (SRP-A; grades 7–12), containing 12 items (Reynolds & Kamphaus, 2004). The SRP-C had one additional item “I have too many problems” that was not part of the SRP-A depression symptoms subscale. In order to make meaningful comparisons across time with a composite that consisted of the same items, this item was dropped from grades 5 and 6. Items were rated as *true* = 2 or *false* = 0 for eight items (e.g., “Nothing is fun anymore”) and on a 4-point scale of *never* = 0, *sometimes* = 1, *often* = 2 and *almost always* = 3 for 4 items (e.g., “I feel sad”) and summed to form a composite score. Internal consistency was excellent (0.87–0.91; $M\alpha = 0.89$) for grades 5–12. The BASC-2 depression scale has shown high correlations with other depression measures such as the Child Depression Inventory (Reynolds & Kamphaus, 2004).

Child depression symptoms as reported by parents were assessed using the Brief Child and Family Phone Interview Version 3 (BCFPI-3). The BCFPI-3 is a structured phone interview designed for mental health screening that is also used for research purposes (Cunningham, Pettingill, & Boyle, 2006). The managing mood subscale corresponded to diagnostic criteria in the DSM-IV and contained six items (e.g., “Do you notice that your child gets no pleasure from usual activities?”) rated along a 3-point scale of *never*, *sometimes* or *often*. Items were averaged to form a composite score. Coefficient alpha for the six items at each time point (grades 5–12) in the present study were excellent 0.83 to 0.92 ($M\alpha = 0.87$). Items were developed from the Ontario Child Health study and factor structure has been demonstrated for the subscales including the managing mood subscale (Cunningham et al., 2006).

6.2.2. Peer victimization

Peer victimization was measured using a modified version of the Olweus (1996) Bully/Victim questionnaire (Vaillancourt et al., 2010). Youth were first provided with a standard definition of bullying and then asked: “How often have you been bullied at school in the past year (since September)?”. Youth also responded to four other questions about different types of bullying (i.e., physical, verbal, social, and cyber). Answers could range from 0 = *not at all* to 4 = *many times per week*. These five items were averaged to create a composite of bullying victimization. From grades 5–12, coefficient alphas ranged from 0.79 to 0.82 ($M\alpha = 0.81$).

6.2.3. Perceived peer rejection

Perceived peer rejection was measured using items from the interpersonal relations subscale of the Behavioural Assessment System for

Children-2 (BASC-2), self-report of personality child and adolescent versions (SRP-C [grades 5–6] and SRP-A [grades 7–12]) containing 4 items (Reynolds & Kamphaus, 2004). Items related to peer rejection were rated as *true* = 2 or *false* = 0 for 2 items (grades 5–12; e.g., “My classmates don't like to be with me”) and on a 4-point scale of *never* = 0, *sometimes* = 1, *often* = 2 and *almost always* = 3 for 2 items (e.g., “Other kids hate to be with me”). Items were scored as identified in the BASC-2 manual and summed to form a composite score (Reynolds & Kamphaus, 2004). Coefficient alphas for the four items ranged from 0.74 to 0.85 ($M\alpha = 0.81$) between grades 5–12.

6.2.4. Socio-economic status indicators

Household income and parental education were reported by the person most knowledgeable about the child (PMK). PMK household income was reported when youth were in grade 5 using categories ranging from less than \$20,000 to more than \$80,000. PMK household income was dichotomized into more than \$80,000 and less than \$80,000. The highest level of education for the PMK was reported at when youth were in grade 5 using five categories: did not complete high school; completed high school; college diploma or trades certificate; university undergraduate degree; university graduate degree. PMK education was dichotomized into PMK up to secondary school education or PMK post-secondary education.

6.3. Analytic plan

Path analysis with full information maximum likelihood (FIML) estimation and maximum likelihood robust (MLR) estimation was performed using Mplus version 6.12 to estimate models (Muthén & Muthén, 2011). To assess model fit, we used the comparative fit index (CFI) and the root mean square error of approximation (RMSEA). CFI values of 0.95 and above indicated adequate fit and RMSEA values < 0.08 indicated adequate fit with lower values indicating better fit (Browne & Cudeck, 1992; Hu & Bentler, 1999). The chi-square test was also used as a fit indicator while considering the sensitivity to large samples (Kline, 2011). For testing differences between nested models, the Satorra–Bentler scaled chi-square difference test was used (Satorra & Bentler, 2001). For comparing non-nested models, the AIC was used where lower values represent better fitting models and where a change of AIC > 10 represented a significant change in model fit (Burnham & Anderson, 2002; Kline, 2011). Using a model building approach, we added parameters in consecutive steps to evaluate whether the parameters added were a significant contribution to the model fit as follows: correlations and covariances, stability paths, and cross-lagged paths between peer problems. This formed the base model to which the cross-lagged paths for the competing models of interest could be added. For the interpersonal risk model, paths from peer problems to depression symptoms were added to the base model. For the symptoms-driven model, the paths from depression symptoms to peer problems were added to the base model. For the transactional model, both paths from peer problems to depression symptoms and from depression symptoms to peer problems were added to the base model. The interpersonal risk model was compared to the symptoms-driven model using the AIC as the models were not nested. The interpersonal risk model was compared to the transactional model by adding the symptoms-driven paths to the interpersonal risk model and testing the increment in fit using the Satorra–Bentler scaled chi-square difference test. The symptoms-driven model was compared to the transactional model by adding the interpersonal risk paths to the symptoms-driven model and evaluating the Satorra–Bentler scaled chi-square difference test. The previous model in any step was considered more parsimonious if there was not a significant increment in model fit. Developmental trends were evaluated by constraining the applicable stability paths to be equal and using the Satorra–Bentler scaled chi-square difference test. The differences between the strength of cross-lagged paths were examined using the Wald chi-square test.

7. Results

Data were tested for assumptions of normality. Most values of skewness and kurtosis were under recommended ranges of 3 and 10 respectively (Kline, 2011) but kurtosis values for peer victimization in grades 11 and 12 were higher than 10 (grade 11 = 11.53; grade 12 = 10.41). This appeared to be due to few extreme scores of peer victimization; however, upon examining cases, the scores were consistent with previous years. That is, there were some individuals who were chronically bullied by their peers and whose peer victimization scores remained high over multiple years. As such, we viewed these cases as part of the population of individuals experiencing victimization and retained their data. In order to account for deviations from normality, maximum likelihood robust (MLR) estimation was used.

In grade 5, children were nested within school and thus the design effect (DEFF) was calculated to determine whether the hierarchical structure of school should be accounted for (McNeish, 2014). Values of DEFF larger than two are considered a violation of the independence of observations where hierarchical structure should then be accounted for. The DEFF was calculated for the model in which depression symptoms were reported by youth and the model where depression symptoms were reported by parents. In both cases, the DEFF for each variable was under the value of two.

Missing completely at random (MCAR) tests tend to fail in cases of non-normal data (Jamshidian & Jalal, 2010). Alternative diagnostic tests for testing the hypothesis that data were not different across missing values of depression symptoms were used. Specifically, non-parametric comparisons of those missing or not missing on depression symptoms within time point and for peer victimization and perceived peer rejection at the previous time point were conducted given the paths to be tested in later modelling. Results indicated very few differences for self- and parent-reports (e.g., 3 tests in total across all grade 5–12 comparisons). Keeping in mind some tests will be significant by chance (Tabachnick & Fidell, 2013) and the number of significant tests was under 5%, these small differences were treated as ignorable. In sum, data were assumed to be missing at random (MAR). Attrition compounds over time. Although we had 80% of the original cohort available for our analyses, our sample size when youth were in grade 12 was 497.

Descriptive statistics and correlations of the variables used in the study are provided in Table 1. As can be seen in Table 1, there were many high within and across time correlations between our variables of interest. Statistically significant correlations were present not only from one time point to the next, but also across variables at most waves of data. For example, significant correlations were found for grade 5 peer victimization with both self-reported and parent-reported depression symptoms at grades 5–12. Also, significant correlations were found for self-reported depression symptoms in grade 5 with peer victimization in grades 5–12 (when youth were in grades 5–10 for parent-reported depression symptoms). Similarly, perceived peer rejection in grade 5 and both self-reported and parent-reported depression symptoms in grades 5–12 showed significant correlations. Self-reported grade 5 depression symptoms were related to perceived peer rejection across grades 5–12 (when youth were in grades 5–11 for parent-reported depression symptoms). Self-reported depression symptoms and parent-reported depression symptoms showed significant correlations within each time point ($r = 0.28\text{--}0.46$, $p < 0.05$). Peer victimization and perceived peer rejection also showed significant correlations within each time point ($r = 0.42\text{--}0.67$, $p < 0.05$).

7.1. Self-reported depression symptoms model

The self-reported depression symptoms model included self-reported depression symptoms (DEP-SR), peer victimization (PV), and perceived peer rejection (PREJ). A series of path models were conducted comparing whether the paths added to the model incrementally

improved model fit at each step. The baseline model included all within-time covariance paths (Model 1: within-time covariances only model) and had poor fit. The subsequent models had increasingly better fit (see Table 2 for model fit indices). In Model 2 (within-time covariances and stability only) first-order stability paths were added. Constructs were highly correlated across the time points in this study. Given the established theoretical and empirical basis of the stability of depression symptoms (e.g., APA, 2013; Rudolph et al., 2009) peer victimization (e.g., Pouwels et al., 2016) and perceived peer rejection (Nolan et al., 2003) over time periods longer than one year, 2nd order stability paths for these variables were also added to Model 2. This resulted in improved fit over Model 1 ($\Delta\chi^2(39) = 1145.095$, $p < 0.001$). Next, cross-lagged paths between PV and PREJ were added to Model 3 and these additions resulted in a significant improvement in the model fit ($\Delta\chi^2(14) = 43.662$, $p < 0.001$). The cross-lagged paths between PV and PREJ, and between PREJ and PV were added separately because they were not specific to the hypotheses being tested. We then compared a model with all possible relations not specific to hypotheses (Model 3) to the interpersonal risk model where PV and PREJ predicted DEP-SR (Model 4a; $\chi^2(185) = 304.980$, $p < 0.001$; CFI = 0.967; RMSEA = 0.030; CI = 0.024–0.036) which was an improvement in model fit ($\Delta\chi^2(14) = 32.324$, $p = 0.004$). A symptoms-driven model (Model 4b) was compared to Model 3 which was an improvement in model fit and ($\Delta\chi^2(14) = 73.272$, $p < 0.001$) also fit the data well ($\chi^2(185) = 252.983$, $p < 0.001$; CFI = 0.981; RMSEA = 0.023; CI = 0.015–0.030). The transactional model (Model 4c) included all possible cross-lagged paths and also fit the data well ($\chi^2(171) = 228.734$, $p = 0.002$; CFI = 0.984; RMSEA = 0.022; CI = 0.014–0.029). The transactional model (4c) was an improvement over Model 3 ($\Delta\chi^2(28) = 65.151$, $p < 0.001$). The transactional model (Model 4c) was superior to the interpersonal risk model ($\Delta\chi^2(14) = 65.578$, $p < 0.001$). However, the symptoms-driven model (Model 4b; AIC = 42,657.162) was better than the interpersonal risk model (Model 4a; AIC = 42,727.437) and the transactional model (Model 4c) was not a significant improvement to model fit over the symptoms-driven model ($\Delta\chi^2(14) = 23.291$, $p = 0.056$). Thus, the symptoms-driven model was the final model selected.

Given that the path model included a large number of paths, the Benjamini-Hochberg false discovery rate (FDR) was applied to the parameters within each model to account for multiplicity (Cribbie, 2007). Following the correction, three paths were affected where grade 8 DEP-SR to grade 10 DEP-SR ($b = 0.13$, $\beta = 0.10$, $p = 0.044$), grade 5 PREJ to grade 7 PREJ ($b = 0.07$, $\beta = 0.10$, $p = 0.042$) and grade 9 DEP-SR to grade 10 PREJ ($b = 0.05$, $\beta = 0.15$, $p = 0.046$) were no longer statistically significant after the correction. In the symptoms-driven model (Model 4b), the paths from grade 6 DEP-SR to grade 7 PREJ, grade 8 DEP-SR to grade 9 PREJ, grade 11 DEP-SR to grade 12 PREJ, grade 8 DEP-SR to grade 9 PV and grade 9 DEP-SR to grade 10 PV were statistically significant. Self-reported depression symptoms were highly stable over time (grades 5–12; one-lag paths $b = 0.35\text{--}0.62$, $p < 0.01$; two-lag paths; $b = 0.12\text{--}0.21$, $\beta = 0.14\text{--}0.23$, $p < 0.01$; exception grade 8 DEP-SR to grade 10 DEP-SR, $p = 0.044$ (FDR)) while peer victimization and perceived peer rejection were moderately stable over time (PV: one-lag paths $b = 0.23\text{--}0.44$, $p < 0.01$; PV: two-lag paths $b = 0.13\text{--}0.27$, $\beta = 0.14\text{--}0.32$, $p < 0.01$; exception grade 7 PV to grade 9 PV, $p = 0.076$; PREJ: one-lag paths $b = 0.22\text{--}0.46$, $p < 0.01$; PREJ: two-lag paths grade 6 PREJ to grade 8 PREJ $b = 0.12$, $\beta = 0.14$, $p = 0.022$ and grade 9 PREJ to grade 11 PREJ $b = 0.21$, $\beta = 0.18$, $p = 0.003$). The path from grade 11 PV to grade 12 PREJ was also statistically significant ($b = 0.77$, $p = 0.003$). Fig. 1 depicts the statistical model and standardized coefficients for the self-reported depression symptoms model (exception standardized path coefficients for two-lag paths are provided in text). Appendix A provides the unstandardized coefficients for all paths.

Table 1
Bivariate correlations, means and standard deviations of study variables.

	DEP-SR-Gr5	DEP-SR-Gr6	DEP-SR-Gr7	DEP-SR-Gr8	DEP-SR-Gr9	DEP-SR-Gr10	DEP-SR-Gr11	DEP-SR-Gr12	DEP-PR-Gr5	DEP-PR-Gr6	DEP-PR-Gr7	DEP-PR-Gr8	DEP-PR-Gr9	DEP-PR-Gr10	DEP-PR-Gr11	DEP-PR-Gr12
DEP-SR-Gr6	0.43															
DEP-SR-Gr7	0.39	0.60														
DEP-SR-Gr8	0.37	0.41	0.52													
DEP-SR-Gr9	0.31	0.28	0.41	0.56												
DEP-SR-Gr10	0.40	0.27	0.37	0.46	0.64											
DEP-SR-Gr11	0.26	0.16	0.33	0.41	0.51	0.66										
DEP-SR-Gr12	0.21	0.16	0.24	0.32	0.47	0.51	0.59									
DEP-PR-Gr5	0.35	0.28	0.24	0.23	0.19	0.21	0.09	0.16								
DEP-PR-Gr6	0.26	0.38	0.27	0.20	0.25	0.22	0.08	0.13	0.64							
DEP-PR-Gr7	0.26	0.32	0.28	0.27	0.17	0.13	0.10	0.09	0.50	0.52						
DEP-PR-Gr8	0.21	0.23	0.25	0.30	0.27	0.25	0.18	0.13	0.46	0.50	0.55					
DEP-PR-Gr9	0.23	0.19	0.23	0.34	0.41	0.33	0.24	0.20	0.41	0.45	0.50	0.62				
DEP-PR-Gr10	0.24	0.21	0.28	0.33	0.41	0.46	0.29	0.25	0.41	0.43	0.39	0.53	0.62			
DEP-PR-Gr11	0.24	0.18	0.28	0.34	0.38	0.41	0.38	0.26	0.36	0.40	0.40	0.50	0.60	0.68		
DEP-PR-Gr12	0.19	0.17	0.19	0.23	0.35	0.39	0.35	0.35	0.37	0.40	0.40	0.41	0.58	0.60	0.72	
PV-Gr5	0.61	0.35	0.24	0.25	0.20	0.31	0.19	0.13	0.21	0.21	0.13	0.13	0.17	0.17	0.16	0.12
PV-Gr6	0.38	0.48	0.37	0.22	0.13	0.20	0.04	0.03	0.21	0.27	0.20	0.20	0.15	0.15	0.22	0.20
PV-Gr7	0.27	0.33	0.44	0.34	0.24	0.25	0.17	0.09	0.15	0.24	0.20	0.21	0.15	0.22	0.19	0.14
PV-Gr8	0.20	0.24	0.31	0.45	0.28	0.24	0.21	0.11	0.19	0.22	0.17	0.23	0.19	0.20	0.28	0.15
PV-Gr9	0.21	0.19	0.28	0.39	0.43	0.31	0.33	0.19	0.13	0.20	0.07	0.09	0.24	0.13	0.22	0.13
PV-Gr10	0.30	0.13	0.29	0.34	0.36	0.48	0.39	0.25	0.18	0.15	0.06	0.14	0.21	0.29	0.31	0.26
PV-Gr11	0.20	0.17	0.23	0.30	0.28	0.30	0.45	0.22	0.08	0.13	0.08	0.16	0.18	0.20	0.29	0.21
PV-Gr12	0.15	0.06	0.07	0.15	0.21	0.25	0.26	0.28	0.07	0.11	0.03	0.11	0.12	0.14	0.19	0.17
PREJ-Gr5	0.73	0.36	0.27	0.27	0.17	0.25	0.19	0.13	0.29	0.23	0.22	0.09	0.15	0.10	0.14	0.05
PREJ-Gr6	0.35	0.60	0.36	0.24	0.15	0.16	0.09	0.09	0.20	0.26	0.17	0.19	0.14	0.10	0.13	0.11
PREJ-Gr7	0.29	0.45	0.61	0.37	0.24	0.19	0.15	0.07	0.24	0.25	0.31	0.28	0.15	0.18	0.17	0.10
PREJ-Gr8	0.26	0.25	0.36	0.53	0.35	0.25	0.21	0.14	0.21	0.22	0.22	0.25	0.23	0.14	0.24	0.12
PREJ-Gr9	0.25	0.25	0.35	0.48	0.68	0.39	0.30	0.29	0.21	0.25	0.15	0.24	0.29	0.27	0.28	0.18
PREJ-Gr10	0.31	0.20	0.30	0.42	0.46	0.67	0.47	0.33	0.22	0.20	0.12	0.28	0.27	0.39	0.39	0.31
PREJ-Gr11	0.23	0.19	0.27	0.32	0.34	0.44	0.61	0.31	0.14	0.19	0.15	0.23	0.25	0.27	0.39	0.30
PREJ-Gr12	0.15	0.13	0.15	0.28	0.36	0.35	0.49	0.54	0.10	0.13	0.11	0.21	0.22	0.20	0.33	0.29
<i>M</i>	5.65	4.04	3.48	3.78	4.34	5.08	5.03	5.14	0.18	0.21	0.20	0.20	0.20	0.23	0.30	0.36
<i>SD</i>	6.03	4.68	4.66	4.84	5.60	5.96	5.64	5.37	0.30	0.33	0.31	0.33	0.35	0.39	0.43	0.47
1.0																
	PV-Gr5	PV-Gr6	PV-Gr7	PV-Gr8	PV-Gr9	PV-Gr10	PV-Gr11	PV-Gr12	PREJ-Gr5	PREJ-Gr6	PREJ-Gr7	PREJ-Gr8	PREJ-Gr9	PREJ-Gr10	PREJ-Gr11	PREJ-Gr12
PV-Gr6	0.52															
PV-Gr7	0.40	0.57														
PV-Gr8	0.31	0.41	0.56													
PV-Gr9	0.31	0.30	0.36	0.46												
PV-Gr10	0.38	0.29	0.37	0.50	0.53											
PV-Gr11	0.31	0.24	0.35	0.44	0.54	0.58										
PV-Gr12	0.24	0.20	0.24	0.29	0.34	0.49	0.52									
PREJ-Gr5	0.67	0.41	0.28	0.21	0.22	0.24	0.27	0.16								
PREJ-Gr6	0.38	0.56	0.34	0.29	0.22	0.17	0.21	0.11	0.45							
PREJ-Gr7	0.26	0.36	0.54	0.38	0.27	0.24	0.30	0.11	0.31	0.50						
PREJ-Gr8	0.25	0.28	0.38	0.65	0.38	0.31	0.34	0.16	0.29	0.38	0.52					
PREJ-Gr9	0.20	0.17	0.32	0.41	0.48	0.33	0.33	0.23	0.22	0.26	0.34	0.51				
PREJ-Gr10	0.27	0.21	0.25	0.31	0.33	0.49	0.34	0.28	0.26	0.24	0.23	0.32	0.53			
PREJ-Gr11	0.25	0.14	0.27	0.31	0.35	0.37	0.55	0.28	0.22	0.20	0.27	0.36	0.46	0.61		
PREJ-Gr12	0.19	0.17	0.17	0.27	0.26	0.30	0.45	0.42	0.12	0.16	0.20	0.25	0.30	0.40	0.53	
<i>M</i>	0.84	0.66	0.59	0.59	0.41	0.41	0.30	0.30	1.37	1.04	0.87	0.89	0.83	0.97	1.00	0.97
<i>SD</i>	0.76	0.69	0.65	0.64	0.49	0.56	0.44	0.44	2.20	1.96	1.66	1.71	1.62	1.81	1.82	1.59

Table 2
Model fit indices for self-reported depression symptoms model.

	χ^2	df	c	p	RMSEA (90% CI)	CFI	AIC	cd	vs.	$\Delta\chi^2$	p	Adf
Model 1: within-time covariances	2130.257	252	1.541	< 0.001	0.103 (0.099–0.107)	0.478	45,467.446	–	–	–	–	–
Model 2: within-time covariances and stability	387.091	213	1.384	< 0.001	0.034 (0.029–0.04)	0.952	42,798.440	2.399	2 vs. 1	–	< 0.001	39
Model 3: within-time covariances, stability and cross-lagged PV & PREJ	339.365	199	1.364	< 0.001	0.032 (0.026–0.037)	0.961	42,753.407	1.668	3 vs. 2	43.662	< 0.001	14
Model 4a: interpersonal risk	304.980	185	1.341	< 0.001	0.030 (0.024–0.036)	0.967	42,727.437	1.668	4a vs. 3	32.324	0.004	14
Model 4b: symptoms-driven	252.983	185	1.339	< 0.001	0.023 (0.015–0.030)	0.981	42,657.162	1.694	4b vs. 3	73.272	< 0.001	14
Model 4c: transactional	228.734	171	1.316	< 0.001	0.022 (0.014–0.029)	0.984	42,647.636	1.657	4c vs. 3	65.151	< 0.001	28
Transactional vs. interpersonal risk	–	–	–	–	–	–	–	1.646	4c vs. 4a	65.578	< 0.001	14
Model 5: symptoms-driven with controls	247.234	187	1.328	0.002	0.021 (0.013–0.028)	0.987	44,353.523	1.620	4c vs. 4b	23.291	0.056	14
Model 6: constrained DEP-SR grades 9–12	258.268	188	1.351	< 0.001	0.023 (0.016–0.030)	0.980	42,661.612	2.135	6 vs. 4b	6.112	0.106	3
Model 7: constrained PV grades 5–12	282.890	196	1.388	< 0.001	0.025 (0.018–0.031)	0.976	42,689.204	2.214	7 vs. 4b	31.832	< 0.001	11
Model 8: constrained PREJ grades 5–12	271.126	196	1.404	< 0.001	0.023 (0.016–0.030)	0.979	42,677.171	2.497	8 vs. 4b	24.739	0.010	11

Note. DEP-SR = Self-reported depression symptoms; PV = Peer victimization; PREJ = Perceived peer rejection.

7.1.1. Covariates

In model 5, covariates of sex, household income and PMK education were added to the symptoms-driven model (4b). Sex, household income, and PMK education were regressed onto each variable at each time point. Household income and PMK education were allowed to covary with each other. Model 5 also fit the data well (χ^2 (187) = 247.234, $p = 0.002$; CFI = 0.987; RMSEA = 0.021; CI = 0.013–0.028). All of the same paths were significant in the model with the covariates (Model 5) and the symptoms-driven model (Model 4b). The model fit was similar between Models 4b and 5, all paths that were significant were the same and were similar in magnitude. Considering the addition of the covariates did not change the significance or magnitude of the paths, the more parsimonious symptoms-driven model without the covariates was chosen as the final model.

7.1.2. Mediation

In order to test the indirect effect of grade 9 DEP-SR to grade 10 PV to grade 11 PV to grade 12 PREJ, the model indirect command in Mplus was used with the path from grade 9 DEP-SR to grade 12 PREJ included in the model using bias-corrected bootstrap (N = 1000) confidence intervals. The indirect effect was not significant ($b = 0.01$, $p = 0.135$) nor was the direct effect ($b = 0.02$, $p = 0.354$).

7.1.3. Developmental trends

To examine the developmental trends related to self-reported depression symptoms, peer victimization and perceived peer rejection, a series of model constraints were conducted. In model 6, beginning with model 4b, depression symptoms stability paths were constrained to be equal across grades 9–12 (i.e., one-lag stability paths were constrained to be equal and two-lag stability paths were constrained to be equal) and were allowed to be free for grades 5–8 to test whether stability was consistent across adolescence. There was not a statistically significant change in the Satorra-Bentler chi-square upon imposing the constraints ($\Delta\chi^2$ (3) = 6.112, $p = 0.106$). This indicated that self-reported depression symptoms were variable in stability during late childhood and stability remained consistent across adolescence. In model 7, beginning with model 4b, peer victimization stability paths across grades 5–12 were constrained to be equal to test whether the stability of peer victimization was consistent across time. There was a statistically significant change in the Satorra-Bentler chi-square upon imposing the constraints ($\Delta\chi^2$ (11) = 31.832, $p < 0.001$). This indicated that the model that better fit the data was the model where the stability paths of peer victimization were free to vary over late childhood and adolescence. In model 8, beginning with model 4b, the stability of perceived peer rejection was constrained to equal across grades 5–12. This constraint degraded model fit ($\Delta\chi^2$ (11) = 24.739, $p = 0.01$) suggesting that freely estimated stabilities better fit the data.

Finally, to test whether the transition to adolescence is indeed a particularly vulnerable period, the differences between the strength of cross-lagged paths were examined. In most provinces in Canada, including the area of data collection, transition to secondary school occurs from grade 8 to grade 9. We found that the path from grade 8 DEP-SR to grade 9 PREJ was not different than grade 6 DEP-SR to grade 7 PREJ (Wald χ^2 (1) = 0.109, $p = 0.741$) and grade 8 DEP-SR to grade 9 PREJ was stronger than grade 11 DEP-SR to grade 12 PREJ (Wald χ^2 (1) = 3.996, $p = 0.046$). In sum, stability paths of depression symptoms were variable across late childhood and consistently stable across adolescence. The stability of peer victimization and perceived peer rejection varied across late childhood and adolescence. As predicted, the symptoms-driven path from DEP-SR to PREJ corresponding to the transition to secondary school (grades 8–9) was stronger than at the end of secondary school (grades 11–12).

7.2. Parent-reported depression symptoms model

The parent-reported depression symptoms model included parent-

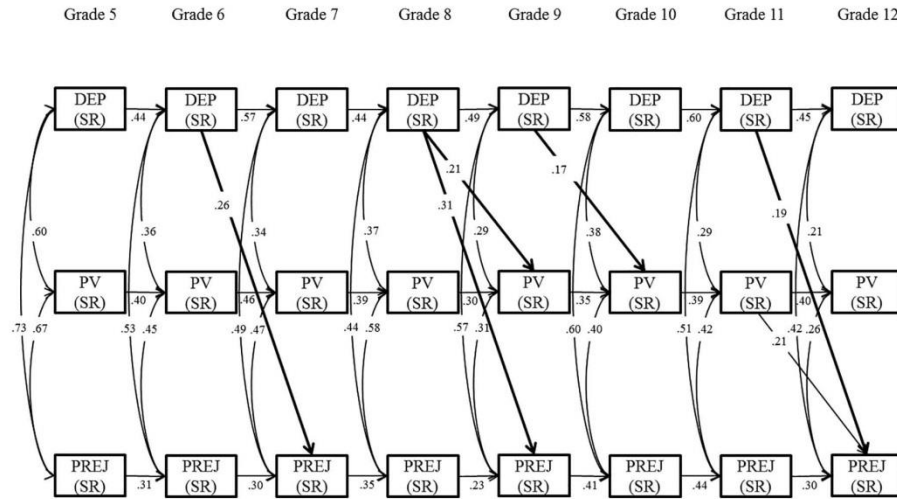


Fig. 1. Cascade Model of Self-reported Depression Symptoms, Peer Victimization and Perceived Peer Rejection. Standardized coefficients are provided in the figure. Solid lines represent paths statistically significant at $p < 0.05$. Bold solid lines relate to paths relevant to the competing hypotheses. Paths that remain in the model but are not statistically significant and the two-lag stability paths are not shown in the figure for ease of interpretation. DEP = Depression symptoms; PV = Peer victimization; PREJ = Perceived peer rejection; SR = Self-report.

Table 3
Model fit indices for parent-reported depression symptoms model.

	χ^2	df	c	p	RMSEA (90% CI)	CFI	AIC	cd	vs.	$\Delta\chi^2$	p	Δdf
Model 1: within-time covariances	2609.172	252	1.553	< 0.001	0.115 (0.111–0.119)	0.275	25,195.845	–	–	–	–	–
Model 2: within-time covariances and stability	357.470	213	1.384	< 0.001	0.031 (0.025–0.037)	0.956	21,716.417	2.476	2 vs. 1	1436.715	< 0.001	39
Model 3: within-time covariances, stability and cross-lagged PV & PREJ	298.484	199	1.370	< 0.001	0.027 (0.020–0.033)	0.969	21,658.533	1.583	3 vs. 2	54.211	< 0.001	14
Model 4a: interpersonal risk	270.865	185	1.365	< 0.001	0.026 (0.019–0.032)	0.974	21,647.266	1.436	4a vs. 3	27.291	0.018	14
Model 4b: symptoms-driven	261.390	185	1.350	< 0.001	0.024 (0.017–0.031)	0.976	21,630.402	1.634	4b vs. 3	34.294	0.002	14
Model 4c: transactional	236.223	171	1.344	< 0.001	0.023 (0.015–0.030)	0.980	21,623.150	1.622	4c vs. 3	56.392	0.001	28
Transactional vs. interpersonal risk	–	–	–	–	–	–	–	1.622	4c vs. 4a	32.221	0.004	14
Transactional vs. symptoms-driven	–	–	–	–	–	–	–	1.423	4c vs. 4b	24.867	0.036	14
Model 5: symptoms-driven with controls	251.859	187	1.342	0.001	0.022(0.014–0.029)	0.983	23,313.571	–	–	–	–	–
Model 6: constrained DEP-PR grades 5–12	299.997	196	1.403	< 0.001	0.027(0.021–0.034)	0.968	21,676.537	1.809	6 vs. 4b	41.675	< 0.001	11
Model 7: constrained DEP-PR grades 9–12	259.818	188	1.369	< 0.001	0.023(0.016–0.030)	0.978	21,627.312	2.553	7 vs. 4b	1.754	0.625	3

Note. DEP-PR = Parent-reported depression symptoms; PV = Peer victimization; PREJ = Perceived peer rejection.

reported depression symptoms (DEP-PR), and self-reported PV and PREJ. In Model 1 (within-time covariances only model), within-time covariances were added to the model and this resulted in poor model fit (see Table 3 for fit indices). Model 2 (within-time covariances and stability only model) included the stability paths among DEP-PR, PV and PREJ. Similar to Model 2 of the self-reported depression symptoms model, one-lag stability paths were added for all variables and two-lag stability paths were added for DEP-PR, PV and PREJ. This resulted in improved model fit for Model 2 ($\Delta\chi^2$ (39) = 1436.715, $p < 0.001$). In Model 3 (within-time covariances, stability, and cross-lagged PV and PREJ), cross-lagged paths between PV and PREJ were added to the model which was a significant improvement in the model fit ($\Delta\chi^2$ (14) = 54.211, $p < 0.001$). The cross-lagged paths from PV and PREJ to DEP-PR were added to the interpersonal risk model (Model 4a: χ^2

(185) = 270.865, $p < 0.001$; CFI = 0.974; RMSEA = 0.026; CI = 0.019–0.034) and resulted in improved model fit ($\Delta\chi^2$ (14) = 27.291, $p = 0.018$). DEP-PR to PV and PREJ were added in the symptoms-driven model (Model 4b) which resulted in improved model fit over Model 3 ($\Delta\chi^2$ (14) = 34.294, $p = 0.002$) and the data fit the model well (χ^2 (185) = 261.390, $p < 0.001$; CFI = 0.976; RMSEA = 0.024; CI = 0.017–0.031). The transactional model (Model 4c) also resulted in improved model fit ($\Delta\chi^2$ (28) = 56.392, $p = 0.001$) and the model fit the data well (χ^2 (171) = 236.223, $p < 0.001$; CFI = 0.980; RMSEA = 0.023; CI = 0.015–0.030). The symptoms-driven model (Model 4b: AIC = 21,630.402) was superior to the interpersonal risk model (Model 4a: AIC = 21,647.266). The change in AIC value was > 10 which indicated that the model with the lower value should be considered the better model (Burnham & Anderson,

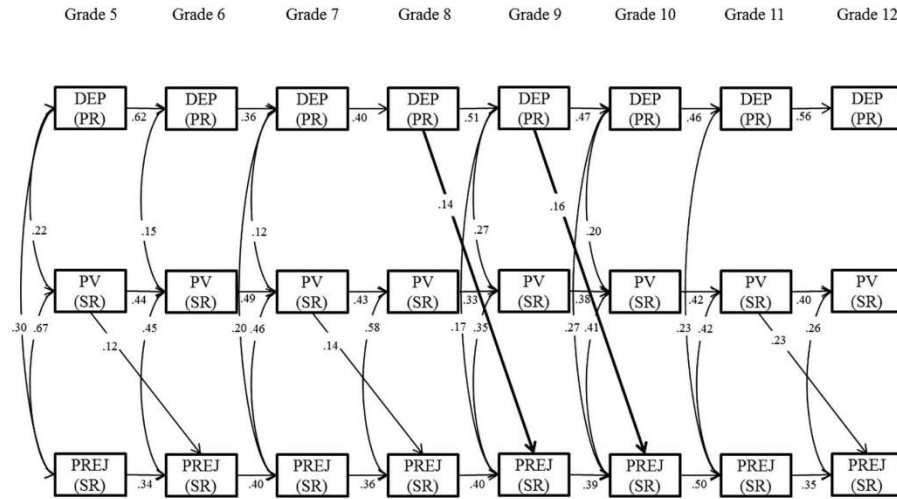


Fig. 2. Cascade Model of Parent-reported Depression Symptoms, Self-Reported Peer Victimization and Perceived Peer Rejection. Standardized coefficients are provided in the figure. Solid lines represent paths statistically significant at $p < 0.05$. Bold solid lines relate to paths relevant to the competing hypotheses. Paths that remain in the model but are not statistically significant and the two-lag stability paths are not shown in the figure for ease of interpretation. DEP = Depression symptoms; PV = Peer victimization; PREJ = Perceived peer rejection; SR = Self-report; PR = Parent-report.

2002). The transactional model (4c: AIC = 21,623.150) was an improvement over the interpersonal risk model (4a; 4c vs. 4a: $\Delta\chi^2(14) = 32.221$, $p = 0.004$) and resulted in improvement over the symptoms-driven model (4b; 4c vs. 4b: $\Delta\chi^2(14) = 24.867$, $p = 0.036$). However, the only remaining statistically significant paths were symptoms-driven paths and the change in AIC was < 10 . Given that the transactional and symptoms-driven models contained the same statistically significant paths of the similar magnitude and adding paths from PV and PREJ to depression symptoms increased model complexity with slight increments in model fit, the more parsimonious symptoms-driven model was selected.

The Benjamini-Hochberg false discovery rate (FDR) was applied to the parameters within the model and resulted in four paths being affected where grade 6 DEP-PR to grade 7 PREJ ($b = 0.69$, $p = 0.044$), grade 7 PV to grade 9 PV ($b = 0.09$, $\beta = 0.12$, $p = 0.047$), grade 6 PREJ to grade 8 PREJ ($b = 0.10$, $\beta = 0.12$, $p = 0.043$), and grade 8 PREJ to grade 10 PREJ ($b = 0.10$, $\beta = 0.10$, $p = 0.044$) were no longer significant following the correction. Similar to the self-reported symptoms-driven model (Model 4b), when depression symptoms were reported by parents, there were statistically significant paths for grade 8 DEP-PR to grade 9 PREJ, as well as grade 9 DEP-PR to grade 10 PREJ. Parent-reported depression symptoms were highly stable over time (grades 5–12; one-lag paths $b = 0.34$ – 0.71 , $p < 0.001$; two-lag paths; $b = 0.24$ – 0.34 , $\beta = 0.21$ – 0.31 , $p < 0.01$). Peer victimization and perceived peer rejection were moderately stable from grades 5–12 (PV: one-lag $b = 0.25$ – 0.47 , $p < 0.01$; PV: two-lag paths; $b = 0.13$ – 0.27 , $\beta = 0.16$ – 0.31 , $p < 0.01$; exception grade 7 PV to grade 9 PV, $p = 0.047$ (FDR); PREJ: one-lag paths; $b = 0.3$ – 0.55 , $p < 0.01$; PREJ: two-lag path; grade 9 PREJ to grade 11 PREJ $b = 0.17$, $\beta = 0.15$, $p = 0.013$). Paths from grade 5 PV to grade 6 PREJ, grade 7 PV to grade 8 PREJ and grade 11 PV to grade 12 PREJ were also statistically significant. Fig. 2 depicts the symptoms-driven model for parent-reported depression symptoms with standardized coefficients (exception standardized paths for two-lag paths are reported in text) and the unstandardized coefficients for each statistically significant path are provided in Appendix B.

7.2.1. Covariates

Similar to the self-reported model, the covariates were added to the final model selected which was the symptoms-driven model (4b) to create model 5. Covariates of sex, PMK education and household income were regressed on DEP-PR, PV and PREJ at each time point and education and income were allowed to correlate with each other. The model with covariates also fit the data well ($\chi^2(187) = 251.859$, $p = 0.001$; CFI = 0.983; RMSEA = 0.022; CI = 0.014–0.029). Since all paths that were significant were the same paths and of similar magnitude in Model 5 compared to Model 4b, along with reasons of parsimony, it was concluded the symptoms-driven model (4b) was the final model.

7.2.2. Developmental trends

To examine the developmental trends related to parent-reported depression symptoms, model constraints were conducted. In model 6, beginning with model 4b, depression symptoms stability paths were constrained to be equal across grades 5–12 to test whether stability was consistent across late childhood and adolescence. There was a statistically significant change in the Satorra-Bentler chi-square upon imposing the constraints ($\Delta\chi^2(11) = 41.675$, $p < 0.001$) indicating that parent-reported depression symptoms were variable in stability during late childhood across adolescence. In model 7, in order to determine whether a similar pattern of stability during adolescence would emerge with the parent data, depression symptoms stability paths were constrained to be equal across grades 9–12 and were allowed to be free for grades 5–8. There was not a statistically significant change in the Satorra-Bentler chi-square upon imposing the constraints ($\Delta\chi^2(3) = 1.754$, $p = 0.625$) indicating that parent-reported depression symptoms were variable in stability during late childhood and stability remained consistent across adolescence.

8. Discussion

In the current study we examined the temporal priority of depression symptoms and poor peer experiences (i.e., perceived peer rejection and peer victimization) across late childhood to late adolescence using a multiple-informant cascade modelling approach spanning eight years

of annual assessments. To date, most studies examining the longitudinal sequence between depression symptoms and poor peer experiences have suffered from notable problems such as being short-term, having long periods of time between assessment occasions, not using a consistent measure across time, relying on one informant source, not examining multiple constructs of peer relations in the same model, and failing to directly test competing models.

Attending to these issues, we found that when depression symptoms were reported by either youth or parents, a symptoms-driven model best fit our data. That is, self-reported and parent-reported depression symptoms predicted later self-reported perceived peer rejection. These results were found even when accounting for known risk factors of depression, namely biological sex (Hyde et al., 2008; Rudolph, 2009), household income, and parent education (Goodman, 1999). Our symptoms-driven results are consistent with two recent studies. Using peer-reported low peer acceptance and a latent variable of parent- and teacher-reported depression symptoms, Kochel et al. (2012) found that depression symptoms predicted low peer acceptance and peer victimization in children in grades 4–6. In another study, Agoston and Rudolph (2013) found that self-reported depression symptoms predicted teacher-reported peer rejection in childhood and early adolescence.

Because our peer relations measures were self-reported it is possible that depressed youth's reports of poor peer relations were biased due to negative perception of others. This would be consistent with cognitive theories suggesting that individuals who experience depression symptoms have a negative perception of the world or the negative perceptions of the “self-in-relation-to-others” (Beck, 2011). Although negative perceptions could have influenced the perception of rejection and victimization among depressed youth, it is important to note that Kochel et al. (2012) and Agoston and Rudolph (2013) found a similar symptoms-driven pathway using independent assessments of peer rejection (i.e., peer- and teacher-reports), suggesting that depressed youth were indeed rejected by their peers. Decades ago, Coyne (1976) showed that adults experiencing depression symptoms elicit negative reactions from others, including rejection. This was thought to occur through negative mood induction. Results of our study suggest a similar pathway in youth, although their perception of rejection may have also been inflated due to negative perception of others or cognitive attribution biases (Beck, Rush, Shaw, & Emery, 1979). Indeed, both those who under-estimated their peer acceptance and those who were accurate in their assessment of poor acceptance by peers were most at risk for concurrent elevated depression symptoms (Zimmer-Gembeck et al., 2007).

Another explanation for the symptoms-driven paths is that those already experiencing depression symptoms may have an especially difficult time navigating the interpersonal challenges that arise during the transition to adolescence (Rudolph, 2009). Indeed, the transition from grade 8 to grade 9 was when symptoms-driven paths emerged for both self-reported and parent-reported depression symptoms. In the self-reported depression symptoms model the path at the transition was stronger than the symptoms-driven path from grade 11 to grade 12. We also found that depression was consistently stable across adolescence which is similar to previous research (Cole et al., 2002). These findings may suggest that more support is needed for early adolescents experiencing depression symptoms during the transition to secondary school and beyond. The stability of depression symptoms replicated across reporters in adolescence also implies intervention may be needed early in order to influence what appears to be a stabilized and entrenched symptom pattern, at least at the mean level.

Our results highlight the importance of examining depression and poor peer experiences over time as patterns of associations may vary by developmental periods. For example, in the self-reported model, depression symptoms predicted peer victimization, although this was not the case in the parent-reported depression symptoms model. These paths emerged around the beginning of adolescence (age 13) when peer relationships become more salient and intimacy with peers increases

(Rudolph, 2009). The increased social demands of adolescence (e.g., negotiating new responsibilities with parents, becoming closer with peers, dating) may place adolescents at risk for different types of problems with peers. For those experiencing symptoms of depression, these new social demands may place them at increased risk of peer victimization, which is precisely what we found. Depression symptoms in grade 8 predicted both victimization and rejection by peers in grade 9 and depression symptoms in grade 9 predicted peer victimization in grade 10. In grade 9, all youth in the current study entered secondary school. It appears as though this transition was a particularly vulnerable period for those experiencing depression symptoms.

Experiences with peer victimization, perceived peer rejection, and symptoms of depression have been shown to vary across time (e.g., Haltigan & Vaillancourt, 2014; Rudolph, 2009), and thus, it is unlikely we will see directional associations at every possible time period, as was the case in the present study. As children age, parents begin to have less intimate knowledge of their children (Harris, 1995; Rudolph, 2009). Perhaps then, it should not be surprising that parent-reported depression symptoms were unrelated to youth's reports of poor peer relations in later time points (grades 11 to 12) and that one of the symptom-driven paths that did not replicate in the parent-reported depression symptoms model was the one from grade 11 depression symptoms to grade 12 perceived peer rejection. The path from grade 6 depression symptoms to grade 7 perceived peer rejection was significant in the self-reported depression symptoms model but this path was no longer significant following the false discovery rate correction when depression symptoms were reported by parents. In the parent-reported depression symptoms model, grade 9 depression symptoms were related to grade 10 perceived peer rejection; however, this path was no longer significant in the self-reported depression model following the false discovery rate correction. Nevertheless, even with accounting for the false discovery rate, we found evidence of a symptoms-driven model across reporters.

Our results also highlight that patterns of associations not only varied across different ages, but also between reporters. Such concordance and discrepancies are often clinically relevant and predictive of a different course of illness (De Los Reyes, 2011). For example, it may be that those who have concordant reports of depression symptoms also have observable features of depression that peers are reacting to. In the present study, depression symptoms preceded peer victimization only when depression symptoms were self-reported, whereas depression symptoms preceded perceived peer rejection both when depression symptoms were self-reported and reported by parents. Previous research has found a link between depression symptoms and later peer victimization when depression symptoms and peer victimization were self-reported (Fekkes, Pijpers, Fredriks, Vogels, & Verloove-Vanhorick, 2006). This link has also been found when depression symptoms were reported by parents and teachers and peer victimization was self-, peer-, and teacher-reported (Kochel et al., 2012). More research is needed to understand why depression symptoms were more robustly associated with perceived peer rejection (i.e., replication across reporters) than with peer victimization.

Similar to research with adults showing negative cognitions as state-dependant (i.e., occurring when experiencing heightened depression symptoms; Lewinsohn et al., 1981), we found within-time relations of self-reported depression symptoms and perceived peer rejection were not only large, but related across every time point. Perceptions of peer rejection also appeared to leave “scars” following depression symptoms even when stability of depression was controlled for. Said differently, experiencing depression symptoms was uniquely related to the concurrent and later perceptions of rejection by peers.

Previous studies have shown that peer victimization typically follows peer rejection (e.g., Buhs & Ladd, 2001; Buhs et al., 2006; Ostrov, 2008; Serdiouk et al., 2015). However, in the current study, peer victimization was associated with later perceived peer rejection (grade 5 to 6; grade 7 to 8; grade 11 to 12) when the stability of both peer

victimization and perceived peer rejection, as well as the within-time relations were accounted for. Although this temporal pattern has been commonly shown (e.g., Buhs & Ladd, 2001; Buhs et al., 2006; Ostrov, 2008; Serdiouk et al., 2015), it is important to note that these studies only involved preschool age to elementary school age children (upper limit = grade 5). Kochel et al. (2012) reported a similar pathway from peer victimization to peer rejection in their study of 4th to 6th grade students. It is possible that perceived peer rejection preceded peer victimization prior to grade 5, which was the first time point of the present study, and what we have modeled in grades 5 to 6, 7 to 8, and 11 to 12 is the continuation of a trajectory that was initiated by perceived peer rejection.

We tested whether peer victimization at grade 10 and grade 11 mediated the relation between depression symptoms in grade 9 and perceived peer rejection in grade 12. In contrast to previous findings of Kochel et al. (2012) who found support for mediation, we did not replicate this finding. This may have related to the long time period across which the mediation was tested (i.e., from grade 9 to 12) and also the age group of adolescence in our study as opposed to the late childhood in theirs.

Finally, we found that the stability paths of self-reported depression symptoms were variable in late childhood and consistently stable over adolescence. However, contrary to expectations, we found this to be true for youth- and parent-reported depression symptoms. In a previous study, Cole et al. (2002) found that age-related differences in stability were present when youth-reports were used and not when parent-reports were considered. Cole et al.'s study began in 1994 and ours began in 2008. Treatment seeking has increased over the past 20 years where individuals reporting on depression symptoms after 2000 were more likely to seek treatment for depression symptoms in adolescence and as adults (Greenberg et al., 2003; Twenge, 2015). Media attention toward mental health issues has also increased: titles of newspaper articles including “depression”, “anxiety” or “mental disorders” increased by 88% from 1980 to 2000 (Baxter et al., 2014). It may be that parents are more aware of depression symptoms in their children than previous generations of parents. More awareness may promote discussion of these issues which may lead to seeking treatment. Further, the parents in our study were interviewed every year about a range of mental health issues in addition to bullying and victimization so they may have been more aware and apt to discuss these issues with their children. Nonetheless, given the discrepancies with our study and Cole et al.'s study, replication of stability trends of depression symptoms across age is needed.

8.1. Limitations and future directions

The strengths of the current study include the annual assessment of depression symptoms and two types of peer problems over the course of eight years and the use of a cascade model approach. Although the present study builds upon previous evidence for symptoms-driven models (e.g., Agoston & Rudolph, 2013; Kochel et al., 2012) there are still limitations. In one of our models only self-reports were used. A common argument against self-reported models is that common method variance may be an issue. However, all self-reported measures may not share the same influence of common method variance. Common method variance has been found to inflate associations and also deflate associations among measures (Spector, 2006). Some researchers have argued that identifying sources of variance and how we may control for them may be a more useful approach rather than assume there is systematic variance associated with method (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003; Spector, 2006). This important point notwithstanding, self-reported depression symptoms have shown age- and sex-related trends over time that parent-reports were not sensitive to, suggesting that parents may not be as accurate as youth (Cole et al., 2002). The perception of self-reported peer rejection is also an important perspective to consider (McDougall, Hymel,

Vaillancourt, & Mercer, 2001). In the case of both perceived peer rejection and peer victimization, it is the perception and not necessarily the reality that is important for mental health—if youth believe they are being treated poorly by their peers, even in the absence of supporting evidence, they will be adversely affected by this erroneous perception (Baumeister & Leary, 1995; Bronfenbrenner, 1979; Leary, 2006).

We did not measure stressful life events other than peer experiences. Being the victim of one form of abuse is often associated with being abused in another manner (Finkelhor, 1995). For example, in a recent study by Lereya, Copeland, Costello, and Wolke (2015), children who were maltreated by their caregiver were more likely to be bullied than non-abused children. Moreover, exposure to child maltreatment is robustly associated with the development of depression (Gilbert et al., 2009). Another limitation is that we did not examine the moderating role of sex but rather used sex as a covariate due to our sample size and model complexity. It has been recommended that models include 5–10 cases per parameter and those that include fewer than five cases per model parameter become less trustworthy (Bentler & Chou, 1987; Kline, 2011). Future studies should ensure sample sizes are large enough to examine the moderating role of sex. This would be an important consideration in adolescence given the emergence of a sex difference in depression with girls being two times more likely to be depressed than boys (APA, 2013; Birmaher et al., 1996; Wade et al., 2002). Although the addition of the controls resulted in fewer than 5 cases per parameter, their addition did not change the findings and they were not retained in the final model.

Given the strength of the stability of depression symptoms from grades 5–12 and consistency of stability estimates across adolescence (grades 9–12), more research is needed from early childhood into adolescence to better understand the stable and more transient features of depression symptoms (Cole, 2006). We also found that peer victimization and perceived peer rejection varied across developmental periods and were not consistently stable from late childhood across adolescence. Previous research has found self-reported peer victimization to be stable (Pouwels et al., 2016). Examining what decreases the stability of peer victimization and perceived peer rejection may provide insight into intervention options.

We encourage researchers to consider stability and within-time relations along with directly testing competing models statistically to provide stronger evidence for the conclusions of one model over another. Comparing the statistical significance of a regression coefficient to another may be risky without testing to see whether the difference between the coefficients is significant (Gelman & Stern, 2006). This is especially problematic with the multiplicity that occurs in path analysis for which corrections in significance values have also been recommended (Cribbie, 2007). Once multiple cascade models examining similar topics are conducted that build on each other, then strong empirical support for temporal priority may be ascertained.

8.2. Conclusion

Interpersonal theories of depression predict that individuals both respond to and contribute to difficulties with peers. In the present study, depression symptoms were found to precede victimization and perceived rejection by peers. Intervention efforts for depression may need to move beyond the individual level to impact symptoms-driven pathways. Relationship quality has been consistently found to be a protective factor for depression symptoms, suggesting relationship quality may be a target for intervention (Thapar et al., 2012). For example, the inclusion of a peer relations skill building program in addition to a school-based intervention program for reducing depression symptoms have shown effectiveness in the reduction of depression symptoms when compared to the depression program alone (Rose, Hawes, & Hunt, 2014). The combination of depression and peer relations programs also showed improvement in social functioning with peers and satisfaction with school life one year later. Intervention

programs should consider the joint role of depression and peer relationship difficulties and in particular, the role depression symptoms may play in the *development* of later peer rejection. Research focusing on testing mediators like relationship quality or peer relations skills may provide important insight into efficacious intervention for depression symptoms and peer experiences.

Acknowledgement

This research is supported by grants from the Canadian Institutes of

Health Research (201009MOP-232632-CHI-CECA-136591), the Social Sciences and Humanities Research Council of Canada (435-2016-1251 and 833-2004-1019), the Ontario Mental Health Foundation (PA-13-303) and the Ontario Graduate Scholarship Program. We thank the parents and youth for their continued support and participation in the McMaster Teen Study. We also thank Heather Brittain and Patricia McDougall for their invaluable support of this study and the Brain and Behaviour lab members for their thoughtful comments regarding the manuscript.

Appendix A. Unstandardized path coefficients: self-reported depression symptoms model.

Cross-lagged paths		
grade 6 DEP-SR to grade 7 PREJ: $b = 0.10, p < 0.001$		
grade 8 DEP-SR to grade 9 PREJ: $b = 0.10, p < 0.001$		
grade 9 DEP-SR to grade 10 PREJ: $b = 0.05, p = 0.046$ (FDR; n.s.)		
grade 11 DEP-SR to grade 12 PREJ: $b = 0.05, p = 0.003$		
grade 8 DEP-SR to grade 9 PV: $b = 0.02, p < 0.001$		
grade 9 DEP-SR to grade 10 PV: $b = 0.02, p = 0.014$		
grade 11 PV to grade 12 PREJ: $b = 0.77, p = 0.003$		
Stability paths		
DEP-SR	grade 5–6: $b = 0.35, p < 0.001$	grade 5–7: $b = 0.12, p = 0.001$
	grade 6–7: $b = 0.58, p < 0.001$	grade 6–8: $b = 0.19, p = 0.005$
	grade 7–8: $b = 0.45, p < 0.001$	grade 7–9: $b = 0.17, p = 0.005$
	grade 8–9: $b = 0.56, p < 0.001$	grade 8–10: $b = 0.13, p = 0.044$ (FDR; n.s.)
	grade 9–10: $b = 0.62, p < 0.001$	grade 9–11: $b = 0.17, p = 0.005$
	grade 10–11: $b = 0.55, p < 0.001$	grade 10–12: $b = 0.21, p = 0.001$
PV	grade 11–12: $b = 0.42, p < 0.001$	
	grade 5–6: $b = 0.36, p < 0.001$	grade 5–7: $b = 0.15, p < 0.001$
	grade 6–7: $b = 0.44, p < 0.001$	grade 6–8: $b = 0.13, p = 0.004$
	grade 7–8: $b = 0.38, p < 0.001$	grade 8–10: $b = 0.27, p < 0.001$
	grade 8–9: $b = 0.23, p < 0.001$	grade 9–11: $b = 0.25, p < 0.001$
	grade 9–10: $b = 0.38, p < 0.001$	grade 10–12: $b = 0.25, p = 0.007$
PREJ	grade 10–11: $b = 0.31, p < 0.001$	
	grade 11–12: $b = 0.41, p < 0.001$	
	grade 5–6: $b = 0.28, p < 0.001$	grade 5–7: $b = 0.07, p = 0.042$ (FDR; n.s.)
	grade 6–7: $b = 0.26, p < 0.001$	grade 6–8: $b = 0.12, p = 0.022$
	grade 7–8: $b = 0.36, p < 0.001$	grade 9–11: $b = 0.21, p = 0.003$
	grade 8–9: $b = 0.22, p < 0.001$	
	grade 9–10: $b = 0.46, p < 0.001$	
	grade 10–11: $b = 0.44, p < 0.001$	
	grade 11–12: $b = 0.26, p = 0.001$	

Appendix B. Unstandardized path coefficients: parent-reported depression symptoms model.

Cross-lagged paths		
grade 6 DEP-PR to grade 7 PREJ, $b = 0.68, p = 0.047$ (FDR; n.s.)		
grade 8 DEP-PR to grade 9 PREJ, $b = 0.67, p = 0.013$		
grade 9 DEP-PR to grade 10 PREJ, $b = 0.82, p = 0.019$		
grade 7 PV to grade 8 PREJ, $b = 0.36, p = 0.023$		
grade 11 PV to grade 12 PREJ, $b = 0.82, p = 0.002$		
Stability paths		
DEP-PR	grade 5–6: $b = 0.69, p < 0.001$	grade 5–7: $b = 0.28, p = 0.001$
	grade 6–7: $b = 0.34, p < 0.001$	grade 6–8: $b = 0.30, p < 0.001$

	grade 7–8: $b = 0.42, p < 0.001$	grade 7–9: $b = 0.24, p < 0.001$
	grade 8–9: $b = 0.56, p < 0.001$	grade 8–10: $b = 0.27, p = 0.001$
	grade 9–10: $b = 0.52, p < 0.001$	grade 9–11: $b = 0.33, p < 0.001$
	grade 10–11: $b = 0.50, p < 0.001$	grade 10–12: $b = 0.25, p = 0.002$
	grade 11–12: $b = 0.61, p < 0.001$	
PV	grade 5–6: $b = 0.40, p < 0.001$	grade 5–7: $b = 0.13, p = 0.001$
	grade 6–7: $b = 0.47, p < 0.001$	grade 6–8: $b = 0.13, p = 0.006$
	grade 7–8: $b = 0.42, p < 0.001$	grade 7–9: $b = 0.09, p = 0.047$ (FDR; n.s.)
	grade 8–9: $b = 0.25, p < 0.001$	grade 8–10: $b = 0.27, p < 0.001$
	grade 9–10: $b = 0.43, p < 0.001$	grade 9–11: $b = 0.24, p < 0.001$
	grade 10–11: $b = 0.33, p < 0.001$	grade 10–12: $b = 0.25, p = 0.005$
	grade 11–12: $b = 0.41, p < 0.001$	
PREJ	grade 5–6: $b = 0.30, p < 0.001$	grade 6–8: $b = 0.10, p = 0.042$ (FDR; n.s.)
	grade 6–7: $b = 0.34, p < 0.001$	grade 8–10: $b = 0.11, p = 0.039$ (FDR; n.s.)
	grade 7–8: $b = 0.38, p < 0.001$	grade 9–11: $b = 0.17, p = 0.014$
	grade 8–9: $b = 0.35, p < 0.001$	
	grade 9–10: $b = 0.44, p < 0.001$	
	grade 10–11: $b = 0.51, p < 0.001$	
	grade 11–12: $b = 0.30, p = 0.001$	

References

- Agoston, A. M., & Rudolph, K. D. (2013). Pathways from depressive symptoms to low social status. *Journal of Abnormal Child Psychology*, 41(2), 295–308. <http://dx.doi.org/10.1007/s10802-012-9675-y>.
- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Washington, DC: Author.
- Angold, A., Costello, E. J., Farmer, E., Burns, B. J., & Erkanli, A. (1999). Impaired but undiagnosed. *Journal of the American Academy of Child and Adolescent Psychiatry*, 38(2), 129–137. <http://dx.doi.org/10.1097/00004583-199902000-00011>.
- Barber, B. K., & Olsen, J. A. (2004). Assessing the transitions to middle and high school. *Journal of Adolescent Research*, 19(1), 3–30. <http://dx.doi.org/10.1177/0743558403258113>.
- Baumeister, R. F., & Leary, M. R. (1995). The need to belong: Desire for interpersonal attachments as a fundamental human motivation. *Psychological Bulletin*, 117(3), 497–529. <http://dx.doi.org/10.1037/0033-2909.117.3.497>.
- Baxter, A. J., Scott, K. M., Ferrari, A. J., Norman, R. E., Vos, T., & Whiteford, H. A. (2014). Challenging the myth of an “epidemic” of common mental disorders: Trends in the global prevalence of anxiety and depression between 1990 and 2010. *Depression and Anxiety*, 31(6), 506–516. <http://dx.doi.org/10.1002/da.22230>.
- Beck, A. T., Rush, A. J., Shaw, B. F., & Emery, G. (1979). *Cognitive therapy for depression*. New York: Guilford Press.
- Beck, J. S. (2011). *Cognitive behavior therapy: Basics and beyond*. NY: Guilford Press.
- Bentler, P. M., & Chou, C. P. (1987). Practical issues in structural modeling. *Sociological Methods & Research*, 16(1), 78–117. <http://dx.doi.org/10.1177/0049124187016001004>.
- Birmaher, B., Ryan, N. D., Williamson, D. E., Brent, D. A., Kaufman, J., Dahl, R. E., ... Nelson, B. (1996). Childhood and adolescent depression: A review of the past 10 years. Part I. *Journal of the American Academy of Child and Adolescent Psychiatry*, 35(11), 1427–1439. <http://dx.doi.org/10.1097/00004583-199611000-00011>.
- Boivin, M., & Hymel, S. (1997). Peer experiences and social self-perceptions: A sequential model. *Developmental Psychology*, 33(1), 135. <http://dx.doi.org/10.1037/0012-1649.33.1.135>.
- Bronfenbrenner, U. (1979). *The ecology of human development: Experiments by nature and design*. Cambridge, MA: Harvard University Press.
- Browne, M. W., & Cudeck, R. (1992). Alternative ways of assessing model fit. *Sociological Methods & Research*, 21(2), 230–258.
- Buhs, E. S., & Ladd, G. W. (2001). Peer rejection as antecedent of young children's school adjustment: An examination of mediating processes. *Developmental Psychology*, 37(4), 550.
- Buhs, E. S., Ladd, G. W., & Herald, S. L. (2006). Peer exclusion and victimization: Processes that mediate the relation between peer group rejection and children's classroom engagement and achievement? *Journal of Educational Psychology*, 98(1), 1–13. <http://dx.doi.org/10.1037/0022-0663.98.1.1>.
- Burnham, K. P., & Anderson, D. R. (2002). *Model selection and multimodel inference: A practical information-theoretic approach* (2nd ed.). New York, NY: Springer-Verlag.
- Card, N. A., & Hodges, E. V. (2008). Peer victimization among schoolchildren: Correlations, causes, consequences, and considerations in assessment and intervention. *School Psychology Quarterly*, 23(4), 451. <http://dx.doi.org/10.1037/a0012769>.
- Choukas-Bradley, S., & Prinstein, M. J. (2014). Peer relationships and the development of psychopathology. In M. Lewis, & K. D. Rudolph (Eds.), *Handbook of developmental psychopathology* (pp. 185–204). New York, NY: Springer Science + Business Media. <http://dx.doi.org/10.1007/978-1-4614-9608-3>.
- Cole, J. D., Dodge, K. A., & Coppotelli, H. (1982). Dimensions and types of social status: A cross-age perspective. *Developmental Psychology*, 18(4), 557.
- Cole, D. A. (1990). Relation of social and academic competence to depressive symptoms in childhood. *Journal of Abnormal Psychology*, 99(4), 422–429. <http://dx.doi.org/10.1037/0021-843X.99.4.422>.
- Cole, D. A. (2006). Coping with longitudinal data in research on developmental psychopathology. *International Journal of Behavioral Development*, 30(1), 20–25. <http://dx.doi.org/10.1177/0165025406059969>.
- Cole, D. A., Tram, J. M., Martin, J. M., Hoffman, K. B., Ruiz, M. D., Jacquez, F. M., & Maschman, T. L. (2002). Individual differences in the emergence of depressive symptoms in children and adolescents: A longitudinal investigation of parent and child reports. *Journal of Abnormal Psychology*, 111(1), 156. <http://dx.doi.org/10.1037/0021-843X.111.1.156>.
- 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. <http://dx.doi.org/10.1037/a0020149>.
- Costello, E. J., Erkanli, A., & Angold, A. (2006). Is there an epidemic of child or adolescent depression? *Journal of Child Psychology and Psychiatry*, 47(12), 1263–1271. <http://dx.doi.org/10.1111/j.1469-7610.2006.01682.x>.
- Coyne, J. C. (1976). Depression and the response of others. *Journal of Abnormal Psychology*, 85(2), 186. <http://dx.doi.org/10.1037/0021-843X.85.2.186>.
- Cribbie, R. A. (2007). Multiplicity control in structural equation modeling. *Structural Equation Modeling: A Multidisciplinary Journal*, 14(1), 98–112. <http://dx.doi.org/10.1080/10705510709336738>.
- Cunningham, C. E., Pettingill, P., & Boyle, M. H. (2006). *The brief child and family phone interview version 3: Interviewer's manual*. Hamilton, ON: BCPI Works.
- De Los Reyes, A. (2011). Introduction to the special section: More than measurement error: Discovering meaning behind informant discrepancies in clinical assessments of children and adolescents. *Journal of Clinical Child & Adolescent Psychology*, 40(1), 1–9. <http://dx.doi.org/10.1080/15374416.2011.533405>.
- Dempsey, A. G., Sulkowski, M. L., Nichols, R., & Storch, E. A. (2009). Differences between peer victimization in cyber and physical settings and associated psychosocial adjustment in early adolescence. *Psychology in the Schools*, 46(10), 962–972. <http://dx.doi.org/10.1002/pits.20437>.
- Fekkes, M., Pijpers, F. I. M., Fredriks, M., Vogels, T., & Verboove-Vanhorick, S. P. (2006). Do bullied children get ill, or do ill children get bullied? A prospective cohort study on the relationship between bullying and health-related symptoms. *Pediatrics*, 117(5), 1568–1574. <http://dx.doi.org/10.1542/peds.2005-0187>.
- Finkelhor, D. (1995). The victimization of children. *American Journal of Orthopsychiatry*, 65(2), 177–193. <http://dx.doi.org/10.1037/h0079618>.
- Gelman, A., & Stern, H. (2006). The difference between “significant” and “not significant” is not itself statistically significant. *The American Statistician*, 60(4), 328–331. <http://dx.doi.org/10.1198/000313006X152649>.
- Gilbert, R., Widom, C. S., Browne, K., Fergusson, D., Webb, E., & Janson, S. (2009). Burden and consequences of child maltreatment in high-income countries. *The Lancet*, 373(9657), 68–81. [http://dx.doi.org/10.1016/S0140-6736\(08\)61706-7](http://dx.doi.org/10.1016/S0140-6736(08)61706-7).
- Goodman, E. (1999). The role of socioeconomic status gradients in explaining differences in US adolescents' health. *American Journal of Public Health*, 89(10), 1522–1528. <http://dx.doi.org/10.2105/AJPH.89.10.1522>.
- Goodman, E., Slap, G. B., & Huang, B. (2003). The public health impact of socioeconomic status on adolescent depression and obesity. *American Journal of Public Health*, 93(11), 1844–1850. <http://dx.doi.org/10.2105/AJPH.93.11.1844>.
- Greenberg, P. E., Kessler, R. C., Birmaher, B. G., Leong, S. A., Lowe, S. W., Berglund, P. A., & Corey-Lisle, P. K. (2003). The economic burden of depression in the United States: How did it change between 1990 and 2000? *Journal of Clinical Psychiatry*, 64(12), 1465–1475. <http://dx.doi.org/10.4088/JCP.v64n1211>.
- 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. <http://dx.doi.org/10.1037/a0038030>.
- Hamilton, J. L., Potter, C. M., Olino, T. M., Abramson, L. Y., Heimberg, R. G., & Alloy, L.

- B. (2016). The temporal sequence of social anxiety and depressive symptoms following interpersonal stressors during adolescence. *Journal of Abnormal Child Psychology*, 44(3), 495–509. <http://dx.doi.org/10.1007/s10802-015-0049-0>.
- Harris, J. R. (1995). Where is the child's environment? A group socialization theory of development. *Psychological Review*, 102(3), 458–489. <http://dx.doi.org/10.1037/0033-295X.102.3.458>.
- Hodges, E. V., & Perry, D. G. (1999). Personal and interpersonal antecedents and consequences of victimization by peers. *Journal of Personality and Social Psychology*, 76(4), 677. <http://dx.doi.org/10.1037/0022-3514.76.4.677>.
- Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal*, 6(1), 1–55. <http://dx.doi.org/10.1080/10705519909540118>.
- Hyde, J. S., Mezulis, A. H., & Abramson, L. Y. (2008). The ABCs of depression: Integrating affective, biological, and cognitive models to explain the emergence of the gender difference in depression. *Psychological Review*, 115(2), 291–313. <http://dx.doi.org/10.1037/0033-295X.115.2.291>.
- Jamshidian, M., & Jalal, S. (2010). Tests of homoscedasticity, normality, and missing completely at random for incomplete multivariate data. *Psychometrika*, 75(4), 649–674. <http://dx.doi.org/10.1007/s11336-010-9175-3>.
- Kaltiala-Heino, R., Fröjd, S., & Marttunen, M. (2010). Involvement in bullying and depression in a 2-year follow-up in middle adolescence. *European Child & Adolescent Psychiatry*, 19(1), 45–55. <http://dx.doi.org/10.1007/s00787-009-0039-2>.
- Kline, R. B. (2011). *Principles and practice of structural equation modelling*. New York, NY: Guilford Press.
- Knack, J. M., Tsar, V., Vaillancourt, T., Hymel, S., & McDougall, P. (2012). What protects rejected adolescents from also being bullied by their peers? The moderating role of peer-valued characteristics. *Journal of Research on Adolescence*, 22(3), 467–479. <http://dx.doi.org/10.1111/j.1532-7795.2012.00792.x>.
- Kochel, K. P., Ladd, G. W., & Rudolph, K. D. (2012). Longitudinal associations among youth depressive symptoms, peer victimization, and low peer acceptance: An interpersonal process perspective: Depressive symptoms, victimization, and peer acceptance. *Child Development*, 83(2), 637–650. <http://dx.doi.org/10.1111/j.1467-8624.2011.01722.x>.
- Landoll, R. R., La Greca, A. M., Lai, B. S., Chan, S. F., & Herge, W. M. (2015). Cyber victimization by peers: Prospective associations with adolescent social anxiety and depressive symptoms. *Journal of Adolescence*, 42, 77–86. <http://dx.doi.org/10.1016/j.adolescence.2015.04.002>.
- Leary, M. R. (2006). Toward a conceptualization of interpersonal rejection. In M. R. Leary (Ed.), *Interpersonal rejection* (pp. 1–27). New York, NY: Oxford University Press. <http://dx.doi.org/10.1093/acprof:oso/9780195130157.003.0001>.
- Lereya, S. T., Copeland, W. E., Costello, E. J., & Wolke, D. (2015). Adult mental health consequences of peer bullying and maltreatment in childhood: Two cohorts in two countries. *The Lancet Psychiatry*, 2(6), 524–531. [http://dx.doi.org/10.1016/S2215-0366\(15\)00165-0](http://dx.doi.org/10.1016/S2215-0366(15)00165-0).
- Lewinsohn, P. M., Steinmetz, J. L., Larson, D. W., & Franklin, J. (1981). Depression-related cognitions: Antecedent or consequence? *Journal of Abnormal Psychology*, 90(3), 213–219. <http://dx.doi.org/10.1037/0021-843X.90.3.213>.
- Marshall, N. A., Arnold, D. H., Rolon-Arroyo, B., & Griffith, S. F. (2015). The association between relational aggression and internalizing symptoms: A review and meta-analysis. *Journal of Social and Clinical Psychology*, 34(2), 135.
- Masten, A. S., & Cicchetti, D. (2010). Developmental cascades. *Development and Psychopathology*, 22(3), 491–495. <http://dx.doi.org/10.1017/S0954579410000222>.
- McDougall, P., Hymel, S., Vaillancourt, T., & Mercer, L. (2001). The consequences of childhood peer rejection. In M. Leary (Ed.), *Interpersonal rejection* (pp. 213–247). New York, NY: Oxford University Press.
- McHugh, M. L. (2013). The Chi-square test of independence. *Biochemia Medica*, 143–149. <http://dx.doi.org/10.11613/BM.2013.018>.
- McNeish, D. M. (2014). Analyzing clustered data with OLS regression: The effect of a hierarchical data structure. *Multiple Linear Regression Viewpoints*, 40, 11–16.
- Merikangas, K. R., He, J., Burstein, M., Swanson, S. A., Avenevoli, S., Cui, L., ... Swendsen, J. (2010). Lifetime prevalence of mental disorders in US adolescents: Results from the National Comorbidity Survey Replication–Adolescent Supplement (NCS-A). *Journal of the American Academy of Child and Adolescent Psychiatry*, 49(10), 980–989. <http://dx.doi.org/10.1016/j.jaac.2010.05.017>.
- Muthén, L. K., & Muthén, B. (2011). *Mplus 6.12 for Windows*. Los Angeles: Author.
- Newman, B. M., Newman, P. R., Griffen, S., O'Connor, K., & Spas, J. (2007). The relationship of social support to depressive symptoms during the transition to high school. *Adolescence*, 42(167), 441–459.
- Nolan, S. A., Flynn, C., & Garber, J. (2003). Prospective relations between rejection and depression in young adolescents. *Journal of Personality and Social Psychology*, 85(4), 745–755. <http://dx.doi.org/10.1037/0022-3514.85.4.745>.
- Nolen-Hoeksema, S., Girgus, J. S., & Seligman, M. E. P. (1992). Predictors and consequences of childhood depressive symptoms: A 5-year longitudinal study. *Journal of Abnormal Psychology*, 101(3), 405–422. <http://dx.doi.org/10.1037/0021-843X.101.3.405>.
- Offord, D. R., Boyle, M. H., Racine, Y., Szatmari, P., Fleming, J. E., Sanford, M., & Lipman, E. L. (1996). Integrating assessment data from multiple informants. *Journal of the American Academy of Child and Adolescent Psychiatry*, 35(8), 1078–1085. <http://dx.doi.org/10.1097/00004583-199608000-00019>.
- Olweus, D. (1996). *The revised Olweus bully/victim questionnaire*.
- Olweus, D. (2001). Peer harassment: A critical analysis and some important issues. In J. Juvonen, & S. Graham (Eds.), *Peer harassment in school: The plight of the vulnerable and victimized* (pp. 3–20). New York, NY: Guilford Press.
- Ostrov, J. M. (2008). Forms of aggression and peer victimization during early childhood: A short-term longitudinal study. *Journal of Abnormal Child Psychology*, 36(3), 311–322. <http://dx.doi.org/10.1007/s10802-007-9179-3>.
- Platt, B., Kadosh, K. C., & Lau, J. Y. F. (2013). The role of peer rejection in adolescent depression. *Depression and Anxiety*, 30(9), 809–821. <http://dx.doi.org/10.1002/da.22120>.
- Podsakoff, P. M., MacKenzie, S. B., Lee, J.-Y., & Podsakoff, N. P. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology*, 88(5), 879–903. <http://dx.doi.org/10.1037/0021-9010.88.5.879>.
- Pouwels, J. L., Souren, P. M., Lansu, T. A. M., & Cillessen, A. H. N. (2016). Stability of peer victimization: A meta-analysis of longitudinal research. *Developmental Review*, 40, 1–24. <http://dx.doi.org/10.1016/j.dr.2016.01.001>.
- Reiss, F. (2013). Socioeconomic inequalities and mental health problems in children and adolescents: A systematic review. *Social Science & Medicine*, 90, 24–31. <http://dx.doi.org/10.1016/j.socscimed.2013.04.026>.
- Reynolds, C. R., & Kamphaus, R. W. (2004). *Behaviour assessment system for children, second edition, manual*. Minneapolis, MN: NCS Pearson, Inc.
- Rohde, P., Lewinsohn, P. M., & Seeley, J. R. (1990). Are people changed by the experience of having an episode of depression? A further test of the scar hypothesis. *Journal of Abnormal Psychology*, 99(3), 264–271. <http://dx.doi.org/10.1037/0021-843X.99.3.264>.
- Rose, A. J., & Rudolph, K. D. (2006). A review of sex differences in peer relationship processes: Potential trade-offs for the emotional and behavioral development of girls and boys. *Psychological Bulletin*, 132(1), 98.
- Rose, K., Hawes, D. J., & Hunt, C. J. (2014). Randomized controlled trial of a friendship skills intervention on adolescent depressive symptoms. *Journal of Consulting and Clinical Psychology*, 82(3), 510–520. <http://dx.doi.org/10.1037/a0035827>.
- Rudolph, K. D. (2009). The interpersonal context of adolescent depression. In S. Nolen-Hoeksema, & L. M. Hilt (Eds.), *Handbook of depression in adolescents* (pp. 377–417). New York, NY: Routledge.
- Rudolph, K. D., Flynn, M., Abated, J., Groot, A., & Thompson, R. (2009). Why is past depression the best predictor of future depression? Stress generation as a mechanism of depression continuity in girls. *Journal of Clinical Child and Adolescent Psychology*, 38(4), 473–485. <http://dx.doi.org/10.1080/15374410902976296>.
- Rutter, M., Kim-Cohen, J., & Maughan, B. (2006). Continuities and discontinuities in psychopathology between childhood and adult life. *Journal of Child Psychology and Psychiatry*, 47(3–4), 276–295. <http://dx.doi.org/10.1111/j.1469-7610.2006.01614.x>.
- Sameroff, A. (2009). The transactional model. In A. Sameroff (Ed.), *The transactional model of development: How children and contexts shape each other* (pp. 3–21). Washington, DC, US: American Psychological Association. <http://dx.doi.org/10.1037/11877-001>.
- Satorra, A., & Bentler, P. M. (2001). A scaled difference chi-square test statistic for moment structure analysis. *Psychometrika*, 66(4), 507–514. <http://dx.doi.org/10.1007/BF02296192>.
- Schwartz, D., Gorman, A. H., Nakamoto, J., & Toblin, R. L. (2005). Victimization in the peer group and children's academic functioning. *Journal of Educational Psychology*, 97(3), 425. <http://dx.doi.org/10.1037/0022-0663.97.3.425>.
- Schwartz, D., Lansford, J. E., Dodge, K. A., Pettit, G. S., & Bates, J. E. (2015). Peer victimization during middle childhood as a lead indicator of internalizing problems and diagnostic outcomes in late adolescence. *Journal of Clinical Child & Adolescent Psychology*, 44(3), 393–404. <http://dx.doi.org/10.1080/15374416.2014.881293>.
- Serdiouk, M., Rodkin, P., Madill, R., Logis, H., & Gest, S. (2015). Rejection and victimization among elementary school children: The buffering role of classroom-level predictors. *Journal of Abnormal Child Psychology*, 43(1), 5–17. <http://dx.doi.org/10.1007/s10802-013-9626-9>.
- Sourander, A., Helstelä, L., Helenius, H., & Piha, J. (2000). Persistence of bullying from childhood to adolescence—A longitudinal 8-year follow-up study. *Child Abuse & Neglect*, 24(7), 873–881. [http://dx.doi.org/10.1016/S0145-2134\(00\)00146-0](http://dx.doi.org/10.1016/S0145-2134(00)00146-0).
- Spector, P. E. (2006). Method variance in organizational research truth or urban legend? *Organizational Research Methods*, 9(2), 221–232. <http://dx.doi.org/10.1177/1094428105284955>.
- Sweeting, H., Young, R., West, P., & Der, G. (2006). Peer victimization and depression in early-mid adolescence: A longitudinal study. *British Journal of Educational Psychology*, 76(3), 577–594. <http://dx.doi.org/10.1348/000709905X49890>.
- Tabachnick, B. G., & Fidell, L. S. (2013). *Using multivariate statistics* (6th ed.). Boston: Pearson.
- Thapar, A., Collishaw, S., Pine, D. S., & Thapar, A. K. (2012). Depression in adolescence. *The Lancet*, 379(9820), 1056–1067. [http://dx.doi.org/10.1016/S0140-6736\(11\)60871-4](http://dx.doi.org/10.1016/S0140-6736(11)60871-4).
- Tiofi, M. M., Farrington, D. P., Lösel, F., & Loeber, R. (2011). Do the victims of school bullies tend to become depressed later in life? A systematic review and meta-analysis of longitudinal studies. *Journal of Aggression, Conflict and Peace Research*, 3(2), 63–73. <http://dx.doi.org/10.1108/17596591111132873>.
- Twenge, J. M. (2015). Time period and birth cohort differences in depressive symptoms in the US, 1982–2013. *Social Indicators Research*, 121(2), 437–454. <http://dx.doi.org/10.1007/s11205-014-0647-1>.
- Vaillancourt, T., Brittain, H. L., McDougall, P., & Duku, E. (2013). Longitudinal links between childhood peer victimization, internalizing and externalizing problems, and academic functioning: Developmental cascades. *Journal of Abnormal Child Psychology*, 41(8), 1203–1215. <http://dx.doi.org/10.1007/s10802-013-9781-5>.
- 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(6), 486–495. <http://dx.doi.org/10.1177/0165025408095553>.
- Vaillancourt, T., Trinh, V., McDougall, P., Duku, E., Cunningham, L., Cunningham, C., ...

A. Krygsman, T. Vaillancourt

Journal of Applied Developmental Psychology 51 (2017) 20–34

- Short, K. (2010). Optimizing population screening of bullying in school-aged children. *Journal of School Violence*, 9(3), 233–250. <http://dx.doi.org/10.1080/15388220.2010.483182>.
- Wade, T. J., Cairney, J., & Pevalin, D. J. (2002). Emergence of gender differences in depression during adolescence: National panel results from three countries. *Journal of the American Academy of Child and Adolescent Psychiatry*, 41(2), 190–198. <http://dx.doi.org/10.1097/00004583-200202000-00013>.
- Zimmer-Gembeck, M. J., Hunter, T. A., & Pronk, R. (2007). A model of behaviors, peer relations and depression: Perceived social acceptance as a mediator and the divergence of perceptions. *Journal of Social and Clinical Psychology*, 26(3), 273. <http://dx.doi.org/10.1521/jscp.2007.26.3.273>.
- Zimmer-Gembeck, M. J., Waters, A. M., & Kindermann, T. (2010). A social relations analysis of liking for and by peers: Associations with gender, depression, peer perception, and worry. *Journal of Adolescence*, 33(1), 69–81. <http://dx.doi.org/10.1016/j.adolescence.2009.05.005>.

Chapter 4 – Paper 3

Peer Victimization and Depression Symptoms:

The Moderating Role of Gender Non-normative Aggression and School Transition

Abstract

The purpose of the study was to test whether gender non-normative aggression and transition to high school moderated the relation between peer victimization and depression symptoms during late childhood and adolescence. Specifically, overt aggression was expected to moderate the relation between peer victimization and depression symptoms for girls and relational aggression was expected to moderate the same relation for girls and boys concurrently and longitudinally. Across time, transition was expected amplify the moderation effect of overt aggression for girls while accounting for prior depression symptoms. This effect was expected to be stronger during the transition to high school. Transition was also expected to amplify the moderation of relational aggression on peer victimization and depression symptoms. The study consisted of 464 youth, ages 11-16 years with peer-reported peer victimization and aggression (i.e., overt aggression and relational aggression) and self-reported depression symptoms over two time points one year apart. Concurrently, overt aggression predicted depression symptoms and overt aggression moderated the association between peer victimization and depression symptoms for girls. For highly overtly aggressive girls, peer victimization predicted later depression symptoms when accounting for prior symptoms. This association was stronger for girls who transitioned than those who did not. Relational aggression was not found to be a moderator of peer victimization and depression symptoms for girls or boys. It may be wise for prevention and intervention efforts to focus on periods of demonstrated risk (e.g., transition to high school) and for those at risk for depression symptoms (e.g., overtly aggressive girls experiencing peer victimization).

Peer Victimization and Depression Symptoms:

The Moderating Role of Gender Non-normative Aggression and School Transition

Depression is rare in childhood and becomes more common in adolescence (Merikangas et al., 2010; Rohde, Lewinsohn, Klein, Seeley, & Gau, 2013; Thapar, Collishaw, Pine, & Thapar, 2012). There is a notable developmental pattern related to depression symptoms— prior to puberty girls and boys have similar rates of depression, whereas following puberty, the gender difference favouring females at a rate of 2:1 emerges (Angold, Costello, & Worthman, 1998; Birmaher et al., 1996; Costello, Erkanli, & Angold, 2006; Thapar et al., 2012; Wade, Cairney, & Pevalin, 2002). Risk factors for the development of depression symptoms are varied and include factors such as temperament, genetics, gender, and interpersonal dysfunction (American Psychiatric Association [APA], 2013). Understanding the developmental pattern when depression symptoms increase during adolescence and under what conditions (e.g., in association with interpersonal dysfunction), particularly for girls, is important in order to ascertain how to support youth in adaptive development and prevent an increase of depression symptoms (Rudolph, 2009).

According to Rudolph, Flynn, and Abaied's (2008) developmentally-based interpersonal model of youth depression, youth respond to and play a part in interpersonal dysfunction, which in turn heightens the risk for depression symptoms in youth. The model infuses a developmental psychopathology perspective into interpersonal theories of depression which highlights the contrast of normative and non-normative development as youth impact their environment and are impacted by the environment over time. Interpersonal dysfunction can be broken down into relationship disturbances (where individuals respond to their environment) and social-behavioural deficits (where qualities of the individual contribute to the environment). Normative

and non-normative development is considered when assessing a social-behavioural deficit at a particular developmental period. Normative development has been described as occurring when intervention is not necessary whereas non-normative development occurs when intervention may be suggested (Costello & Angold, 2006). According to the model, an example of a relationship disturbance is peer victimization and an example of a social-behavioural deficit is aggression perpetration (Rudolph et al., 2008). This model was later adapted for adolescents as a developmentally-informed model of the interpersonal context of adolescent depression where social-behavioural deficits amplified the association of relationship disturbances to predicting depression symptoms (Rudolph, 2009). Although aggression was not specifically mentioned as a social-behavioural deficit in the 2009 revision, Rudolph et al. (2008) did discuss moderators of the interpersonal dysfunction and depression symptoms association as “critical for understanding the long-term developmental trajectories of depressed youth and for identifying at-risk youth” (p. 95). Thus, the relationship disturbance of peer victimization and the social-behavioural deficit of aggression are interpersonal dysfunctions and risk factors for depression symptoms, which may interact to predict depression symptoms.

Peer victimization can take many forms such as physical (e.g., hitting, kicking), verbal (e.g., calling others names), and relational (e.g., exclusion; rumour spreading) victimization. Peer victimization has been conceptualized as a relationship disturbance where others take negative actions upon the person being victimized and did not include qualities of the victim from the perspective of peers. This distinction was made because: 1) individuals have the right to be spared from victimization by peers; therefore the construct of victimization by peers should include the behaviour and not the qualities of the victim that peers may react to, 2) it is important not to conflate actions of the individual on others (i.e., aggression) and actions others engage in

toward the individual (i.e., peer victimization) within the theoretical framework of the developmentally-based interpersonal model of youth depression.

Previous research has supported the link between peer victimization and later depression symptoms (Schwartz, Gorman, Nakamoto, & Toblin, 2005; Schwartz, Lansford, Dodge, Pettit, & Bates, 2015; Moore et al., 2017; Ttofi, Farrington, Lösel, & Loeber, 2011). Although peer victimization may present an increased risk of depression for some, not all individuals victimized by peers experience maladjustment (McDougall & Vaillancourt, 2015). This suggests that the conditions under which the relation between peer victimization and depression symptoms holds over time has relevance. One condition could be how the relation between peer victimization and depression symptoms is impacted in the context of gender non-normative aggression in late childhood and adolescence.

Like victimization, aggression can also take different forms (e.g., overt aggression and relational aggression; Little, Jones, Henrich, & Hawley, 2003). Overt aggression includes physical and verbal aggression. Relational aggression is behaviour directed toward manipulating relationships such as exclusion and gossip (Crick & Grotpeter, 1995). Proportionately, relational aggression tends to be used more by girls than by boys and is important to include in conceptualizations of aggression in order to accurately assess relations of risk factors to mental health outcomes for both girls and boys (Conway, 2005; Vaillancourt, Miller, & Sharma, 2010). Physical aggression is commonly used in early childhood but after the age of three, it decreases over childhood for girls and boys (Alink et al., 2006; Côté, Vaillancourt, Leblanc, Nagin, & Tremblay, 2006; Tremblay et al., 1999). In early childhood, boys tend to use physical and verbal aggression more than girls, and girls tend to use relational aggression more than boys (Ostrov & Keating, 2004). Most children desist in their use of physical aggression by the end of childhood,

although a small portion of children do not abstain from using physical aggression (Côté et al., 2006). Björkqvist (1994) proposed that relational aggression replaces physical aggression use as children age and become more socially sophisticated. The theory has been supported by longitudinal research demonstrating physical aggression predicted later relational aggression use (Miller, Vaillancourt, & Boyle, 2009; Vaillancourt, Miller, Fagbemi, Côté, & Tremblay, 2007). In adolescence, most individuals exhibit low levels of physical aggression that decrease over time (Cleverley, Szatmari, Vaillancourt, Boyle, & Lipman, 2012). Using relational aggression during middle school has been described as normative for girls and boys (Underwood, 2003). However, although boys use relational aggression, they tend to also use other forms of aggression including physical and verbal aggression; whereas girls typically only use relational aggression (Vaillancourt et al., 2010; Vaillancourt, 2013). Thus, overt aggression is normative in early childhood for boys and for most, decreases over time, and is thus non-normative in older children (i.e., middle childhood and adolescence). Across childhood and adolescence, overt aggression is never normative for girls. Conversely, relational aggression is non-normative in early childhood, especially for preschool boys, but increases with age, and thus is normative in late childhood and adolescence for girls and boys.

The period of late childhood and adolescence is a time when depression symptoms are emerging and show more within-time variability which offers an advantage in predicting individual differences in depression symptoms (Cole et al., 2002). Youth may be more vulnerable to depression symptoms during times of normative transitions such as the transition to high school (Barber & Olsen, 2004; Newman, Newman, Griffen, O'Connor, & Spas, 2007). Adolescents begin to rely on peers as a source of support and at the same time the transition to high school disrupts established peer relationships and may require the formation of new

relationships (Rudolph et al., 2008). These changes in interpersonal relationships that coincide with the transition to high school may exhaust coping capacity when other interpersonal dysfunctions occur at the same time (e.g., transition, peer victimization, and aggression; Cicchetti & Rogosch, 2002; Rudolph et al., 2008). There may be more coping resources available to adapt to each interpersonal dysfunction individually if they occurred separately, at different points in time (Cicchetti & Rogosch, 2002). Normative transitions such as school transitions have been proposed as moderators of social-behavioural deficits and relationship disturbances in the developmentally-based interpersonal model of youth depression (Rudolph et al., 2008). School transition may also be a moderator of aggression and peer victimization in predicting depression symptoms.

At first, the use of aggression may seem at odds with symptoms of depression like anhedonia and sadness, but a concurrent relation has been consistently noted (see Dutton & Karakanta, 2013 for review). Longitudinally, aggression predicts later depression symptoms. For example, in recent study, Blain-Arcaro and Vaillancourt (2016) found that when examining the directions of association between aggression and depression (i.e., aggression predicting depression symptoms and depression symptoms predicting aggression), physical and relational aggression predicted depression symptoms for girls and boys. In another study, Cleverley et al. (2012) found that high to moderate trajectories of overt and relational aggression from ages 10-15 related to depression symptoms at ages 18-19. These results are consistent with meta-analytic findings that relational aggression is associated with internalizing symptoms across childhood and adolescence and that this relation grows stronger with age (Marshall, Arnold, Rolon-Arroyo, & Griffith, 2015). Overall, these studies suggest that both overt and relational aggression predict later depression symptoms for girls and boys.

Researchers have recognized that some individuals who experience peer victimization can also react aggressively. Youth experiencing victimization and engaging in aggression have been identified as “provocative whipping boys” (Olweus, 1978), later termed “provocative victims” (Olweus, 2001), “aggressive victims” and “bully-victims” (Pellegrini, Bartini, & Brooks, 1999; Schwartz, Proctor, Chien, 2001). Being categorized as experiencing peer victimization and perpetrating aggression has been linked to depression symptoms concurrently and over time (Haynie et al., 2001; Copeland, Wolke, Angold, & Costello, 2013). For example, in one study, those experiencing peer victimization and bullying others at 8 years of age had higher depression symptoms at age 15 than those not involved in bullying behaviour or experiencing peer victimization only (Kumpulainen & Räsänen, 2000). Bullying can be viewed as a subset of aggressive behaviour in which a power imbalance exists and the repetition of negative behaviour (e.g., aggression) occurs in addition to the intention to inflict harm (Olweus, 2001). In a recent study examining joint trajectories of bullying perpetration and peer victimization, the victim-to-bully group and the victimized group were associated with both self-reported and parent-reported depression symptoms which was stronger for girls than for boys (Haltigan & Vaillancourt, 2014). Taken together, these studies suggest peer victimization relates to later depression symptoms and for some, this relation is contemporaneous with the use of aggression.

In the present study we examined the relationship disturbance of peer victimization and the social-behavioural deficit of gender non-normative aggression (i.e., overt aggression in girls) in predicting later depression symptoms in late childhood and adolescence. To take common method variance into account, a multi-informant approach was used. Specifically, it has been recommended that the predictor and outcome vary by informant in order to account for common

method variance (e.g., Hawker & Bolton, 2000; Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). Peer-reports of peer victimization and aggression and self-reports of depression symptoms were used. Depression symptoms were examined instead of the disorder because those with symptoms below the threshold of disorder have been found not to differ from those with the disorder in rates of treatment, self-harm, and severity (Angold, Costello, Farmer, Burns, & Erkanli, 1999; Rutter, Kim-Cohen, & Maughan, 2006). Consistent with our gender non-normative aggression hypothesis, we predicted that overt aggression would be particularly problematic for girls when they also experienced peer victimization. That is, we expected that overt aggression would amplify the association of peer victimization predicting depression symptoms more strongly for girls than for boys because overt aggression is always non-normative for girls. We also expected that this pattern of findings would be present across time when controlling for prior symptoms of depression and would be particularly pronounced during the transition to high school. That is, we expected overtly aggressive girls who were victimized by their peers and transitioning into high school to be the most at risk for elevated symptoms of depression. Concerning relational aggression, which is commonly used by girls and boys in adolescence (Card, Stucky, Sawalani, & Little, 2008; Underwood, 2003), we predicted that while relational aggression would moderate the relation between peer victimization and depression symptoms there would be no moderating effect for gender but there would be a moderating effect for school transition. That is, we predicted that relationally aggressive youth who were victimized by their peers and transitioned to high school would be especially at risk for depression symptoms.

Method

Participants

Participants (N=464; 48.71% girls) took part in a longitudinal project on peer relationships of students in grades 6-9 at Time 1 (T1; $M_{age}=12$ years, $SD_{age}=1$ year, range 11-16 years;) and students in grades 7-10 at Time 2 (T2; $M_{age}=13$ years, $SD_{age}=1$ year, range=12-16 years). The participation rate for T1 was 98% and was 96% for T2. Peer-reported peer victimization, peer-reported overt aggression, peer-reported relational aggression and self-reported depression symptoms in late childhood and adolescence at T1 and T2 were used in the current study. Students reported their own ethnicity and the majority were Caucasian (89.5%).

Procedures

A series of self-report and peer-report questionnaires were administered to groups of students in 50 minute sessions in the spring of the school year and again the following year in six schools. The procedures for the peer nomination questionnaire were adapted from the Revised Class Play (RPC; Masten, Morison & Pellegrini, 1985). Students nominated classmates who best fit the behavioural and non-behavioural characteristics provided. An unlimited number of nominations were allowed for each item. The university ethics board approval was maintained for each year of the study. Parental consent and student assent were attained each year of the study.

Measures

Depression. Symptoms of depression were measured using the Child Depression Inventory (CDI; Kovacs, 1992, 2003). The CDI measures depressed mood and affect and consisted of 26 items with the suicide item not included in the present sample at the request of the school board. Respondents choose between three short sentences for each item (e.g., *I am sad once in a while; I am sad many times; and I am sad all the time*). The internal consistency of depression symptoms was good at both time points (T1 $\alpha=.91$; T2 $\alpha=.88$).

Peer victimization. Peer victimization was measured by peer-reports. The adapted RCP included 40 roles and additional items were created from literature on peer relations (Vaillancourt & Hymel, 2006). Individual items were standardized within class in Grades 6-7 and standardized within grade for Grades 8-10 to control for varying number of reports per class for children and adolescents. Four items assessing victimization related to items that included actions peers engage in toward the victim were used. Items related to the qualities of victimized youth were not used in order not to conflate relationship problems with social-behavioural deficits. The peer victimization items were: *Who gets picked on by others?*; *Who often gets left out of things?*; *Who do people make fun of?*; *Who gets hit and pushed by others?*. Items were averaged to form a composite of peer victimization. The composites had excellent internal consistency at each time point (T1 $\alpha = .93$; T2 $\alpha = .95$). A principle components factor analysis with varimax rotation was conducted on the victimization and aggression items at each time point. The four peer victimization items loaded on one factor at each time point (eigenvalue: T1=4.32; T2=4.35) and accounted for 30.05% of the variance at T1 and 31.98% of the variance in T2.

Aggression. Aggression was measured using peer nominations adapted from the RCP and standardized within class for children in grades 6-7 and within grade for students in grades 8-10 (Masten et al., 1985). The RCP has shown excellent psychometric properties over many studies across time (Gest, Sesma, Masten, & Tellegen, 2006). Three items assessing overt aggression (i.e., *Who hits, pushes others?*; *Who threatens other people to get their way?*; *Who starts fights and arguments with others?*) and four items assessing relational aggression (i.e., *Who tells other to stop liking a person to get with them?*; *Who spreads rumours about someone to get others to stop liking the person?*; *Who will make someone feel bad or look bad by making*

a face or turning away or rolling eyes?; Who tries to control or dominate a person by keeping them out of the group?) were used consistent with previous research (i.e., Vaillancourt & Hymel, 2006) and items that were available at both Time 1 and Time 2. Internal consistency for the composite of overt aggression was .90 at T1 and was .88 at T2 and for the relational aggression composite was .86 at T1 and was .90 at T2. The overt aggression (OA) and relational aggression (RA) items loaded onto separate factors at T1 (eigenvalue: OA=1.07; RA=3.32) and T2 (eigenvalue: OA=1.29; RA=3.52). The overt aggression factor accounted for 21.70% of the variance at T1 and 23.14% of the variance at T2. The relational aggression factor accounted for 27.45% of the variance at T1 and 28.26% of the variance at T2.

Data Analyses

A saturated regression model with full information maximum likelihood (FIML) and maximum likelihood robust (MLR) estimation using Mplus version 8.0 were used to estimate models (Muthén, & Muthén, 2017). The moderation of overt aggression and relational aggression on the association between peer victimization and depression symptoms were tested concurrently (within T1 and within T2) and over time. When moderators of overt and relational aggression were examined with peer-reported victimization predicting later self-reported depression symptoms, previous self-reported depression symptoms were controlled for. Only models where R^2 is statistically significant are interpreted. Moderation of sex and transition were examined using a multi-group model and any significant paths were compared to the opposite sex using the Wald chi-square statistic to determine if there was a sex difference. Simultaneous entry for interaction terms has been described as appropriate in previous literature (Hayes, 2013). To examine at what levels the moderator (i.e., overt aggression or relational aggression) produced a statistically significant relation between peer victimization and depression symptoms,

the model was conducted with the moderator one standard deviation above the mean and with the moderator one standard deviation below the mean and then graphically depicted at high, average, and low levels of the moderator (Aiken & West, 1991). In cases where one standard deviation below the mean was outside the range of the data the minimum value of the moderator was substituted for one standard deviation below the mean (Hayes, 2013).

Results

Data were tested for assumptions of normality and were found to exhibit kurtosis values over the recommended limit of 10 (Kline, 2011). To account for deviations in normality, MLR was used. Given that usual tests of missing data use statistics based on assumptions of normality, non-parametric tests that relax the distributional assumptions were used to examine missing data. Examining those with missing scores on depression in T2 (total N=53) to those not missing data by using the independent samples Mann-Whitney U test separately for girls and boys, those who were missing data had higher overt aggression scores ($p=.013$), higher relational aggression scores ($p=.026$), and tended to be older ($p=.040$) compared to boys with complete data. No differences were found for girls. Because children were nested within school, we examined if it was necessary to cluster by school to account for the similarity of children attending the same school. The design effect (DEFF) was calculated for girls and boys and a DEFF of over two indicated that clustering would be necessary (McNeish, 2014). The design effect exceeded two for T1 depression symptoms for girls (DEFF=4.26) and boys (DEFF=4.63), T2 depression symptoms for girls (DEFF=2.32), and T2 peer victimization for girls (DEFF=3.05) therefore the regression analyses were clustered by school.

Bivariate correlations, means, standard deviations and sex differences tests for peer victimization, overt aggression, relational aggression, and depression symptoms are provided in

Table 1. Boys were nominated by peers as experiencing more peer victimization than girls at T2 ($t(340.04)=-2.29, p=.023; d=0.23.$) and were more overtly aggressive at T1 ($t(417.06)=-3.75, p<.001; d=0.35.$) and T2 ($t(279.27)=-3.66, p<.001; d=0.37.$) than girls. Girls were nominated by peers as being more relationally aggressive at T1 ($t(369.51)=2.88, p=.004; d=0.27.$) and T2 ($t(352.80)=3.66, p<.001; d=0.36.$) than boys. There were no differences in depression symptoms between girls and boys at T1 or T2.

At T1, a multi-group model was used to examine the moderation of sex and the model with girls explained a significant amount of the variance in depression symptoms ($R^2=.06, p=.001$) while the model with boys did not ($R^2=.01, p=.340$). In the model for girls, peer victimization was associated with depression symptoms but was not significantly different from the same path for boys (Wald $\chi^2(1)=3.03, p=.082$) meaning that there was no evidence for a sex difference and the association will not be interpreted. However, overt aggression was associated with depression symptoms for girls ($b=2.31, p<.001$) and this was statistically significantly different from the association for boys (Wald $\chi^2(1)=10.50, p=.001$). Overt aggression did not moderate the relation between peer victimization and depression symptoms at T1 ($b=-1.24, p=.090$) nor did relational aggression ($b=2.35, p=.169$) for girls or for boys (peer victimization x overt aggression: $b=1.17, p=.359$; peer victimization x relational aggression: $b=0.23, p=.739$).

At T2, when a multi-group model was conducted using sex as the grouping variable, the model for girls accounted for a statistically significant portion of the variance in depression symptoms ($R^2=.10, p=.003$) while the model for boys did not ($R^2=.04, p=.183$). In the model for girls, overt aggression was associated with depression symptoms ($b=4.31, p=.005$) and was different from boys (Wald $\chi^2(1)=6.82, p=.009$). Overt aggression was found to moderate the relation between peer victimization and depression symptoms ($b=5.52, p=.048$) for girls and the

association was different from boys (Wald $\chi^2(1) = 6.09, p = .014$). The peer victimization x relational aggression interaction for girls was not statistically significant ($b = 1.56, p = .387$). In order to determine the effect size of the interaction, a model was conducted without the peer victimization and overt aggression interaction term (girls: $R^2 = .09, p = .008$; boys: $R^2 = .03, p = .249$). A good measure of effect size is f^2 which is defined as the proportion of the variance that the interaction term accounted for in the outcome over the amount of variance that was unexplained in the outcome (Aiken & West, 1991; Dawson, 2014). The effect size of the interaction was .01 which corresponded to a small effect size (around $f^2 = .02$ is small whereas around $f^2 = .15$ is moderate; Aikens & West, 1991). Models were then conducted at high and low levels of overt aggression. At high levels of overt aggression, peer victimization was associated with depression symptoms ($b = 7.25, p = .048$) whereas peer victimization and depression symptoms were not associated at moderate ($b = 2.63, p = .076$) and low levels of overt aggression ($b = -0.52, p = .559$).

Next the model was conducted with peer victimization, overt aggression, relational aggression, and depression at T1 and using the outcome of depression at T2 where overt aggression was expected to moderate peer victimization and depression for girls and relational aggression was expected to moderate peer victimization and depression for girls and boys, particularly for those who transitioned from elementary to high school. To examine whether transition status had an impact on the moderation of overt aggression for girls and relational aggression for girls and boys, a multiple group model with groups of girls who transitioned, boys who transitioned, girls who did not transition and boys who did not transition to high school was conducted. The models that accounted for a significant portion of the variance in T2 depression symptoms were the models for non-transitioning boys ($R^2 = .21, p = .017$) and girls ($R^2 = .50, p < .001$) and transitioning girls ($R^2 = .45, p = .012$). The model for transitioning boys did not

account for a significant amount of variance in T2 depression symptoms ($R^2=.16$, $p=.225$). The peer victimization x relational aggression interaction predicting later depression was not statistically significant for girls ($b=-2.99$, $p=.223$) who transitioned nor for boys ($b=1.57$, $p=.635$) and girls ($b=0.47$, $p=.670$) who did not transition. Although the peer victimization x relational aggression interaction was statistically significant ($b=2.67$, $p=.028$) for transitioning boys, as stated earlier, the R^2 was not statistically significant and therefore any associations in this model were not interpreted. The peer victimization x overt aggression interaction predicting later depression was statistically significant for girls who transitioned to high school ($b=9.37$, $p=.007$) and those who did not ($b=2.38$, $p=.018$) and these associations were different from each other (Wald χ^2 (1)=4.06, $p=.044$). The peer victimization x overt aggression interactions varied by sex for those who transitioned (Wald χ^2 (1)=6.98, $p=.008$) and those who did not transition (Wald χ^2 (1)=4.80, $p=.029$). The peer victimization x overt aggression interactions for boys were not statistically significant when boys transitioned ($b=-0.93$, $p=.347$) or did not transition ($b=-2.63$, $p=.395$). In order to calculate the effect size of the interaction, a saturated multiple regression model was conducted excluding the interaction term of peer victimization and overt aggression. A significant portion of the variance in T2 depression symptoms was accounted for in the following models: non-transitioning boys ($R^2=.18$, $p<.001$) and girls ($R^2=.50$, $p<.001$) and transitioning girls ($R^2=.39$, $p=.029$). The effect size of the interaction was small for non-transitioning girls ($f^2=.02$) and was moderate ($f^2=.11$) for transitioning girls.

The graph for the moderation of T1 overt aggression on T1 peer victimization predicting T2 depression for girls who did not transition is depicted in Figure 1. At low and moderate levels of overt aggression, T1 peer victimization did not predict T2 depression symptoms (low: $b=-0.92$, $p=.551$; moderate: $b=1.11$, $p=.105$). At high levels of T1 overt aggression, T1 peer

victimization predicted T2 depression symptoms (high: $b=3.24$, $p<.001$). Figure 2 depicts the graph of the moderation of T1 overt aggression on T1 peer victimization predicting T2 depression symptoms for girls who transitioned. At low levels of T1 overt aggression, T1 peer victimization was not related to T2 depression symptoms (low: $b=-4.90$, $p=.125$). At moderate and high levels of T1 overt aggression, T1 peer victimization was a statistically significant predictor of T2 depression symptoms (moderate: $b=3.06$, $p=.001$; high: $b=11.48$, $p<.001$) for girls who transitioned to high school. The association between T1 peer victimization and T2 depression symptoms for girls who transitioned was found to be stronger than the association for the girls who did not transition to high school (Wald $\chi^2(1)=6.86$, $p=.009$) for those who used high levels of overt aggression. At moderate levels of overt aggression, the association between T1 peer victimization and T2 depression for girls who transitioned and did not transition were not different from each other (Wald $\chi^2(1)=2.21$, $p=.137$). Finally, the data were also transformed with a natural log to better approximate a normal distribution and the significance of terms was similar and the primary finding was the same: overt aggression moderated the relation between peer victimization and depression symptoms and was strongest for transitioning girls.

Discussion

The purpose of the present study was to test whether gender non-normative aggression and school transition moderated the relation between peer victimization and depression symptoms. Overt aggression was expected to moderate the relation between peer victimization and depression symptoms for girls. Relational aggression was expected to moderate the relation between peer victimization and depression symptoms for girls and boys. We also expected the same moderation patterns to occur over time, when controlling for prior depression symptoms

and that the association of peer victimization and depression symptoms would be stronger during the transition to high school.

We found that at T1, overt aggression was associated concurrently with depression symptoms for girls. At T2, we found that overt aggression moderated the relation between peer victimization and depression symptoms for girls. This relation was not present for boys. Longitudinally, as predicted, overt aggression moderated the relation between peer victimization and depression symptoms for girls who did and did not transition and moderation was stronger for girls that transitioned to high school. For girls who transitioned and those who did not transition, at high levels of overt aggression, peer victimization predicted later depression symptoms while controlling for prior depression symptoms. The association of peer victimization predicting depression symptoms was stronger for highly overtly aggressive girls who transitioned to high school than those who remained in the same school. At low levels of overt aggression peer victimization and depression symptoms were not related for girls who transitioned and those who did not.

Our results support the inclusion of overt aggression as a social-behavioural deficit consistent with the developmentally-informed model of the interpersonal context of adolescent depression (Rudolph et al., 2008; Rudolph, 2009). Our findings suggest that overt aggression for girls may be considered as a social-behavioural deficit which moderates the relationship disturbance of peer victimization in predicting depression symptoms. Highly overtly aggressive girls who were victimized by their peers and transitioned to high school were the most impaired in terms of depression symptoms when previous depression symptoms were accounted for.

These findings are consistent with Crick's (1997) theory of non-normative aggression for girls: peer victimization predicted the maladaptive outcome of increased depression symptoms

for girls using overt aggression which is never normative for girls. There tends to be strong social sanctions on girls to inhibit engaging in overtly aggressive behaviour (Conway, 2005). Indeed, overtly aggressive girls do not benefit from the use of overt aggression in terms of social status; they are not well liked by their peers nor are they perceived as popular (Vaillancourt & Hymel, 2006).

The transition to high school coincides with multiple changes. Although support and intimacy needs are increasingly met by peers, the transition to high school disrupts established peer bonds and may require interpersonal skills in establishing new relationships (Rudolph et al., 2008). This may be particularly problematic for girls who tend to have higher interpersonal investment (Rose & Rudolph, 2006; Rudolph, 2009; Rudolph et al., 2008). Girls' friendships tend to include more validation, affection, and self-disclosure than boys (Rose & Rudolph, 2006; Rudolph et al., 2008) placing a greater demand on emotions (Rudolph et al., 2008). The disruption of the friendships that girls may have previously depended on for support can deplete coping capacities (Rudolph et al., 2008). Further, the contextual change of schools can also include going from classes where the same students move through classes with the same group throughout the school day to a system where each class is composed of different students and teachers. There is more autonomy in locating and arriving at individual classes, organizing books or homework and there are considerably more students and teachers to interact with. This new school structure places greater interpersonal demands on students (Rudolph, 2009; Rudolph et al., 2008). For those who have also experienced interpersonal dysfunctions (e.g. peer victimization and aggression), the additional contextual and interpersonal changes discussed above that occur during transition to high school may place these individuals at higher risk for depression symptoms (Rudolph, 2009; Rudolph et al., 2008).

We examined whether relational aggression moderated the association between peer victimization and depression for girls and boys concurrently and over time and did not find this to be the case. We also did not find that transition heightened the impact of the moderation of relational aggression on the association between peer victimization and depression symptoms. Relational aggression, while associated with maladaptive outcomes has also been associated with adaptive attributes such as increased positive friendship quality in reciprocated best friendships and increased social status such as popularity (Banny, Heilbron, Ames, & Prinstein, 2011; Vaillancourt & Hymel, 2006). It may be that when relational aggression is proactively used it hides the identity of the perpetrator and is associated with more adaptive outcomes like social status (Vaillancourt, 2017). It may be the dysregulated (i.e., using it impulsively) use of relational aggression that is associated with maladaptive outcomes suggesting that the function of aggression in addition to form may be important to examine in predicting risk factors for depression symptoms. In a meta-analysis of proactive and reactive aggression and maladaptive outcomes, reactive aggression had a unique association with internalizing problems and was more strongly associated with internalizing problems than proactive aggression (Card & Little, 2006).

Consistent with the developmentally-based interpersonal model of depression symptoms for youth, transition moderated interpersonal dysfunctions (Rudolph et al., 2008). That is, for girls, overt aggression moderated the relation between peer victimization and depression symptoms for girls who were transitioning to high school or remaining in the same school and transition amplified the moderation effect. This is consistent with the notion that overt aggression is never normative for girls and that multiple interpersonal dysfunctions stress a person's capacity to cope with the interpersonal changes during the transition to high school.

Although the overt aggression moderation was replicated within and across time, this did not occur at the first time point. At the first time point, overt aggression predicted depression symptoms for girls but this was not dependent on peer victimization. This supports the 2008 version of the developmentally-based interpersonal model of depression symptoms in youth (Rudolph et al., 2008) with overt aggression as a social-behavioural deficit associated with depression symptoms with the moderator of sex. However, the developmental nature of the model suggests that longitudinal research is needed to determine the interpersonal dysfunctions that predict *later* depression symptoms. Examining these associations over time allowed us to examine the moderating roles of school transition, sex, and gender non-normative aggression on the relation between peer victimization and later depression symptoms.

Limitations and Future Research

The present study has a number of strengths including the use of a large sample of youth across late childhood and adolescence using multiple informants of peer nominations and self-reported data with consistent measurements across time within a longitudinal design. Despite these strengths, there were also some limitations. First, although missing data was low, those who did not have reports of depression symptoms at T2 tended to be older aggressive boys. This type of biased attrition is not surprising as aggression has been associated with truancy (Dodge, Coie, & Lynam, 2006). In the present study, although the older aggressive boys were consented to participate in the study, they were absent on the day the data were collected. Second, we only examined one mental health outcome in the current study. Conduct disorder is comorbid with depressive disorders in childhood and adolescence (Costello, Mustillo, Erkanli, Keeler, & Angold, 2003). One of the common peer problems for youth experiencing conduct disorder is aggression (Parker, Rubin, Erath, Wojslawowicz, & Buskirk, 2006). Children with conduct

disorder also tend to be rejected and disliked by peers. This suggests that conduct problems may be an outcome in addition to depression symptoms and could be considered in assessing the relations among peer victimization and aggression and maladaptive outcomes in future studies. Although these outcomes were not measured in the present study, future studies should consider multiple forms of specific maladaptive outcomes, such as depression symptoms and conduct problems, to better differentiate the unique contribution of risk factors on multiple outcomes. Although the sample size was reasonable for a multiple informant study and would have been sufficient for the two-way interactions with aggression, we likely lacked power for a four-way interaction (McClelland, 2014; Whisman & McClelland, 2005). Studies are needed to replicate these findings with larger samples both with peer-reported peer victimization and aggression along with self-reported depression symptoms, as well as studies with varied informants with sample sizes appropriate for a four-way interaction.

We examined peer victimization and aggression and not bullying because we were interested in the broader constructs as they relate to depression symptoms. The elements of power imbalance and repetition may or may not be involved but it was overt aggression that was expected to change the relation between peer victimization and depression symptoms. At high levels of overt aggression, the relationship patterns of selecting an individual with less power as a target on multiple occasions may become more likely. More research is needed to determine if the same pattern (i.e., moderation of overt aggression on the relation between peer victimization and depression symptoms) occurs when the variables specifically include repeated overt aggression in the presence of a power imbalance. We predict that would be the case, however, this highlights that types of bullying perpetration may need to be separated into overt and relational forms of bullying because as we found in this study, the different forms have a

different impact on the relation between peer victimization and depression symptoms. In order to separate forms of bullying, multiple questions on each form would be preferable to create appropriate composites.

Peer-reported overt aggression and victimization may be seen as a risk factor for later increased depression symptoms in youth for girls particularly at times of normative transition such as the transition to high school. Screening for involvement with peer victimization and for depression symptoms by health care professionals has been recommended (Beeson & Vaillancourt, 2016; Williams, O'Connor, Eder, & Whitlock, 2009). Screening is important to identify those who may need more support in managing peer relations and depression symptoms and to direct individuals to appropriate services. Systematic health care screening for depression symptoms during adolescence have become more common recently and may identify those in need of intervention earlier than without such processes in place (Yates, Burt, & Troy, 2011). This suggests that more research is needed examining screening processes and testing the utility of appropriate services may be needed during the transition to high school for girls exhibiting overt aggression with their peers in the context of peer victimization. This would be important for researchers to examine and develop evidence for the impact of intervention at this critical period in order to prevent a later increase in depression symptoms over and above prior depression symptoms. Such an increase may be enough to meet criteria for a major depressive episode in adolescence which, as has long been known, substantially increases risk of later episodes and mortality related to suicide (APA, 2013; Aalto-Setälä, Marttunen, Tuulio-Henriksson, Poikolainen, & Lönqvist, 2002; Weissman et al., 1999). Moreover, the earlier the onset of depression, the larger the lag of time in seeking treatment and those who are able to establish treatment often do so many years after onset (Wang et al., 2007; Whiteford et al.,

2013). Prioritizing prevention and intervention of depression is a key factor for improvement in population health (Whiteford et al., 2013). Accordingly, it may be prudent to focus prevention and intervention research efforts during periods of demonstrated risk (e.g., the transition to high school) and for those at risk for mental health problems (e.g., overtly aggressive girls who are victimized by their peers).

Compliance with ethical standards: This study was funded by the Canadian Institutes of Health Research, Canada Research Chairs program and the University of British Columbia Hampton Research Fund. Amanda Lynn Krygsman declares she has no conflict of interest. Tracy Vaillancourt declares she has no conflict of interest. All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. Informed consent was obtained from parents or guardians and informed assent for children participating in the study.

Author contributions: Amanda Krygsman conducted the literature review, wrote the manuscript, cleaned data, selected and performed statistical analyses, incorporated changes related to feedback from Tracy Vaillancourt and from reviewers. Tracy Vaillancourt designed the study, wrote ethics and grant applications, recruited participants, provided data collection and storage, provided the data set, provided expertise and feedback through each phase of the preparation of the manuscript, reviewed and provided final approval for submission for publication.

References

- Aiken, L. S., & West, S. G. (1991). *Multiple regression: Testing and interpreting interactions*. Thousand Oaks, CA: Sage Publications, Inc.
- Aalto-Setälä, T., Marttunen, M., Tuulio-Henriksson, A., Poikolainen, K., & Lönnqvist, J. (2002). Depressive symptoms in adolescence as predictors of early adulthood depressive disorders and maladjustment. *The American Journal of Psychiatry*, 159, 1235–1237.
doi:10.1176/appi.ajp.159.7.1235
- Alink, L. R. A., Mesman, J., Van Zeijl, J., Stolck, M. N., Juffer, F., Koot, H. M., ... Van Ijzendoorn, M. H. (2006). The early childhood aggression curve: Development of physical aggression in 10- to 50-month-old children. *Child Development*, 77, 954–966.
doi:10.1111/j.1467-8624.2006.00912.x
- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Washington, DC: Author.
- Angold, A., Costello, E. J., Farmer, E., Burns, B. J., & Erkanli, A. (1999). Impaired but undiagnosed. *Journal of American Academy of Child and Adolescent Psychiatry*, 38(2), 129–137. doi:10.1097/00004583-199902000-00011
- Angold, A., Costello, E. J., & Worthman, C. M. (1998). Puberty and depression: The roles of age, pubertal status and pubertal timing. *Psychological Medicine*, 28, 51–61.
doi:10.1017/S003329179700593X
- Banny, A. M., Heilbron, N., Ames, A., & Prinstein, M. J. (2011). Relational benefits of relational aggression: Adaptive and maladaptive associations with adolescent friendship quality. *Developmental Psychology*, 47, 1153. doi:10.1037/a0022546

- Barber, B. K., & Olsen, J. A. (2004). Assessing the transitions to middle and high school. *Journal of Adolescent Research, 19*, 3–30. doi:10.1177/0743558403258113
- Beeson, C. M. L. & Vaillancourt, T. (2016). The short- and long-term health and education outcomes of peer victimization: Implications for educators and clinicians. In B. Haslam & P. J. Valletutti, (Eds.), *From Medical and Psychosocial Problems in the Classroom: The Teacher's Role in Diagnosis and Management* (5th edition) (pp 445-468). Austin, TX: PRO-ED.
- Birmaher, B., Ryan, N. D., Williamson, D. E., Brent, D. A., Kaufman, J., Dahl, R. E., ... & Nelson, B. (1996). Childhood and adolescent depression: A review of the past 10 years. Part I. *Journal of the American Academy of Child & Adolescent Psychiatry, 35*, 1427-1439. doi:10.1097/00004583-199611000-00011
- Blain-Arcaro, C., & Vaillancourt, T. (2016). Longitudinal associations between depression and aggression in children and adolescents. *Journal of Abnormal Child Psychology, 45*, 959–970. doi:10.1007/s10802-016-0204-2
- Björkqvist, K. (1994). Sex differences in physical, verbal, and indirect aggression: A review of recent research. *Sex Roles, 30*, 177-188.
- Card, N. A., & Little, T. D. (2006). Proactive and reactive aggression in childhood and adolescence: A meta-analysis of differential relations with psychosocial adjustment. *International Journal of Behavioral Development, 30*, 466–480. doi:10.1177/0165025406071904
- Card, N. A., Stucky, B. D., Sawalani, G. M., & Little, T. D. (2008). Direct and indirect aggression during childhood and adolescence: A meta-analytic review of gender differences,

intercorrelations, and relations to maladjustment. *Child Development*, 79, 1185–229.

doi:10.1111/j.1467-8624.2008.01184

Cicchetti, D., & Rogosch, F. A. (2002). A developmental psychopathology perspective on adolescence. *Journal of Consulting and Clinical Psychology*, 70(1), 6–20.

doi:10.1037//0022-006X.70.1.6

Cleverley, K., Szatmari, P., Vaillancourt, T., Boyle, M., & Lipman, E. (2012). Developmental trajectories of physical and indirect aggression from late childhood to adolescence: Sex differences and outcomes in emerging adulthood. *Journal of the American Academy of Child and Adolescent Psychiatry*, 51, 1037–1051. doi:10.1016/j.jaac.2012.07.010

Cole, D. A., Tram, J. M., Martin, J. M., Hoffman, K. B., Ruiz, M. D., Jacquez, F. M., & Maschman, T. L. (2002). Individual differences in the emergence of depressive symptoms in children and adolescents: A longitudinal investigation of parent and child reports. *Journal of Abnormal Psychology*, 111, 156–165. doi:10.1037//0021-843X.111.1.156

Conway, A. M. (2005). Girls, aggression, and emotion regulation. *The American Journal of Orthopsychiatry*, 75(2), 334–339. doi:10.1037/0002-9432.75.2.334

Copeland, W. E., Wolke, D., Angold, A., & Costello, E. J. (2013). Adult psychiatric outcomes of bullying and being bullied by peers in childhood and adolescence. *JAMA Psychiatry*, 70, 419–26. doi:10.1001/jamapsychiatry.2013.504

Costello, E., J. & Angold, A. (2006). Developmental epidemiology. In D. Cicchetti, & D. J. Cohen (Eds.), *Developmental Psychopathology* (2nd ed.; Vol. 1; pp. 41-75). Hoboken, NJ: John Wiley & Sons, Inc.

- Costello, E. J., Erkanli, A., & Angold, A. (2006). Is there an epidemic of child or adolescent depression? *Journal of Child Psychology and Psychiatry*, 47, 1263-1271.
doi:10.1111/j.1469-7610.2006.01682.x
- Costello, E. J., Mustillo, S., Erkanli, A., Keeler, G., & Angold, A. (2003). Prevalence and development of psychiatric disorders in childhood and adolescence. *Archives of General Psychiatry*, 60, 837-844.
- Côté, S., Vaillancourt, T., LeBlanc, J. C., Nagin, D. S., & Tremblay, R. E. (2006). The development of physical aggression from toddlerhood to pre-adolescence: A nation wide longitudinal study of Canadian children. *Journal of Abnormal Child Psychology*, 34, 68-82.
<http://doi.org/10.1007/s10802-005-9001-z>
- Crick, N. R. (1997). Engagement in gender normative versus nonnormative forms of aggression. *Developmental Psychology*, 33, 613-617. doi:10.1037/0012-1649.33.4.610
- Crick, N. R., & Grotpeter, J. K. (1995). Relational aggression, gender, and social-psychological adjustment. *Child Development*, 66, 710-722.
- Dawson, J. F. (2014). Moderation in management research: What, why, when, and how. *Journal of Business and Psychology*, 29(1), 1-19. doi:10.1007/s10869-013-9308-7
- Dodge, K. A., Coie, J. D., & Lynam, D. (2006). Aggression and antisocial behaviour in youth. In W. Damon, & R. M. Lerner (Chief Eds.), Eisenberg, N. (Vol. Ed.), *Handbook of Child Psychology: Vol. 3. Social, emotional, and personality development* (6th ed., pp.719-788). Hoboken, New Jersey: John Wiley & Sons, Inc.
- Dutton, D. G., & Karakanta, C. (2013). Depression as a risk marker for aggression: A critical review. *Aggression and Violent Behavior*, 18(2), 310-319. doi:10.1016/j.avb.2012.12.002

- Gest, S. D., Sesma, A., Masten, A. S., & Tellegen, A. (2006). Childhood peer reputation as a predictor of competence and symptoms 10 years later. *Journal of Abnormal Child Psychology*, 34(4), 509-526. doi: 10.1007/s10802-006-9029-8
- 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, 2426 -2436. doi:10.1037/a0038030
- Hawker, D. S., & Boulton, M. J. (2000). Twenty years' research on peer victimization and psychosocial maladjustment: A meta-analytic review of cross-sectional studies. *Journal of Child Psychology and Psychiatry and Allied Disciplines*, 41, 441–455. doi:10.1111/1469-7610.00629
- Hayes, A. F. (2013). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*. New York, NY: Guilford Press.
- Haynie, D. L., Nansel, T., Eitel, P., Crump, A. D., Saylor, K., Yu, K., & Simons-Morton, B. (2001). Bullies, victims, and bully/victims: Distinct groups of at-risk youth. *The Journal of Early Adolescence*, 21, 29–49.
- Kline, R.B. (2011). *Principles and practice of structural equation modeling* (3rd ed.). New York: Guilford Press.
- Kovacs, M. (1992, 2003). *Children's Depression Inventory Manual*. Multi-Health Systems Inc.: Toronto, ON, Canada.
- Kumpulainen, K., & Räsänen, E. (2000). Children involved in bullying at elementary school age: Their psychiatric symptoms and deviance in adolescence - An epidemiological sample. *Child Abuse and Neglect*, 24, 1567–1577. doi:10.1016/S0145-2134(00)00210-6

- Little, T. D., Jones, S. M., Henrich, C. C., & Hawley, P. H. (2003). Disentangling the “whys” from the “whats” of aggressive behaviour. *International Journal of Behavioral Development*, 27, 122–133. doi:10.1080/01650250244000128
- Marshall, N. A., Arnold, D. H., Rolon-Arroyo, B., & Griffith, S. F. (2015). The association between relational aggression and internalizing symptoms: A review and meta-analysis. *Journal of Social and Clinical Psychology*, 34, 135-160.
- Masten, A. S., Morison, P., & Pellegrini, D. S. (1985). A revised class play method of peer assessment. *Developmental Psychology*, 21, 523-533. doi:10.1037//0012-1649.21.3.523
- McClelland, G. H. (2014). Nasty data: Unruly, ill-mannered observations can ruin your analysis. In H. T. Reis & C. M. Judd (Eds.), *Handbook of Research Methods in Social and Personality Psychology* (2nd ed., pp. 608–626). New York, NY: Cambridge University Press. Retrieved from <http://ebooks.cambridge.org/ref/id/CBO9780511996481>
- McDougall, P., & Vaillancourt, T. (2015). Long-term adult outcomes of peer victimization in childhood and adolescence. *American Psychologist*, 70(4), 300–310. doi:10.1037/a0039174
- McNeish, D. M. (2014). Analyzing clustered data with OLS regression: The effect of a hierarchical data structure. *Multiple Linear Regression Viewpoints*, 40, 11–16.
- Merikangas, K. R., He, J., Burstein, M., Swanson, S. A., Avenevoli, S., Cui, L., ... Swendsen, J. (2010). Lifetime prevalence of mental disorders in US adolescents: Results from the National Comorbidity Survey Replication–Adolescent Supplement (NCS-A). *Journal of the American Academy of Child & Adolescent Psychiatry*, 49(10), 980–989. doi:10.1016/j.jaac.2010.05.017

- Miller, J. L., Vaillancourt, T., & Boyle, M. H. (2009). Examining the heterotypic continuity of aggression using teacher reports: Results from a national Canadian study. *Social Development, 18*, 164-180.
- Moore, S. E., Norman, R. E., Suetani, S., Thomas, H. J., Sly, P. D., & Scott, J. G. (2017). Consequences of bullying victimization in childhood and adolescence: A systematic review and meta-analysis. *World Journal of Psychiatry, 7*, 60. doi:10.5498/wjp.v7.i1.60
- Muthén, L.K. & Muthén, B.O. (2017). *Mplus User's Guide*. Eighth Edition. Los Angeles, CA: Author.
- Newman, B. M., Newman, P. R., Griffen, S., O'Connor, K., & Spas, J. (2007). The relationship of social support to depressive symptoms during the transition to high school. *Adolescence, 42*, 441-459.
- Olweus, D. (1978). *Aggression in the schools*. New York: Wiley.
- Olweus, D. (2001). Peer harassment: A critical analysis and some important issues. In J. Juvonen, & S. Graham (Eds.) *Peer harassment in school: The plight of the vulnerable and victimized* (pp.3-20). New York, NY: Guilford Press.
- Ostrov, J. M., & Keating, C. F. (2004). Gender differences in preschool aggression during free play and structured interactions: An observational study. *Social Development, 13*, 255-277.
- Parker, J., G., Rubin, K., H., Erath, S., Wojslawowicz, J., C., Buskirk, A. (2006). Peer relationships, child development, and adjustment: A developmental psychopathology perspective. In D. Cicchetti, & D. J., Cohen (Eds.), *Developmental Psychopathology, Vol. 3: Risk, Disorder, and Adaptation, 2nd ed.*, (pp. 419–493). New York, NY: Wiley.

- Pellegrini, A. D., Bartini, M., & Brooks, F. (1999). School bullies, victims, and aggressive victims: factors relating to group affiliation and victimization in early adolescence. *Journal of Educational Psychology*, 91(2), 216-224. doi: 10.1037/0022-0663.91.2.216
- Podsakoff, P. M., MacKenzie, S. B., Lee, J.-Y., & Podsakoff, N. P. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology*, 88(5), 879–903. doi:10.1037/0021-9010.88.5.879
- Rohde, P., Lewinsohn, P. M., Klein, D. N., Seeley, J. R., & Gau, J. M. (2013). Key characteristics of major depressive disorder occurring in childhood, adolescence, emerging adulthood, and adulthood. *Clinical Psychological Science*, 1, 41–53. doi:10.1177/2167702612457599
- Rose, A. J., & Rudolph, K. D. (2006). A review of sex differences in peer relationship processes: Potential trade-offs for the emotional and behavioral development of girls and boys. *Psychological Bulletin*, 132(1), 98–131. doi:10.1037/0033-2909.132.1.98
- Rudolph, K. D. (2009). The interpersonal context of adolescent depression. In S. Nolen-Hoeksema & L. M. Hilt (Eds.), *Handbook of depression in adolescents* (pp. 377-418). New York, NY : Routledge, Taylor Francis Group.
- Rudolph, K.D., Flynn, M., & Abaied, J.L. (2008). A developmental perspective on interpersonal theories of youth depression. In J. R. Z. Abela & B. L. Hankin (Eds.), *Handbook of depression in children and adolescents* (pp. 79-102). New York, NY: Guilford.
- Rutter, M., Kim-Cohen, J., & Maughan, B. (2006). Continuities and discontinuities in psychopathology between childhood and adult life. *Journal of Child Psychology and Psychiatry*, 47, 276–295. doi:10.1111/j.1469-7610.2006.01614.x

- Schwartz, D., Proctor, L. J., & Chien, D. H. (2001). The aggressive victim of bullying. In J. Juvonen, & S. Graham (Eds.) *Peer harassment in school: The plight of the vulnerable and victimized* (pp.147-174). New York, NY: Guilford Press.
- Schwartz, D., Gorman, A. H., Nakamoto, J., & Toblin, R. L. (2005). Victimization in the peer group and children's academic functioning. *Journal of Educational Psychology, 97*, 425-435. doi:10.1037/0022-0663.97.3.425
- Schwartz, D., Lansford, J. E., Dodge, K. A., Pettit, G. S., & Bates, J. E. (2015). Peer victimization during middle childhood as a lead indicator of internalizing problems and diagnostic outcomes in late adolescence. *Journal of Clinical Child & Adolescent Psychology, 44*, 393–404. doi:10.1080/15374416.2014.881293
- Thapar, A., Collishaw, S., Pine, D. S., & Thapar, A. K. (2012). Depression in adolescence. *The Lancet, 379*, 1056–1067. doi:10.1016/S0140-6736(11)60871-4
- Tremblay, R. E., Japel, C., Perusse, D., McDuff, P., Boivin, M., Zoccolillo, M., & Montplaisir, J. (1999). The search for the age of “onset” of physical aggression: Rousseau and Bandura revisited. *Criminal Behavior and Mental Health, 9*, 8-23. doi:10.1002/cbm.288
- Ttofi, M. M., Farrington, D. P., Lösel, F., & Loeber, R. (2011). Do the victims of school bullies tend to become depressed later in life? A systematic review and meta-analysis of longitudinal studies. *Journal of Aggression, Conflict and Peace Research, 3*, 63–73. doi:10.1108/17596591111132873
- Underwood, M. K. (2003). *Social Aggression in Girls*. New York: Guilford Press.
- Vaillancourt T. (2013). Do human females use indirect aggression as an intrasexual competition strategy? *Phil Trans R Soc B 368*: 20130080. doi:10.1098/rstb.2013.0080

- Vaillancourt, T., & Hymel, S. (2006). Aggression and social status: The moderating roles of sex and peer-valued characteristics. *Aggressive Behavior*, 32, 396–408. doi:10.1002/ab.20138
- Vaillancourt, T. (2017). Indirect aggression and social aggression. In M.H. Bornstein, M.E. Arterberry, K.L. Fingerman, & J.E. Lansford (Eds.), *The SAGE Encyclopedia of Lifespan Human Development*. Sage Publications.
- Vaillancourt, T., Miller, J. L., Fagbemi, J., Côté, S., & Tremblay, R. E. (2007). Trajectories and predictors of indirect aggression: Results from a nationally representative longitudinal study of Canadian children aged 2–10. *Aggressive Behavior*, 33, 314–326. doi:10.1002/ab.20202
- Vaillancourt, T., Miller, J. L., & Sharma, A. (2010). “Tripping the Prom Queen”: Female intrasexual competition and indirect aggression. In K. Österman (Ed.), *Indirect and direct aggression*, (pp. 17-32). Frankfurt: Peter Lang Publishing Group.
- Wade, T. J., Cairney, J., & Pevalin, D. J. (2002). Emergence of gender differences in depression during adolescence: National panel results from three countries. *Journal of the American Academy of Child and Adolescent Psychiatry*, 41, 190–198. doi:10.1097/00004583-200202000-00013
- Wang, P. S., Angermeyer, M., Borges, G., Bruffaerts, R., Chiu, W. T., De Girolamo, G., ... others. (2007). Delay and failure in treatment seeking after first onset of mental disorders in the World Health Organization’s World Mental Health Survey Initiative. *World Psychiatry*, 6, 177-185.
- Weissman, M., Wolk, S., Goldstein, R., Moreau, D., Adams, P., Greenwald, S. ... Wickramaratne, P. (1999). Depressed adolescents grown up. *JAMA*, 281, 1707–1713. doi:10.1001/jama.281.18.1707

- Whisman, M. A., & McClelland, G. H. (2005). Designing, testing, and interpreting interactions and moderator effects in family research. *Journal of Family Psychology, 19*(1), 111–120. doi:10.1037/0893-3200.19.1.111
- Whiteford, H. A., Degenhardt, L., Rehm, J., Baxter, A. J., Ferrari, A. J., Erskine, H. E., ... others. (2013). Global burden of disease attributable to mental and substance use disorders: Findings from the Global Burden of Disease Study 2010. *The Lancet, 382*, 1575–1586.
- Williams, S. B., O'Connor, E. A., Eder, M., & Whitlock, E. P. (2009). Screening for child and adolescent depression in primary care settings: A systematic evidence review for the US preventive services task force. *Pediatrics, 123*(4), e716–e735. doi:10.1542/peds.2008-2415
- Yates, T. M., Burt, K. B., & Troy, M. F. (2011). A developmental approach to clinical research. In D. Cicchetti & G. I. Roisman (Eds.), *Minnesota Symposia on Child Psychology, Volume 36: The Origins and Organization of Adaptation and Maladaptation* (Vol. 6; pp. 231–282). John Wiley & Sons.

Table 1

Bivariate correlations, means and standard deviations of study variables

	DEP-T2 (SR)	PV-T1 (PR)	PV-T2 (PR)	OA-T1 (PR)	OA-T2 (PR)	RA-T1 (PR)	RA-T2 (PR)	Total <i>M</i>	Total <i>SD</i>	Girls <i>M</i>	Girls <i>SD</i>	Boys <i>M</i>	Boys <i>SD</i>	<i>t</i>	<i>p</i>	<i>d</i>
DEP-T1 (SR)	0.52	<i>0.07</i>	<i>0.09</i>	<i>0.06</i>	0.10	<i>0.03</i>	<i>0.03</i>	9.71	8.79	9.34	8.22	10.06	9.30	-0.88	0.379	-
DEP-T2 (SR)		0.13	0.11	<i>0.09</i>	<i>0.10</i>	<i>0.06</i>	<i>0.05</i>	8.25	7.09	8.65	7.98	7.83	5.96	1.17	0.243	-
PV-T1 (PR)			0.84	<i>0.06</i>	<i>0.03</i>	<i>-0.03</i>	<i>-0.02</i>	0.00	0.89	-0.08	0.79	0.08	0.97	-1.88	0.061	-
PV-T2 (PR)				<i>0.04</i>	<i>0.05</i>	<i>-0.01</i>	<i>-0.01</i>	-0.04	0.89	-0.14	0.71	0.07	1.05	-2.29	0.023	0.23
OA-T1 (PR)					0.62	0.62	0.42	0.00	0.90	-0.16	0.71	0.15	1.02	-3.75	0.000	0.35
OA-T2 (PR)						0.44	0.56	-0.02	0.84	-0.17	0.52	0.14	1.06	-3.66	0.000	0.37
RA-T1 (PR)							0.69	0.00	0.83	0.11	1.00	-0.11	0.61	2.88	0.004	0.27
RA-T2 (PR)								0.02	0.88	0.16	1.04	-0.15	0.63	3.66	0.000	0.36

Notes. DEP=Depression symptoms; PV=Peer victimization; OA=Overt aggression; RA=Relational aggression; SR=Self-report; PR=Peer-report; T1=Time 1; T2=Time 2. Statistics in bold are statistically significant at the 0.05 level (2-tailed) and those in italics are not statistically significant.

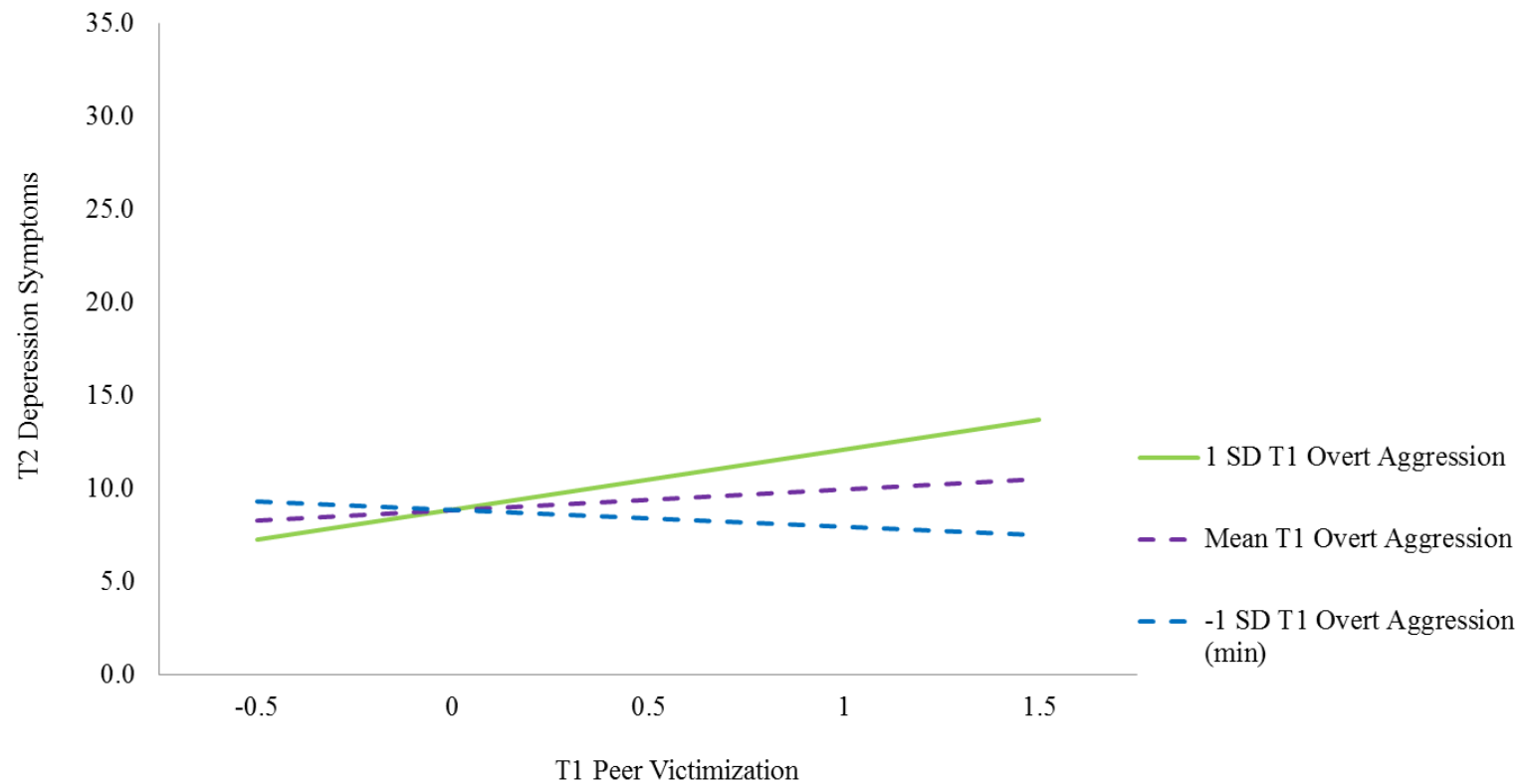


Figure 1. Graph of Peer Victimization (T1) Predicting Depression Symptoms (T2) with Moderator of Overt Aggression (T1) for Girls who Did Not Transition and Controlling for T1 Depression Symptoms. Solid line is statistically significant at the .05 level and the dashed lines are not statistically significant. T1=Time 1; T2=Time 2; Range of peer victimization includes 95% of data.

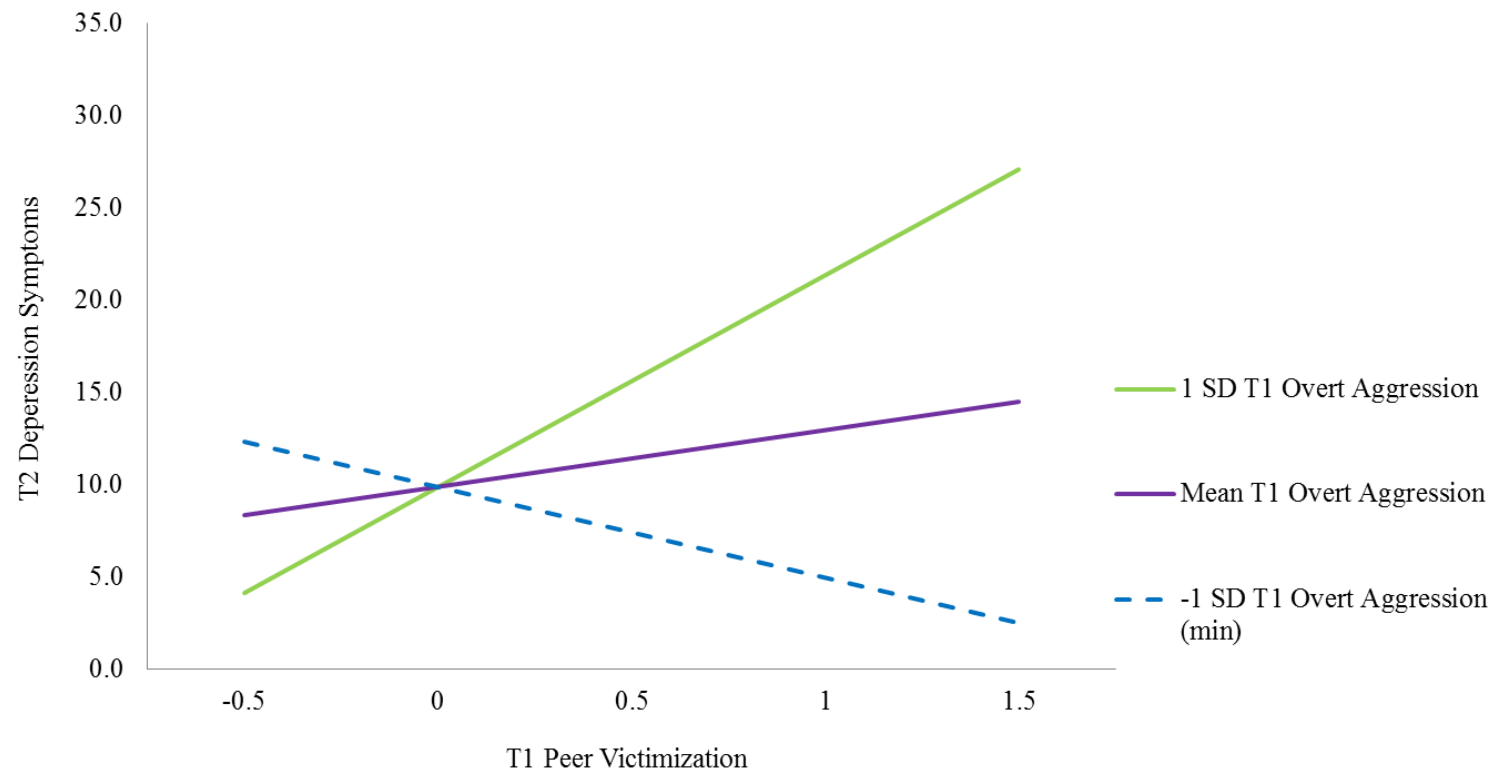


Figure 2. Graph of Peer Victimization (T1) Predicting Depression Symptoms (T2) with Moderator of Overt Aggression (T1) for Girls who Transitioned to High School and Controlling for T1 Depression Symptoms. Solid line is statistically significant at the .05 level and the dashed lines are not statistically significant. T1=Time 1; T2=Time 2; Range of peer victimization includes 95% of data.

Chapter 5 – General Discussion

Summary of Research Findings

Study 1:

The primary purpose of Study 1 was to test the developmentally-based interpersonal model of depression in preschool age children (Rudolph, 2009; Rudolph et al., 2008; Rudolph et al., 2016). The social-behavioural deficit of non-normative aggression and the relationship disturbance of peer victimization were expected to predict depression symptoms and interact to predict depression symptoms (Rudolph, 2009; Rudolph et al., 2008; Rudolph et al., 2016). Whether the form of aggression impacted this relation was also tested. Specifically, in preschool children, physical aggression was expected to moderate the association of physical victimization and depression symptoms and relational aggression was expected to moderate the association between relational peer victimization and depression symptoms. A secondary aim was to test whether gender and form of aggression moderated the association of peer victimization and depression symptoms. Specifically, physical aggression was expected to moderate the association of physical peer victimization and depression symptoms for boys and relational aggression was expected to moderate the association between relational peer victimization and depression symptoms for girls. Support was found for the social-behavioural deficit of relational aggression moderating the relationship disturbance of relational peer victimization in association with depression symptoms. Physical aggression did not moderate the association between physical peer victimization and depression symptoms. A simple effect of physical aggression being associated with depression symptoms was also found. These associations were found when interpersonal dysfunctions (i.e., aggression and victimization) and depression symptoms were reported by teachers. There was no evidence of moderation of gender. Observed relational

aggression was negatively related to teacher-reported depression symptoms highlighting the possibility of a group of children who use this form of aggression and gain benefits from it.

Study 2:

The objective of Study 2 was to statistically compare the interpersonal risk, symptoms-driven, and transactional models over eight years from grade 5 to grade 12. Different associated features of mental health have been found to depend on informant (Offord et al., 1996). Allowing informants to remain separate allows for different possible patterns to emerge. In order to determine if findings could be replicated across reporters, one model included parent-reported depression symptoms and one included self-reported depression symptoms. Predictions regarding developmental trends included assessing whether stability paths varied more at younger ages and were consistently stable during adolescence similar to previous research (Cole et al., 2002). Peer victimization stability was expected to be variable during late childhood and adolescence. Cross-lagged paths that emerge during the transition to secondary school were expected to be stronger than other time points. Peer victimization was expected to mediate the relation between depression symptoms and perceived peer rejection similar to previous research (Kochel et al., 2012). Support for a symptoms-driven model was found for depression symptoms and peer experiences. Depression symptoms predicted later perceived peer rejection when depression symptoms were self-reported and when parent-reported. Previous research has shown a similar pattern using a variety of independent reports of depression symptoms and peer rejection (Agoston & Rudolph, 2013; Kochel et al., 2012) suggesting that depressed youth may indeed be rejected by peers. Depression symptoms also predicted later peer victimization when data were self-reported. These associations have also been demonstrated in previous research using multiple informants (Kochel et al., 2012). Peer victimization was found to lead to

perceived peer rejection and not the reverse. Peer victimization did not mediate the relation between depression symptoms and perceived peer rejection. This may have related to the long period of time over which mediation was tested (i.e., from grade 9 to grade 12) or the age of participants. In our sample, mediation was tested in adolescence and previous research has found this pattern of association in late childhood (Kochel et al., 2012). Self-reported depression symptoms were found to be consistently stable in adolescence and variable in late childhood as predicted. Symptoms-driven paths emerged at the transition from grade 8 to grade 9 in both self-reported and parent-reported models. In the self-reported depression symptoms model, the path from grade 8 to grade 9 was stronger than the path from grade 11 to grade 12. This suggests that those already experiencing depression symptoms may have a particularly difficult time during the transition to secondary school (Rudolph, 2009).

Study 3:

The objective of Study 3 was to examine whether gender non-normative aggression, gender and transition to secondary school moderated the association between peer victimization and depression symptoms in a cohort of Canadian youth from grade 6 to grade 9 assessed at two time points. Peer-reported victimization and aggression and self-reported depression symptoms were used. Moderators of aggression and gender were tested concurrently and moderators of aggression, gender, and transition were tested over time while accounting for prior depression symptoms. Overt aggression was found to moderate the association between peer victimization and depression symptoms for girls at the second time point and overt aggression was found to predict the depression symptoms for girls at the first time point. When examined longitudinally, including school transition as a moderator and accounting for prior depression symptoms, overt aggression moderated the association between peer victimization and depression symptoms for

girls and this association was amplified for girls who transitioned compared to those who did not transition.

Integration of Findings and Implications

Studies 1 and 3 both found the social-behavioural deficit of aggression was a moderator of the association between the relationship disturbance of peer victimization and depression symptoms. However, the form of aggression mattered in each study and predictions were different depending on age. That is, the form of aggression that was normative and non-normative for preschool children differed for children and adolescents. For preschool children, relational aggression is just beginning to emerge (Vaillancourt, Miller, Fagbemi, Côté, & Tremblay, 2007). The association between relational peer victimization and depression symptoms was present at high levels of relational aggression use in early childhood when teacher reports were used. By middle childhood, relational aggression use is normative for boys and girls (Underwood, 2003) and during late childhood and adolescence, the association of peer victimization with depression symptoms was not dependant on relational aggression. Overt aggression was age and gender non-normative for girls in late childhood and adolescence. Overt aggression moderated the association between peer victimization and depression symptoms across peer- and self-reports concurrently. That is, at high levels of overt aggression, peer victimization was associated with depression symptoms for girls.

In summary, some support was obtained that social-behavioural deficits and relationship disturbances interact in association with depression symptoms as early as preschool and in late childhood and adolescence. This supports the developmentally-based interpersonal model of depression (Rudolph, 2009; Rudolph et al., 2016). However, the form of aggression and age also matter in determining what constituted a social behavioural deficit. This also highlights that care

should be taken in using findings regarding aggression from childhood or adolescence to approximate processes in young children without first examining the developmental progression of the behaviour. In late childhood and adolescence, gender also mattered—overt aggression moderated the association between peer victimization for girls but not boys. Finally, school transition also impacts these associations such that, for highly overtly aggressive girls, school transition amplified the association of peer victimization predicting later depression symptoms when accounting for previous depression symptoms.

The associations of peer experiences or interpersonal dysfunctions and depression symptoms were also found to be impacted by transition to high school in multiple ways. In Study 2 and Study 3, transition to high school strengthened the association of interpersonal dysfunction and depression symptoms. In Study 2, the path of depression symptoms prior to the transition predicted peer rejection following the transition and this path was stronger than the same path at the end of high school. This was found when depression symptoms were self-reported and when accounting for the stability of constructs and within time relations. The path of depression symptoms prior to the transition predicting peer rejection following the transition also replicated across self- and parent-reported depression symptoms. In Study 3, peer victimization before the transition predicted depression symptoms following the transition when girls engaged in high levels of overt aggression and when girls were victimized by peers prior to the transition to high school. This was found while accounting for depression symptoms before the transition. This suggests that both overtly aggressive girls, victimized by their peers and those who are experiencing depression symptoms prior to the transition to high school may have difficulty after the transition (with depression symptoms and perceived peer rejection respectively).

Finally, similar to allowing form of aggression to remain separate and finding different associations, informant perspectives were also left separate. This was done in order to allow different associated features to emerge should they exist (Offord et al., 1996) and to observe the ways in which effects across informants were similar or different. Research has shown different associations with psychosocial variables depending on the reporter of psychopathology suggesting that there may be value in viewing psychopathology as informant-specific syndromes by keeping informants separate (Dirks, Boyle, & Georgiades, 2011; Dirks, De Los Reyes, Briggs-Gowan, Cella, & Wakschlag, 2012; Offord et al., 1996).

Informant discrepancies have often been regarded as problems that need to be fixed (De Los Reyes, 2011). While multiple informants are often recommended as the best approach, there is little agreement on how multiple informants should be used (Dirks et al., 2011; Dirks et al., 2012). Informant discrepancies may reveal useful information from which we can learn (De Los Reyes, 2011). Studies differ in informants, methods, and the statistics used and researchers can speculate about the differences, find patterns in the inconsistencies and consistencies, and form hypotheses about why this may be the case, which can then be incorporated into future research. There are multiple elements in an informant report aside from measurement error such as child characteristics, the context of the possibility for observation, and the knowledge or experience of the informant regarding who they are reporting on (Dirks et al., 2011; Kraemer et al. 2003). The context of observations and the knowledge or experience of the observer can yield useful information (Dirks et al., 2011). For example, in the case of Study 1, it was speculated that daycare teachers may have a more generalized view of aggression and victimization obtained over many opportunities to observe the child. Whereas behaviour that is rare, such as relational peer victimization and relational aggression, may not have been as well captured over the up to

five 10 minute intervals of observation of research assistants. This could be tested in future research to include more observation sessions of 10 minute intervals to see if observations would then be more consistent with teacher reports.

In Study 1 and Study 3, social-behavioural deficits moderated the association of relationship disturbances and depression symptoms. There is evidence that mathematically, the presence of common method variance contributed to difficulty in being able to detect interactions (Siemsen, Roth, & Oliveira, 2010), meaning that at least in the case of interactions, common method variance should not be such a concern. Indeed, researchers are now encouraging others to be curious about discrepancies, use the possible reasons for them in future research, and to not dismiss findings based on the possibility of measurement error (Achenbach, 2011; De Los Reyes, 2011).

Contributions to Knowledge

Study 2 contributed to scientific knowledge in the area of analytic methods. Longitudinal designs are needed to evaluate the contribution of interpersonal risk, symptoms-driven, and transactional models. Direct statistical comparison of the relative contribution of interpersonal risk, symptoms-driven, and transactional models is needed in order to state one model better fits the data than another. In this paper, researchers are encouraged to examine the relative contribution of interpersonal risk, symptoms-driven, and transactional models in determining whether support is found for one of the models as opposed to relying solely on the statistical significance of directional paths. This rigorous analytic approach contributes to the knowledge of how researchers interpret support related to competing models.

The support for the symptoms-driven model also adds to the growing literature suggesting symptoms-driven pathways are important to consider as are multiple forms of peer

experiences. Study 3 identifies that overtly aggressive girls who experience peer victimization have heightened depression symptoms one year later and particularly following the transition to high school when accounting for prior symptoms of depression. These findings are important in identifying areas of risk that may benefit from intervention. Study 2 found depression symptoms lead to perceived peer rejection, particularly following transition. Study 1 goes back to the origin of where peer experiences typically begin to accumulate— preschool. In this study, high amounts of relational aggression and relational victimization by peers was associated with depression symptoms. This suggests another group of children at risk of heightened depression symptoms are relationally aggressive preschoolers who are also relationally victimized by peers. From a developmental psychopathology perspective, experience and the meaning attributed to experience are viewed in the context of development (Yates et al., 2011). Early childhood research on peer experiences and depression symptoms are important not only because these associations are present in children this young, but these experiences form the basis of peer experiences on which later schemas are built. At this young age, there is ample opportunity to intervene prior to the consolidation of a negative view of the self, others, or the world (Haines et al., 1999).

Intervention and Prevention Implications

Whether individuals adapt to the transition to a new school environment or not may depend on the match of individual needs with the perception of the availability of support in the new environment (Cicchetti & Rogosch, 2002). The close coupling of interpersonal dysfunction and depression symptoms could imply there are unmet needs in the new environment for those who have come into the context with experiences of overt aggression and peer victimization for girls or experience with depression symptoms for boys and girls. Labeling the need suggests

some form of action (e.g., a needs assessment could be conducted). Identification of needs according to multiple perceptions, prioritizing needs that arise, and compiling appropriate interventions can be assessed (Watkins & Kavale, 2014). Needs assessments (e.g., focus groups) of transitioning students who are experiencing symptoms of depression and girls experiencing peer victimization and engaging in overt aggression may be helpful in beginning to determine how best to address these needs. Needs assessments may come from the perceptions of students themselves, teachers or parents, mental health professionals who work with adolescents, and researchers of peer relations and mental health in order to form a starting point for which cost-effective and evidence-based interventions may be compiled.

While a needs assessment from a variety of stakeholders including youth will be important in determining the variety of possible options on program implementation and what is likely to be effective, there are some evidence-based programs targeting different levels of intervention and prevention efforts that may apply. Interpersonal psychotherapy (IPT) was developed as a treatment for depression in adults and has been developed as a treatment for adolescents (IPT-A) both of which have been supported by randomized control trials (Young & Mufson, 2008). Symptom reduction and improving the individual's role in interpersonal relations are goals of IPT and in adolescence, IPT-A focuses on the individual's independence and negotiation of relationships on which the individual also depends. The area of interpersonal issues are agreed upon and focused on in conjunction with depression symptoms. Depression symptoms and interpersonal experiences are discussed and linked in discussions with clinician and client, psychoeducation and interpersonal skill building are emphasized. The approach is time-limited (12 sessions) and focuses on both depression symptoms and interpersonal problems where the focus could include peer relations. This intervention would be helpful for those

experiencing depression symptoms prior to the transition to secondary school and those experiencing both depression symptoms and problems with peers (e.g., girls engaging in aggression and experiencing peer victimization). A group-based program that has shown some evidence of preventing the likelihood of developing depression is the Coping with Stress program which aims to manage mood, conflict with parents and peers along with altering thinking patterns for adolescents (Gladstone & Beardslee, 2009; Stice, Shaw, Bohon, Marti, & Rohde, 2009). This program may be useful for those with demonstrated risk of developing heightened depression symptoms (e.g., overtly aggressive girls experiencing peer victimization).

Finally, multiple randomized control trials of interventions aimed at reducing the incidence of depressive episodes have shown success in adolescence: reductions in the incidence of depression symptoms ranging from 34-44% (see Munoz, Schueller, Barrera, Le, & Torres, 2014 for review). One of the recommendations of the review of Munoz et al. (2014) was to focus prevention efforts on high risk populations such as those who have experienced an episode of depression given that the likelihood of future depressive episodes is very high. As mentioned previously, prevention and intervention efforts on areas of demonstrated risk may be important in preventing an increase in depression symptoms. This research may be helpful to keep in mind as schools and communities respond to the issues of depression symptoms in youth and peer problems.

Limitations

Although sample sizes were an advantage, as with most studies, sample sizes also limited what elements could be incorporated into each study. Study 1 likely lacked the power to be able to detect sex differences as a three-way interaction (McClelland, 2014; Whisman & McClelland, 2005). In Study 2, examining constructs yearly for eight years in cascade model approach where

stabilities and within time associations were accounted was an advantage in examining cross-lagged paths. Examining the model in this way also limited the examination of sex to a control variable instead of an interaction. In Study 3, the four-way interaction of peer victimization, overt aggression, gender and transition was examined and deemed more important to include than using a cascade model approach.

Western, educated, industrialized, rich and democratic (WEIRD) societies and specifically undergraduate populations in the United States are common participants in experiments on human behaviour but may differ in areas such as perceptions of fairness or cooperation (Henrich, Heine, & Norenzayan, 2010). Researchers cautioned others to take care of generalizing beyond the subsample of WEIRD undergraduates when making claims about human nature. The studies in the present dissertation came from Canadian community samples of children and youth but these are still part of a WEIRD society and should not be generalized beyond that without cross-cultural evidence of similarities or differences. For example, the core symptoms of depression appear cross-culturally (APA, 2013; Tseng, 2001), however the frequency of symptom presentation is less consistent (Tseng, 2001). Risk factors associated with depression symptoms are expected to be influenced by culture (Klienman, 2004). More research is needed on the associations of peer experiences and depression symptoms across different cultures. In each study, care was taken to allow the full range of experiences consistent with a developmental psychopathology perspective (Cicchetti & Rogosch, 2002), yet also considering the limitations within the statistical approaches and analyses. Symptoms of depression were examined and not the disorder in order to make full use of the available data, not decrease the power to detect effects by dichotomizing variables (Whisman & McClelland, 2005) and to acknowledge the importance of subclinical levels of symptoms (Cicchetti & Rogosch, 2002).

Another limitation is that while the focus of the interpersonal environment in this dissertation was that of peers, risk factors of depression symptoms are varied and can also involve the family environment and genetic risk for the development of depression symptoms. In terms of the family environment, childhood depression symptoms are associated with parenting factors and these factors account for 8% of variance in childhood depression according to meta-analytic findings (McLeod, Weisz, & Wood, 2007). These researchers also found that parent rejection (i.e., withdrawal, lack of warmth and hostility) was more strongly associated with childhood depression symptoms than controlling behaviour. This research also calls to question parenting playing a large role in symptom development, and although links exist, there is only a small direct role of parenting factors and many other factors are influencing the development of depression symptoms.

In terms of genetic factors, rates of first degree relatives having experienced depression are higher for individuals experiencing a depressive episode than the first degree relatives of those who have not experienced depression (Sullivan, Neale, & Kendler, 2000). There is also research pointing to gene and environment interactions. For example in a study by Caspi et al. (2003) individuals carrying one or two copies of the short allele of the serotonin-transporter gene (5-HTTLPR) who were also exposed to maltreatment in childhood were found to be more likely to develop depression symptoms in adulthood. This replicated effect tends to be small and sensitive to methods effects (Lau, Lester, Hodgson, & Eley, 2014).

Finally, while depression symptoms were the focus of investigation in this dissertation, as acknowledged in paper 3, multiple other conditions can be comorbid with depression. One example is conduct problems and another is anxiety symptoms. Although depression and anxiety are often studied together in the form of internalizing disorders, there are some important

differences between anxiety disorders and depression that imply separation may be desirable in some circumstances. In anxiety disorders, a key feature is excessive responses to the anticipation of threat, which is present in perceptual biases. This threat can be detected even when the information is presented very briefly such as 30-500 msec (Mineka & Vrshek-Schallhorn, 2014). For individuals who have major depressive disorder, negative information is attended to but the presentation time tends to be longer (1000-1500 msec). Further, deficits in the ability to experience positive emotion are present in depression but not anxiety disorders. This research suggests that the information perceived in the interpersonal environment may differ for those with only anxiety symptoms and the deficits in experiencing positive emotion for those with depression symptoms also likely have impact on interpersonal relations. Separating symptom clusters of anxiety and depression allows these different patterns to emerge and can further our understanding of the risk factors and consequences associated with depression symptoms. Ideally, many different symptom clusters would need to be examined simultaneously in order to ascertain the unique and common contributions of different types of symptoms in association with peer experiences. This type of inquiry would require a longitudinal design that is well-powered.

Overall, many factors contribute to the development of depression symptoms. In each study, researchers have to make decisions on which variables to focus on within the constraints of study design, sample size and statistical analyses. In the present dissertation, the focus of interpersonal experiences was peer experiences and the focus mental health problem was depression symptoms along with some conditions under which these constructs were associated during childhood and adolescence.

Conclusion

Peer experiences in association with depression symptoms were found to vary depending on multiple conditions. Aggression modified the association of peer victimization and depression symptoms and this differed by developmental period and form of peer experiences (i.e., victimization and aggression). Consideration of peer experiences that depression symptoms predict, as well as peer experiences that predict depression symptoms is important in future research. Finally, critical periods which place some children at greater risk for depression symptoms and peer problems (such as the transition to high school) deserve attention with respect to research, prevention, and intervention efforts in order to reduce the burden of depression for individuals and society. Indeed, research on policy and services in mental health that is evidence-based, sustainable, and cost-effective is imperative in order to impact the burden of mental health problems (Whiteford et al., 2013). It may be prudent to focus policy and mental health services research along with prevention and intervention efforts on times of demonstrated risk (e.g., transition to high school), for those at risk for mental health problems (e.g., relationally aggressive preschoolers experiencing relational peer victimization; overtly aggressive girls in late childhood and adolescence experiencing peer victimization), while considering both mental health problems (e.g., depression symptoms) and peer problems (e.g., peer victimization, peer rejection).

References

- Aalto-Setälä, T., Marttunen, M., Tuulio-Henriksson, A., Poikolainen, K., & Lönngqvist, J. (2002). Depressive symptoms in adolescence as predictors of early adulthood depressive disorders and maladjustment. *The American Journal of Psychiatry*, 159, 1235–1237. doi:10.1176/appi.ajp.159.7.1235
- Achenbach, T. M. (2011). Commentary: Definitely more than measurement error: But how should we understand and deal with informant discrepancies? *Journal of Clinical Child & Adolescent Psychology*, 40, 80–86. doi:10.1080/15374416.2011.533416
- Agoston, A. M., & Rudolph, K. D. (2013). Pathways from depressive symptoms to low social status. *Journal of Abnormal Child Psychology*, 41, 295–308. doi:10.1007/s10802-012-9675-y
- Alsaker, F. D. & Valkanover, S. (2001). Early diagnosis and prevention of victimization in kindergarten. In J. Juvonen & S. Graham (Eds.), *Peer harassment in school: The plight of the vulnerable and victimized* (pp.175-195). New York, NY: Guilford Press.
- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Washington, DC: Author.
- American Psychological Association. (2010). *Publication manual of the American Psychological Association* (6th ed.). Washington, DC: Author.
- Angold, A., Costello, E. J., Farmer, E., Burns, B. J., & Erkanli, A. (1999). Impaired but undiagnosed. *Journal of American Academy of Child and Adolescent Psychiatry*, 38, 129–137. doi:10.1097/00004583-199902000-00011
- Barker, E. D., Boivin, M., Brendgen, M., Fontaine, N., Arseneault, L., Vitaro, F., ... Tremblay, R. E. (2008). Predictive validity and early predictors of peer-victimization trajectories in

preschool. *Archives of General Psychiatry*, 65, 1185–1192.

doi:10.1001/archpsyc.65.10.1185

Blakely-McClure, S. J., & Ostrov, J. M. (2017). Examining co-occurring and pure relational and physical victimization in early childhood. *Journal of Experimental Child Psychology*, 166, 1–16. doi:10.1016/j.jecp.2017.07.011

Birmaher, B., Ryan, N. D., Williamson, D. E., Brent, D. A., Kaufman, J., Dahl, R. E., ... & Nelson, B. (1996). Childhood and adolescent depression: A review of the past 10 years. Part I. *Journal of the American Academy of Child & Adolescent Psychiatry*, 35, 1427-1439. doi:10.1097/00004583-199611000-00011

Caspi, A., Sugden, K., Moffitt, T. E., Taylor, A., Craig, I. W., Harrington, H., ... & Poulton, R. (2003). Influence of life stress on depression: Moderation by a polymorphism in the 5-HTT gene. *Science*, 301, 386-389. doi:10.1126/science.1083968

Choukas-Bradley, S., & Prinstein, M. J. (2014). Peer relationships and the development of psychopathology. In M. Lewis, & K.D. Rudolph (Eds.), *Handbook of developmental psychopathology* (pp.185–204). New York, NY: Springer Science+Business Media. doi:10.1007/978-1-4614-9608-3

Cicchetti, D., & Rogosch, F. A. (2002). A developmental psychopathology perspective on adolescence. *Journal of Consulting and Clinical Psychology*, 70(1), 6–20. doi:10.1037//0022-006X.70.1.6

Coie, J. D., Dodge, K. A., & Coppotelli, H. (1982). Dimensions and types of social status: A cross-age perspective. *Developmental Psychology*, 18, 557.

Cole, D. A., Tram, J. M., Martin, J. M., Hoffman, K. B., Ruiz, M. D., Jacquez, F. M., & Maschman, T. L. (2002). Individual differences in the emergence of depressive symptoms

in children and adolescents: A longitudinal investigation of parent and child reports.

Journal of Abnormal Psychology, 111, 156. doi:10.1037//0021-843X.111.1.156

Cole, D. A. (2006). Coping with longitudinal data in research on developmental

psychopathology. *International Journal of Behavioral Development*, 30, 20–25.

doi:10.1177/0165025406059969

Costello, E., J. & Angold, A. (2006). Developmental epidemiology. In D. Cicchetti, & D. J.

Cohen (Eds.), *Developmental Psychopathology* (2nd ed.; Vol. 1; pp. 41-75). Hoboken, NJ:

John Wiley & Sons, Inc.

Côté, S., Vaillancourt, T., LeBlanc, J. C., Nagin, D. S., & Tremblay, R. E. (2006). The

development of physical aggression from toddlerhood to pre-adolescence: A nation wide

longitudinal study of Canadian children. *Journal of Abnormal Child Psychology*, 34, 68–

82. doi:10.1007/s10802-005-9001-z

Crick, N. R., Casas, J. F., & Ku, H. C. (1999). Relational and physical forms of peer

victimization in preschool. *Developmental Psychology*, 35, 376–385. doi:10.1037/0012-

1649.35.2.376

Crick, N. R., & Grotpeter, J. K. (1995). Relational aggression, gender, and social-psychological

adjustment. *Child Development*, 66, 710-722. doi:10.1111/j.1467-8624.1995.tb00900.x

Crick, N. R., Ostrov, J. M., Appleyard, K., Jansen, E. A., & Casas, J. F. (2004). Relational

aggression in early childhood: “You can’t come to my birthday party unless...” In M.

Putallaz, & K. L. Bierman, (Ed.). *Aggression, antisocial behaviour, and violence among*

girls: A developmental perspective. New York, NY: Guilford Press.

De Los Reyes, A. (2011). Introduction to the special section: More than measurement error:

Discovering meaning behind informant discrepancies in clinical assessments of children

and adolescents. *Journal of Clinical Child & Adolescent Psychology*, 40, 1–9.

doi:10.1080/15374416.2011.533405

Dempsey, A. G., Sulkowski, M. L., Nichols, R., & Storch, E. A. (2009). Differences between peer victimization in cyber and physical settings and associated psychosocial adjustment in early adolescence. *Psychology in the Schools*, 46, 962–972. doi:10.1002/pits.20437

Dirks, M. A., Boyle, M. H., & Georgiades, K. (2011). Psychological symptoms in youth and later socioeconomic functioning: Do associations vary by informant? *Journal of Clinical Child & Adolescent Psychology*, 40, 10–22. doi:10.1080/15374416.2011.533403

Dirks, M.A., De Los Reyes, A., Briggs-Gowan, M., Cella, D., & Wakschlag, L.S. (2012). Annual research review: Embracing not erasing contextual variability in children's behaviour – theory and utility in the selection and use of methods and informants in developmental psychopathology. *Journal of Child Psychology and Psychiatry*, 52, 558–574. doi:10.1111/j.1469-7610.2012.02537.x

Domènech-Llaberia, E., Viñas, F., Pla, E., Jané, M. C., Mitjavila, M., Corbella, T., & Canals, J. (2009). Prevalence of major depression in preschool children. *European Child and Adolescent Psychiatry*, 18, 597–604. doi:10.1007/s00787-009-0019-6

Fergusson, D. M., Horwood, L. J., Ridder, E. M., & Beautrais, A. L. (2005). Subthreshold depression in adolescence and mental health outcomes in adulthood. *Archives of General Psychiatry*, 62(1), 66–72.

Ferrari, A. J., Charlson, F. J., Norman, R. E., Patten, S. B., Freedman, G., Murray, C. J. L., ... Whiteford, H. A. (2013). Burden of depressive disorders by country, sex, age, and year: Findings from the global burden of disease study 2010. *PLoS Medicine*, 10(11), e1001547. doi:10.1371/journal.pmed.1001547

- Gibb, B.E. (2014). Depression in children. In I. H. Gotlib & C. L. Hammen, *Handbook of depression* (3rd ed.; pp. 374-390). New York, NY: The Guildford Press.
- Gladstone, T. R., & Beardslee, W. R. (2009). The prevention of depression in children and adolescents: A review. *The Canadian Journal of Psychiatry*, 54(4), 212–221.
- Haines, B. A., Metalsky, G. I., Cardamone, A. L., & Joiner, T. (1999). Interpersonal and cognitive pathways into the origins of attributional style: A developmental perspective. In T. Joiner & J. C. Coyne (Eds.), *The interactional nature of depression: Advances in interpersonal approaches*. (pp. 65–92). Washington, DC: American Psychological Association.
- Hamilton, J. L., Potter, C. M., Olino, T. M., Abramson, L. Y., Heimberg, R. G., & Alloy, L. B. (2016). The temporal sequence of social anxiety and depressive symptoms following interpersonal stressors during adolescence. *Journal of Abnormal Child Psychology*, 44, 495-509. doi:10.1007/s10802-015-0049-0
- Hawker, D. S., & Boulton, M. J. (2000). Twenty years' research on peer victimization and psychosocial maladjustment: a meta-analytic review of cross-sectional studies. *Journal of Child Psychology and Psychiatry*, 41, 441-455. doi:10.1111/1469-7610.00629
- Henrich, J., Heine, S.J., & Norenzayan, A. (2010). The weirdest people in the world? *Behavioural and Brain Sciences*, 33, 61-135. doi:10.1017/S0140525X0999152X
- Joiner, T., Coyne, J. C., & Blalock, J. (1999). On the interpersonal nature of depression: Overview and synthesis. In T. Joiner & J. C. Coyne (Eds.), *The interactional nature of depression: Advances in interpersonal approaches*. (pp. 3–19). Washington: American Psychological Association.

- Kamper-DeMarco, K. E., & Ostrov, J. M. (2017). Prospective associations between peer victimization and social-psychological adjustment problems in early childhood. *Aggressive Behavior*, 43, 471–482. doi:10.1002/ab.21705
- Kaltiala-Heino, R., Fröjd, S., & Marttunen, M. (2010). Involvement in bullying and depression in a 2-year follow-up in middle adolescence. *European Child & Adolescent Psychiatry*, 19, 45–55 doi:10.1007/s00787-009-0039-2
- Klienman, A. (2004). Culture and depression. *New England Journal of Medicine*, 351, 951-953.
- Kochel, K. P., Ladd, G. W., & Rudolph, K. D. (2012). Longitudinal associations among youth depressive symptoms, peer victimization, and low peer acceptance: An interpersonal process perspective: depressive symptoms, victimization, and peer acceptance. *Child Development*, 83, 637–650. doi:10.1111/j.1467-8624.2011.01722.x
- Kraemer, H. C., Measelle, J. R., Ablow, J. C., Essex, M. J., Boyce, W. T., & Kupfer, D. J. (2003). A new approach to integrating data from multiple informants in psychiatric assessment and research: Mixing and matching contexts and perspectives. *American Journal of Psychiatry*, 160, 1566-77. doi:10.1176/appi.ajp.160.9.1566
- Kumpulainen, K., Räsänen, E., Henttonen, I., Almqvist, F., Kresanov, K., Linna, S.-L., ... Tamminen, T. (1998). Bullying and psychiatric symptoms among elementary school-age children. *Child Abuse & Neglect*, 22, 705–717.
- Kumpulainen, K., & Räsänen, E. (2000). Children involved in bullying at elementary school age: their psychiatric symptoms and deviance in adolescence: an epidemiological sample. *Child Abuse & Neglect*, 24, 1567–1577.
- Landoll, R. R., La Greca, A. M., Lai, B. S., Chan, S. F., & Herge, W. M. (2015). Cyber victimization by peers: Prospective associations with adolescent social anxiety and

depressive symptoms. *Journal of Adolescence*, 42, 77-86.

doi:10.1016/j.adolescence.2015.04.002

Lau, J.Y.F., Lester, K.J., Hodgson, K., & Eley, T.C. (2014). The genetics of mood disorders. In I. H. Gotlib & C. L. Hammen, *Handbook of depression* (3rd ed.; pp. 165-181). New York, NY: The Guildford Press.

Little, T. D., Jones, S. M., Henrich, C. C., & Hawley, P. H. (2003). Disentangling the “whys” from the “whats” of aggressive behaviour. *International Journal of Behavioral Development*, 27, 122–133. doi:10.1080/01650250244000128

Luby, J. L., Heffelfinger, A. K., Mrakotsky, C., Hessler, M. J., Brown, K. M., & Hildebrand, T. (2002). Preschool major depressive disorder: preliminary validation for developmentally modified DSM-IV criteria. *Journal of the American Academy of Child and Adolescent Psychiatry*, 41, 928–937. doi:10.1097/00004583-200208000-00011

Marshall, N. A., Arnold, D. H., Rolon-Arroyo, B., & Griffith, S. F. (2015). The association between relational aggression and internalizing symptoms: A review and meta-analysis. *Journal of Social and Clinical Psychology*, 34, 135-160.

McClelland, G. H. (2014). Nasty data: Unruly, ill-mannered observations can ruin your analysis. In H. T. Reis & C. M. Judd (Eds.), *Handbook of Research Methods in Social and Personality Psychology* (2nd ed., pp. 608–626). New York: Cambridge University Press.
Retrieved from <http://ebooks.cambridge.org/ref/id/CBO9780511996481>

McLeod, B. D., Weisz, J. R., & Wood, J. J. (2007). Examining the association between parenting and childhood depression: A meta-analysis. *Clinical Psychology Review*, 27(8), 986-1003.
doi:10.1016/j.cpr.2007.03.001

- Merikangas, K. R., He, J., Burstein, M., Swanson, S. A., Avenevoli, S., Cui, L., ... Swendsen, J. (2010). Lifetime prevalence of mental disorders in US adolescents: Results from the National Comorbidity Survey Replication–Adolescent Supplement (NCS-A). *Journal of the American Academy of Child & Adolescent Psychiatry*, 49(10), 980–989. doi:10.1016/j.jaac.2010.05.017
- Markon, K. E., Chmielewski, M., & Miller, C. J. (2011). The reliability and validity of discrete and continuous measures of psychopathology: A quantitative review. *Psychological Bulletin*, 137(5), 856–879. doi:10.1037/a0023678
- Mesman, J., & Koot, H. M. (2000). Child-reported depression and anxiety in preadolescence: II. Preschool predictors. *Journal of the American Academy of Child and Adolescent Psychiatry*, 39, 1379–1386. doi:10.1097/00004583-200011000-00012
- Mineka, S., & Vrshek-Schallhorn, S. (2014). Comorbidity of unipolar depressive and anxiety disorders. In I. H. Gotlib & C. L. Hammen, *Handbook of depression* (3rd ed.; pp. 84-102). New York, NY: The Guildford Press.
- Moore, S. E., Norman, R. E., Suetani, S., Thomas, H. J., Sly, P. D., & Scott, J. G. (2017). Consequences of bullying victimization in childhood and adolescence: A systematic review and meta-analysis. *World Journal of Psychiatry*, 7(1), 60. doi:10.5498/wjp.v7.i1.60
- Munoz, R.F., Schueller, S.M., Barrera, A.Z., Le, H-N., & Torres, L.D. (2014). Major depression can be prevented: Implications for research and practice. In I. H. Gotlib & C. L. Hammen, *Handbook of depression* (3rd ed.; pp. 471-491). New York, NY: The Guildford Press.

- Nolan, S. A., Flynn, C., & Garber, J. (2003). Prospective relations between rejection and depression in young adolescents. *Journal of Personality and Social Psychology*, 85(4), 745–755. doi:10.1037/0022-3514.85.4.745
- Offord, D. R., Boyle, M. H., Racine, Y., Szatmari, P., Fleming, J. E., Sanford, M., & Lipman, E. L. (1996). Integrating assessment data from multiple informants. *Journal of the American Academy of Child and Adolescent Psychiatry*, 35, 1078-1085. doi: 10.1097/00004583-199608000-00019
- Olweus, D. (2001). Peer harassment: a critical analysis and some important issues. In J. Juvonen, & S. Graham (Eds.) *Peer harassment in school: The plight of the vulnerable and victimized* (pp.3-20). New York, NY: Guilford Press.
- Ostrov, J. M. (2008). Forms of aggression and peer victimization during early childhood: A short-term longitudinal study. *Journal of Abnormal Child Psychology*, 36, 311–322. doi:10.1007/s10802-007-9179-3
- Ostrov, J. M., & Godleski, S. A. (2010). Toward an integrated gender-linked model of aggression subtypes in early and middle childhood. *Psychological Review*, 117(1), 233-242. doi:10.1037/a0018070
- Ostrov, J. M., Kamper, K. E., Hart, E. J., Godleski, S. A., & Blakely-McClure, S. J. (2014). A gender-balanced approach to the study of peer victimization and aggression subtypes in early childhood. *Development and Psychopathology*, 26(3), 575–587. doi:10.1017/S0954579414000248
- Platt, B., Kadosh, K. C., & Lau, J. Y. F. (2013). The role of peer rejection in adolescent depression. *Depression and Anxiety*, 30, 809–821. doi:10.1002/da.22120
- Rohde, P., Lewinsohn, P. M., Klein, D. N., Seeley, J. R., & Gau, J. M. (2013). Key characteristics of major depressive disorder occurring in childhood, adolescence, emerging

adulthood, and adulthood. *Clinical Psychological Science*, 1, 41–53.

doi:10.1177/2167702612457599

- Rudolph, K. D. (2009). The interpersonal context of adolescent depression. In S. Nolen-Hoeksema, & L. M. Hilt (Eds.) *Handbook of depression in adolescents* (pp.377-417): New York, NY: Routledge.
- Rudolph, K.D., Flynn, M., & Abaied, J.L. (2008). A developmental perspective on interpersonal theories of youth depression. In J. R. Z. Abela & B. L. Hankin (Eds.), *Handbook of depression in children and adolescents* (pp. 79-102). New York, NY: Guilford.
- Rudolph, K. D., Flynn, M., Abaied, J., Groot, A., & Thompson, R. (2009). Why is past depression the best predictor of future depression? Stress generation as a mechanism of depression continuity in girls. *Journal of Clinical Child and Adolescent Psychology*, 38(4), 473–485. doi:10.1080/15374410902976296
- Rudolph, K.D., Lansford, J.E., & Rodkin, P.C. (2016). Interpersonal theories of developmental psychopathology. In D. Cicchetti (Ed.), *Developmental psychopathology, Maladaptation and Psychopathology* (pp. 243-311). Hoboken, NJ: John Wiley & Sons, Inc.
- Rutter, M., Kim-Cohen, J., & Maughan, B. (2006). Continuities and discontinuities in psychopathology between childhood and adult life. *Journal of Child Psychology and Psychiatry*, 47, 276–295. doi:10.1111/j.1469-7610.2006.01614.x
- Schwartz, D., Gorman, A. H., Nakamoto, J., & Toblin, R. L. (2005). Victimization in the peer group and children's academic functioning. *Journal of Educational Psychology*, 97, 425. doi:10.1037/0022-0663.97.3.425
- Schwartz, D., Lansford, J. E., Dodge, K. A., Pettit, G. S., & Bates, J. E. (2015). Peer victimization during middle childhood as a lead indicator of internalizing problems and

- diagnostic outcomes in late adolescence. *Journal of Clinical Child & Adolescent Psychology*, 44, 393–404. doi:10.1080/15374416.2014.881293
- Siemsen, E., Roth, A., & Oliveira, P. (2010). Common method bias in regression models with linear, quadratic, and interaction effects. *Organizational Research Methods*, 13, 456–476. doi:10.1177/1094428109351241
- Sourander, A., Helstelä, L., Helenius, H., & Piha, J. (2000). Persistence of bullying from childhood to adolescence—a longitudinal 8-year follow-up study. *Child Abuse & Neglect*, 24, 873–881. doi:10.1016/S0145-2134(00)00146-0
- Sroufe, L. A., & Rutter, M. (1984). The domain of developmental psychopathology. *Child Development*, 55, 17. doi:10.2307/1129832
- Stice, E., Shaw, H., Bohon, C., Marti, C. N., & Rohde, P. (2009). A meta-analytic review of depression prevention programs for children and adolescents: Factors that predict magnitude of intervention effects. *Journal of Consulting and Clinical Psychology*, 77(3), 486–503. doi:10.1037/a0015168
- Sullivan, P. F., Neale, M. C., & Kendler, K. S. (2000). Genetic epidemiology of major depression: Review and meta-analysis. *American Journal of Psychiatry*, 157, 1552–1562. doi:10.1176/appi.ajp.157.10.1552
- Sweeting, H., Young, R., West, P., & Der, G. (2006). Peer victimization and depression in early-mid adolescence: A longitudinal study. *British Journal of Educational Psychology*, 76, 577–594. doi:10.1348/000709905X49890
- Thapar, A., Collishaw, S., Pine, D. S., & Thapar, A. K. (2012). Depression in adolescence. *The Lancet*, 379, 1056–1067. doi:10.1016/S0140-6736(11)60871-4

- Tokunaga, R. S. (2010). Following you home from school: A critical review and synthesis of research on cyberbullying victimization. *Computers in Human Behavior*, 26, 277–287. doi:10.1016/j.chb.2009.11.014
- Tremblay, R. E., Japel, C., Perusse, D., McDuff, P., Boivin, M., Zoccolillo, M., & Montplaisir, J. (1999). The search for the age of “onset” of physical aggression: Rousseau and Bandura revisited. *Criminal Behavior and Mental Health*, 9, 8-23. doi:10.1002/cbm.288
- Tseng, W-S. (2001). *Handbook of Cultural Psychiatry*. San Diego, CA: Academic Press.
- Ttofi, M. M., Farrington, D. P., Lösel, F., & Loeber, R. (2011). Do the victims of school bullies tend to become depressed later in life? A systematic review and meta-analysis of longitudinal studies. *Journal of Aggression, Conflict and Peace Research*, 3, 63–73. doi:10.1108/17596591111132873
- Underwood, M. K. (2003). *Social Aggression in Girls*. New York: Guilford Press
- Vaillancourt T. (2013). Do human females use indirect aggression as an intrasexual competition strategy? *Phil Trans R Soc B* 368: 20130080. doi:10.1098/rstb.2013.0080
- Vaillancourt, T., Brittain, H. L., McDougall, P., & Duku, E. (2013). Longitudinal links between childhood peer victimization, internalizing and externalizing problems, and academic functioning: Developmental cascades. *Journal of Abnormal Child Psychology*, 41, 1203–1215. doi:10.1007/s10802-013-9781-5
- Vaillancourt, T., Miller, J. L., Fagbemi, J., Côté, S., & Tremblay, R. E. (2007). Trajectories and predictors of indirect aggression: Results from a nationally representative longitudinal study of Canadian children aged 2–10. *Aggressive Behavior*, 33(4), 314–326. doi:10.1002/ab.20202

- Vaillancourt, T., Miller, J. L., & Sharma, A. (2010). "Tripping the Prom Queen": Female intrasexual competition and indirect aggression. In K. Österman (Ed.), *Indirect and direct aggression*, (pp. 17-32). Frankfurt: Peter Lang Publishing Group.
- Watkins, R., & Kavale, J. (2014). Needs: Defining what you are assessing. In J. W. Altschuld & R. Watkins (Eds.), *Needs assessment: Trends and a view toward the future. New Directions for Evaluation*, 144, 19–31.
- Watkins, R., & Kavale, J. (2014). Needs: Defining what you are assessing. *New Directions for Evaluation*, 2014(144), 19–31. doi:10.1002/ev.20100
- Weissman, M., Wolk, S., Goldstein, R., Moreau, D., Adams, P., Greenwald, S. ... Wickramaratne, P. (1999). Depressed adolescents grown up. *JAMA*, 281, 1707–1713. doi:10.1001/jama.281.18.1707
- Whisman, M. A., & McClelland, G. H. (2005). Designing, testing, and interpreting interactions and moderator effects in family research. *Journal of Family Psychology*, 19, 111–120. doi:10.1037/0893-3200.19.1.111
- Whiteford, H. A., Degenhardt, L., Rehm, J., Baxter, A. J., Ferrari, A. J., Erskine, H. E., ... others. (2013). Global burden of disease attributable to mental and substance use disorders: Findings from the Global Burden of Disease Study 2010. *The Lancet*, 382, 1575–1586.
- Yates, T. M., Burt, K. B., & Troy, M. F. (2011). A Developmental Approach to Clinical Research. In *Minnesota Symposia on Child Psychology, Volume 36: The Origins and Organization of Adaptation and Maladaptation* (Vol. 6, p. 231). John Wiley & Sons.
- Young, J. F. & Mufson, L. (2008). Interpersonal psychotherapy for treatment and prevention of adolescent depression. In J. R. Z. Abela & B. L. Hankin (Eds.), *Handbook of depression in children and adolescents* (pp. 288-306). New York, NY: Guilford.

Zimmer-Gembeck, M. J., Hunter, T. A., & Pronk, R. (2007). A model of behaviors, peer relations and depression: Perceived social acceptance as a mediator and the divergence of perceptions. *Journal of Social and Clinical Psychology, 26*, 273. doi: 10.1521/jscp.2007.26.3.273

Zimmer-Gembeck, M. J., Waters, A. M., & Kindermann, T. (2010). A social relations analysis of liking for and by peers: Associations with gender, depression, peer perception, and worry. *Journal of Adolescence, 33*, 69–81. doi:10.1016/j.adolescence.2009.05.005