



# Peer Victimization and Depression Symptoms: The Moderating Role of Gender Non-normative Aggression and School Transition

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## 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 1 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).

**Keywords** Depression · Peer victimization · Overt aggression · Relational aggression · Transition

Depression is rare in childhood and becomes more common in adolescence (Merikangas et al. 2010; Rohde et al. 2013; Thapar et al. 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 et al. 1998; Birmaher et al. 1996; Costello et al. 2006; Thapar et al. 2012; Wade et al. 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's adaptive development and prevent an increase of depression symptoms (Rudolph 2009).

According to Rudolph et al. (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

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period. Normative development has been described as occurring when intervention is not necessary, whereas non-normative development occurs when intervention may be suggested (Costello and 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, and 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 et al. 2005; Schwartz et al. 2015; Moore et al. 2017; Ttofi et al. 2011). Although peer victimization may present an increased risk of depression for some, not all individuals victimized by peers experience maladjustment (McDougall and 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 et al. 2003). Overt aggression includes physical and

verbal aggression. Relational aggression is behaviour directed toward manipulating relationships such as exclusion and gossip (Crick and 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 et al. 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 et al. 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 and 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 et al. 2009; Vaillancourt et al. 2007). In adolescence, most individuals exhibit low levels of physical aggression that decrease over time (Cleverley et al. 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 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 is thus 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 and Olsen 2004; Newman et al. 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 and 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 and 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 and Karakanta 2013 for review). Longitudinally, aggression predicts later depression symptoms. For example, 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 et al. 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 et al. 1999; Schwartz et al. 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 et al. 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 and 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 and 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 avoid problems with common method variance, 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 and Boulton 2000; Podsakoff et al. 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 et al. 1999; Rutter et al. 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 et al. 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;  $M_{\text{age}} = 12$  years,  $SD_{\text{age}} = 1$  year, range 11–16 years;) and students in grades 7–10 at Time 2 (T2;  $M_{\text{age}} = 13$  years,  $SD_{\text{age}} = 1$  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 race/ethnicity and the majority were Caucasian (89.5%).

## Procedures

A series of self-report and peer-report questionnaires were administered to groups students in 50 min 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 et al. 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 chose 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 RPC included 40 roles and additional items were created from literature on peer relations (Vaillancourt and 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 target 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 et al. 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 and 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 and 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 and 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

The 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

**Table 1** Bivariate means, standard deviations and correlations 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 M	Total SD	Girls M	Girls SD	Boys M	Boys SD	<i>t</i>	<i>p</i>	<i>d</i>
DEP-T1 (SR)	<b>0.52</b>	0.07	0.09	0.06	<b>0.10</b>	0.03	0.03	9.71	8.79	9.34	8.22	10.06	9.30	-0.88	0.379	-
DEP-T2 (SR)		<b>0.13</b>	<b>0.11</b>	0.09	0.10	0.06	0.05	8.25	7.09	8.65	7.98	7.83	5.96	1.17	0.243	-
PV-T1 (PR)			<b>0.84</b>	0.06	0.03	-0.03	-0.02	0.00	0.89	-0.08	0.79	0.08	0.97	-1.88	0.061	-
PV-T2 (PR)				0.04	0.05	-0.01	-0.01	-0.04	0.89	-0.14	0.71	0.07	1.05	-2.29	0.023	0.23
OA-T1 (PR)					<b>0.62</b>	<b>0.62</b>	<b>0.42</b>	0.00	0.90	-0.16	0.71	0.15	1.02	-3.75	0.000	0.35
OA-T2 (PR)						<b>0.44</b>	<b>0.56</b>	-0.02	0.84	-0.17	0.52	0.14	1.06	-3.66	0.000	0.37
RA-T1 (PR)							<b>0.69</b>	0.00	0.83	0.11	1.00	-0.11	0.61	<b>2.88</b>	0.004	0.27
RA-T2 (PR)								0.02	0.88	0.16	1.04	-0.15	0.63	<b>3.66</b>	0.000	0.36

Statistics in bold are statistically significant at the 0.05 level (two-tailed) and those in italics are not statistically significant

DEP depression symptoms, PV peer victimization, OA overt aggression, RA relational aggression, SR self-report, PR peer-report, T1 time 1, T2 time 2

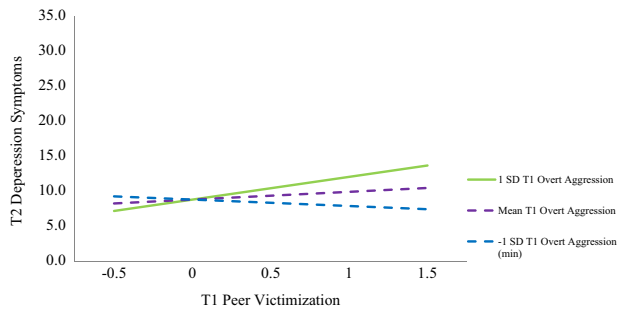
experiencing more peer victimization than girls at T2 ( $t(340.04) = -2.29, p = .023; d = 0.23$ ) and were more overtly aggressive at T1 ( $t(417.06) = -3.75, p < .001; d = 0.35$ ) and T2 ( $t(279.27) = -3.66, p < .001; d = 0.37$ ) than girls. Girls were nominated by peers as being more relationally 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 was not 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  $\times$  overt aggression:  $b = 1.17, p = .359$ ; peer victimization  $\times$  relational aggression:  $b = 0.23, p = .739$ ).

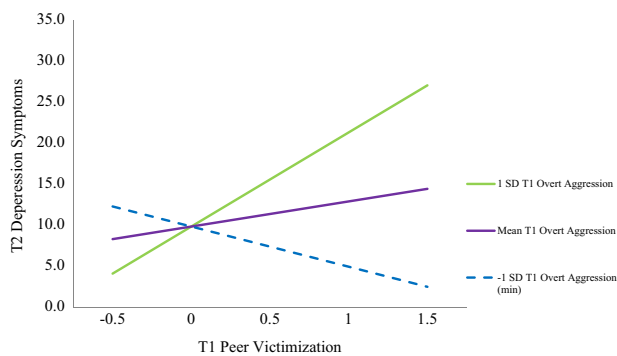
At T2, when a multi-group model was conducted using sex as the grouping variable, the model for girls accounted for a statistically significant portion of the variance in depression symptoms ( $R^2 = .10, p = .003$ ) while the model for boys did not ( $R^2 = .04, p = .183$ ). In the model for girls, 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  $\times$  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 and 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 and 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  $\times$  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  $\times$  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  $\times$  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  $\chi^2(1) = 4.06, p = .044$ ). The peer victimization  $\times$  overt aggression interactions varied by sex for those who transitioned (Wald  $\chi^2(1) = 6.98, p = .008$ ) and those who did not transition (Wald  $\chi^2(1) = 4.80, p = .029$ ). The peer victimization  $\times$  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



**Fig. 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. Range of peer victimization includes 95% of the data



**Fig. 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. Range of peer victimization includes 95% of the data

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 Fig. 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 not 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 and 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 and Rudolph 2006; Rudolph 2009; Rudolph et al. 2008). Girls' friendships tend to include more validation, affection, and self-disclosure than boys (Rose and 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 include the same students moving 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), these additional contextual and interpersonal changes may place them 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 et al. 2011; Vaillancourt and 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 increased 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 and Little 2006).

Consistent with the developmentally-based interpersonal model of depression symptoms for youth, transition moderated interpersonal dysfunctions (Rudolph et al. 2008). That is, 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 the peer nominations and the self-reported data with consistent measurements across time within a longitudinal design. Despite these strengths, there were 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 et al. 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 et al. 2003). One of the common peer problems for youth experiencing conduct disorder is aggression (Parker et al. 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 and 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, it would be preferable to create composites that include multiple questions of each form.

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 et al. 2016; Williams et al. 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 et al. 2011). This suggests that more research is needed to examine screening processes and to test the utility of appropriate services 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 et al. 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).

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### Compliance with ethical standards

**Conflict of interest** The authors declare that they have no conflict of interest.

**Ethical approval** 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** Informed consent was obtained from parents or guardians and informed assent for children participating in the study.

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