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**Transactional Associations between Children's Socioemotional Difficulties and Parental Aggression toward the Child over a Ten-Year Period in a Lower-Income Population**

## Abstract

**Purpose.** This study examined the transactional effects of parental physical and verbal aggression and children's externalizing (EP) and internalizing problems (IP) from early school age to adolescence in lower-income community sample using a multi-informant perspective. **Methods.** Mother-child dyads (n=175) from urban low socioeconomic backgrounds that are part of the BLIND Longitudinal Risk Project, a prospective intergenerational study, participated. Children's EP and IP were assessed by mothers and teachers at ages 6-8, 9-11, and 13-17-years-old (Child Behavior Checklist). Mothers also self-reported physical and verbal aggression toward their child (Conflict Tactics Scales Parent-Child). **Results.** Results from cross-lagged analyses with mothers' reports of EP and IP revealed a transactional process with EP and physical aggression, and a child-driven effect with IP and verbal aggression. EP at 6-8-years-old were associated with increased physical aggression at 9-11 years of age, that in turn were associated with increased EP in adolescence. IP at 6-8 years old were associated with increased verbal aggression at 9-11 years. Some effects were identified when using teachers' reports of socioemotional difficulties, including a transactional process from verbal aggression at 6-8 years old, to increased EP at 9-11 years, to increased physical aggression at 13-17 years. **Conclusions.** Overall, parent-driven and child-driven effects were present, but results differed across informants and behaviour problem types. These results have important implications for research and intervention that are discussed in light of the developmental psychopathology and transactional models of development.

*Keywords:* externalizing problems, internalizing problems, verbal aggression, physical aggression, transactions

Socioemotional difficulties in childhood, such as externalizing (e.g., hyperactivity, aggression, antisocial behaviours; EP) and internalizing (e.g., anxiety, depression, withdrawal; IP) problems, have been consistently associated with impairment and negative outcomes throughout the lifespan (e.g., Erskine et al., 2016; Kremer, Flower, Huang, & Vaughn, 2016). Parental practices and behaviours, such as aggression, can exacerbate these socioemotional difficulties in children (e.g., Lysenko, Barker, & Jaffee, 2013). Recent progress in developmental science has underscored the relevance of studying these factors transactionally and over multiple developmental periods. In the present study, we explored the transactions between parental aggression and socioemotional difficulties in a three-wave design using prospective, longitudinal, and multi-informant data from the BLIND Longitudinal Risk Project (hereafter, BLIND Project), a longitudinal study of lower-income families initiated in 1976.

In a recent meta-analysis, Erskine et al. (2016) underscored the deleterious long-term consequences (e.g., academic underachievement, criminality) for children suffering from Attention-Deficit/Hyperactivity Disorder and Conduct Disorder, two common externalizing disorders. Furthermore, trajectories of high EP in childhood appear to remain stable, leading to disruptive disorders in adulthood, and mood and anxiety disorders (Moffitt, Caspi, Harrington, & Milne, 2002; Reef, Diamantopoulou, van Meurs, Verlhist, & van der Ende, 2011). IP are also associated with negative long-term outcomes. In a forty-year longitudinal study, Colman, Wadsworth, Croudace, and Jones (2007) found that individuals presenting such difficulties in adolescence had higher rates of mental disorders in adulthood and had been treated more frequently for mental health problems. Furthermore, IP were found to predict lower academic achievement and higher peer-victimization (Kremer et al, 2016; Vaillancourt, Brittain, McDougall, & Duku, 2013). Given these medium to long-term outcomes, studying early precursors of socioemotional difficulties in childhood appear central to fostering healthy developmental trajectories.

Positive parenting and maternal sensitivity were found to be negatively associated with EP and IP, while the reverse was true for harsh or critical parenting (Feldstein et al., 2020; Mills et al., 2012; Reuben et al., 2016). Parental aggression (e.g., physical and verbal) is often conceptualized as a form of harsh parenting and is consistently associated with EP and IP in childhood and adolescence (Burnette, Oshri, Lax, Richards, & Ragbeer, 2012; Cecil, Barker, Jaffee, & Viding, 2012; Rosen, Handley, Cicchetti, & Rogosch, 2018). Lee Wiggins, Mitchell, Hyde, and Monk (2015) found that children showing trajectories of high EP and IP had parents who displayed higher levels of harsh parenting throughout their childhood. Furthermore, sex differences in harsh discipline (i.e., males experiencing it more frequently) were found to account for 10 to 20% of the sex differences in conduct problems (i.e., males usually presenting higher levels than females; Lysenko et al., 2013). While other individual and environmental factors (e.g., temperament, genetic vulnerability, socioeconomic status; Hentges et al., 2015; Mills et al., 2012; Rioux, Castellanos-Ryan, Parent, & Séguin, 2016) have been associated with the development of socioemotional difficulties in childhood, parenting practices appear to be of central importance for at least two reasons: 1) they have been repeatedly associated with EP and IP; and 2) they can effectively be targeted in prevention and intervention efforts aiming to foster psychosocial adaptation in at-risk children (National Academies of Sciences, Engineering, and Medicine, 2016).

Parent-driven effects regarding the development of socioemotional difficulties have been well studied and established. In addition, following current transactional and developmental psychopathology models of development (Cicchetti, 2006; Sameroff, 2009), there is a need to understand reciprocal influences between parents and children, so researchers have turned to the study of possible child-driven (Davidov, Knafo-Noam, Serbin, & Moss, 2015) and transactional processes. Transactional processes can be uncovered with models including at least three waves of data between at least two people. These processes are identified when one variable at Time 1 (T1), predicts the other

variable at Time 2 (T2), which in turn predicts the initial variable at Time 3 (T3). These models describe children as active agents in their relation to their environment (Kuczynski & De Mol, 2015). As presented by Olson and Lunkenheimer (2009) “the relationship between parent and child is an active, self-organizing system in which stable patterns emerge over time from ongoing parent-child transactions” (pp. 63). Since early parent-child interaction is the primary context for the development of self-regulation – a core component of socioemotional difficulties – the association between negative parent-child interaction and socioemotional difficulties, according to these authors, is a reflection of a failure in the development of self-regulation (Olson & Lunkenheimer, 2009). Another commonly used model to understand deleterious transactional processes is Patterson’s Coercive Process Theory that postulates a process of mutual reinforcement where caregivers’ coercive reactions to children’s difficult behaviours reinforce those behaviours, creating mutually enhancing cycles of negative interactions (Patterson, Dishion, and Bank, 1984).

Consistent with the assumptions of transactional and developmental psychopathology models, reciprocal and bidirectional effects have been identified between parenting variables and socioemotional difficulties in children and adolescents. However, results have been mixed in the sense that parent-driven and child-driven effects that have been uncovered are not consistent across studies, probably due to methodological and developmental differences (e.g., age range of participants, types of socioemotional difficulties and parental behaviours assessed, measurement). For example, results from a five-year longitudinal study including two waves with children and adolescents indicated several parent-driven effects on socioemotional difficulties including parental control and rejection, and one child-driven effect with IP longitudinally predicting parenting stress (Barbot, Crossman, Hunter, Grigorenko, & Luther, 2014). Further, in a three-wave study of the associations between physical punishment and EP and IP (BLIND, 2015), physical punishment predicted EP, but no associations over time were found with IP.

Studies specifically investigating transactional processes between parental aggression, that could be construed as a form of harsh parenting or as abusive depending on the severity, and children's socioemotional difficulties are sparse and most document the effects of harsh discipline or corporal punishment. One study identified positive bidirectional effects between harsh discipline and conduct problems in twins aged 3- to 7-years-old (Lysenko et al., 2013), and another one between trajectories of harsh discipline and aggression over 5 years in a Turkish sample of children (Baydar & Akcinar, 2018). Bidirectional and transactional effects were also found between self-control and harsh parenting with the same twin sample (Cecil et al., 2012). Lee Wiggins et al. (2015) reported that externalizing symptoms were associated with increased harsh parenting at age 5, which in turn was associated with increased externalizing symptoms at age 9 controlling for levels of internalizing symptoms. This transactional process was not found with IP. Scaramella, Neppl, Ontai, and Conger (2008) identified a transactional process at play, but beginning with harsh parenting at age 2 being associated with increased EP at age 3, and EP at age 3 being associated with more harsh parenting at age 4. Using a Chinese sample, two-wave cross-lagged analyses identified parent-driven effects between mild and severe corporal punishment and physical abuse and EP in females 6 months later (Xing, Wang, Zhang, He, & Zhang, 2011). Positive child-driven effects were only found with severe corporal punishment and physical abuse in males. Another recent study identified both parent-driven and child-driven effects between verbal aggression and corporal punishment and oppositional defiant and attention deficits symptoms in a large sample of girls followed between 5 and 16 years old (Derella, Burke, Step, & Hipwell, 2019). Child-driven effects appeared more salient for behavioural symptoms of opposition and verbal aggression, while attention deficits and hyperactivity symptoms predicted both verbal aggression and corporal punishment (Derella et al., 2019). Another study documented reciprocal effects between EP and physical discipline from 6-9 years old, but only parent-driven effects for physical discipline and antisocial behaviours in a different sample of boys aged 10-15 years old

(Lansford et al., 2011). Finally, physical punishment by mothers and fathers predicted depressive symptoms and misconduct, but only misconduct – and not depressive symptoms – predicted physical punishment between 12 and 16 years old in Wang and Kenny's study (2014). Thus, there are indications that transactional processes involving harsh discipline or punishment and socioemotional difficulties, especially EP, are at play in childhood; however, the directions of the effects differ.

Taken together, results have varied across studies, and few studies have investigated transactional effects between childhood socioemotional difficulties and parental aggression specifically. Most studies rely only on maternal report and do not cover more than a six-year period. In addition, parental aggression is often measured as a single and broad construct – i.e. harsh parenting – instead of looking separately at its verbal and physical components. Yet, while they often co-occur (Kim, Mennen, & Trickett, 2017), physical aggression and verbal aggression are associated with distinct outcomes (Kim & Cicchetti, 2010; Sng et al., 2018). The present study was designed to fill these gaps and contribute toward a deeper understanding of the transactions between parental physical and verbal aggression and socioemotional difficulties in childhood, over a period of approximately 10 years encompassing three developmental periods (i.e., early school age, middle childhood/pre-adolescence, adolescence). The ages from 6 to 17 years old were targeted for several reasons. First, as demands for emotional and behavioural self-regulation increase at the beginning of this period and competent interpersonal interactions are a focal developmental task, EP and IP in school age and adolescence represent a major threat to positive adaptation (Eisenberg, Hofer, Sulik, & Spinrad, 2013; Fitzsimons & Finkel, 2013). Parent-child conflicts are also quite common during these periods and opportunities for violent parental behaviours might be frequent (Laursen, Coy, & Collins, 1998; Marceau, Ram, & Susman, 2015). In addition, major transitions are occurring between the waves of this study and represent important challenges that could result in discontinuity of socioemotional difficulties and parental aggression (Cicchetti & Rogosch, 2002; Graber & Brooks-Gunn, 1996).

Entrance to formal schooling (T1 of this study), then to high school (T3 of this study), transition from childhood to adolescence (between T2 and T3 of this study) and the demands associated with these changes are examples of such challenging transitions occurring between 6 and 17 years of age. Finally, while EP and IP during childhood and adolescence can crystallize into long-term chronic problems across several life contexts (e.g., family, couple, work; Colman et al., 2007; Erksine et al., 2016), early individual or family interventions can contribute to restore impaired developmental trajectories (Eiraldi et al., 2016; Ghafoori, 2001; Michelson, Davenport, Dretzke, Barlow, & Day, 2013).

Because it is now widely acknowledged that a multi-informant perspective is essential to obtain a thorough assessment of children's behaviours across contexts and to minimize potential informants' biases, mothers' and teachers' reports of EP and IP were incorporated in the present study (DelCarmen-Wiggins & Carter, 2004; De Los Reyes, 2011). Models were tested separately for mothers' and teachers' reports given the potentially differing behaviours of youths across contexts. While EP and IP frequently co-occur, they are distinct expressions of distress (inward vs. outward) with common genetic and non-shared environmental etiology (Cosgrove et al., 2011). Given the outward nature of EP and according to the Coercive Process Theory (Patterson et al., 1984), EP could be associated with stronger child-driven effects on parental aggression than IP. In fact, empirical findings to date seem to show more consistent bidirectional and transactional processes with EP than IP. However, parents could also react more negatively to highly withdrawn, depressed, and anxious children and those children could experience heightened distress following parental aggression (Albrecht, Galambos, & Jansson, 2007; Liang & Eley, 2005; Wang & Kenny, 2014). Therefore, based on previous findings and theoretical support for the relevance of studying EP and IP as related but separate constructs, different models were tested for EP and IP, but both were residualized after regressing on upon the other (Waldman, Poore, van Hulle, Rathouz, and Lahey, 2016). Finally, because of their frequent co-occurrence, the cross-lagged models that we tested integrated both physical and verbal aggression as separate but



correlated constructs. In doing so, the associations that would be uncovered between parental aggression and socioemotional difficulties would be specific to the type of aggression involved.

Based on the assumptions of transactional models and following previous empirical findings (Olson & Lunkenheimer, 2009; Patterson et al., 1994; Sameroff, 2009), we hypothesized that transactional effects between child and parent behaviour would be identified. Both EP and IP were expected to be associated with increasing levels of parental aggression over time and vice-versa, but the child-driven effects of EP on parental aggression was expected to be stronger. Physical and verbal aggression were expected to be associated with one another. Finally, fewer cross-lagged effects were expected in the models using teachers' than parents' reports of EP and IP given their cross-informant nature and the fact that the verbal and physical aggression are enacted by parents and not teachers.

### **Method**

Our study was designed to examine the transactional effects of parental physical and verbal aggression and EP and IP from early school age to adolescence in a lower-income community sample from the BLIND Project, a long-term study offering unique opportunities to examine these effects. This prospective longitudinal and intergenerational project began during the mid-70s in urban disadvantaged neighborhoods (for more complete methodology see BLIND, 1985; BLIND, 1998). School age children (G1) and their parents were recruited and oversampled to include a high proportion of aggressive and socially withdrawn children. Some of these children were then followed into adulthood and parenthood, and their children (G2) were included in the study, providing a rich opportunity to investigate family processes in an at-risk community sample. Consequently, the parents in this study are the original participants (G1) recruited in the 1970s and the children are their offspring (G2).

### **Participants**

Families who participated in this study are a subsample ( $n = 175$ ) of the original BLIND Project sample ( $N = 1774$ ) comprised of French-speaking children (G1) recruited in grades 1, 4, and 7 growing

up in lower-income neighborhoods in a large BLIND metropolitan area during the mid-70s (G1). These children were assessed on dimensions of aggression and social withdrawal using a peer-nomination measure (Pupil Evaluation Inventory: Pekarik, Prinz, Liebert, Weintraub, & Neale, 1976). Oversampling at the higher levels of aggression and withdrawal was done deliberately to allow for a range of scores across the continuum. This sample was thus considered high-risk given its low socioeconomic status and high levels of socioemotional difficulties relative to the general population. Following these original assessments, participants were followed in smaller subsamples, and subsequently their offspring (G2) were integrated in the project as the original sample became parents.

The subsample used in the present study ( $n = 175$ ) includes the original participants (G1) and their spouses who had children aged 1-6 years old in 1996-1998 (G2), at the beginning of an intergenerational phase of the BLIND Project. Three time-points were used in this study: T1 (1999-2003; G2 ages 6-8 years old:  $M = 7.44$  years old,  $SD = 0.65$ ), T2 (2002-2006; 9-11 years old;  $M = 10.56$ ,  $SD = 0.71$ ) and T3 (2006-2009; 13-17 years old;  $M = 13.44$ ,  $SD = 1.06$ ). Mothers' average age at T1 was 34.73 years old ( $SD = 3.32$ ). T-test analyses revealed no significant difference between the full sample ( $N = 1,774$ ) and this subsample in terms of neighborhood disadvantage, occupational prestige scores of parents (G0), or aggression and social withdrawal levels of G1 in their childhoods.

Sociodemographic characteristics of the sample at T1 are presented in Table 1. The sample is predominantly French-Canadian (Québécois), with less than 5% of other ethnicities (e.g., Haitian, North African, Lebanese and Vietnamese). Most participants spoke French at home and all attended French language schools. Mothers' mean education level corresponds to a high school diploma in the BLIND (completion in Grade 11). Weekly income corresponds to a yearly family income of a little under \$43,000 CAN, which was approximately \$6,000 under the mean income for the BLIND in 1999 (BLIND, 2005). Mean occupational prestige scores, calculated using Rossi, Sampson, Bose, Jasso, and Passel's indices (1974), correspond to entry level craftsmen's jobs and clerical occupations. Overall,

these current sociodemographic characteristics, in addition to the higher levels of socioemotional difficulties and poverty in parents' childhoods (G1), highlight the at-risk nature of this sample.

- Table 1 here -

## Measures

**Sociodemographic information.** Family sociodemographic information was gathered using a questionnaire that has been reliably used in the past for the BLIND Project (BLIND, 2015) completed by the mothers at every measurement time. Given that most of the indicators were stable over time, only T1 characteristics are reported in Table 1.

**Physical and verbal aggression.** Self-reported physical and verbal aggression of the mothers toward their children was assessed using the French translation of the Conflict Tactics Scales Parent-Child Version (CTS1; Straus, 1979). Mothers were asked to rate the frequency of behaviours varying in severity on a 7-point Likert-scale ranging from *never* (0) to *more than 20 times* (6) in the past year. Examples of items from the verbal aggression subscale are insulting their child, screaming at their child, or threatening him/her. Examples of items from the physical aggression subscale are hitting their child or pushing him/her. As suggested by Straus (1979), a sum was then calculated to create the scores on the physical (9 items) and verbal (6 items) aggression subscales. Psychometric properties (e.g., internal consistency and test-retest reliability) of this questionnaire are well established (Straus, 1979). Because some of the items pertaining to severe physical aggression were rated 0 by every parent in our sample, we were not able to compute an internal consistency Cronbach's alpha for this scale. Internal consistencies of the verbal aggression subscale in this study were acceptable (ranging from  $\alpha = .72$  to  $.78$ ). Mean scores of physical and verbal aggression are presented in Table 1.

**Socioemotional difficulties.** Children's socioemotional difficulties were assessed by mothers and teachers using the French translation of the Child Behaviour Checklist and the Teacher Report Form for school-aged children (CBCL, TRF; Achenbach & Rescorla, 2001). Informants were invited

to rate the frequency of the child's behaviours in the past 6 months on a 3-point scale ranging from *never true* (0) to *often or always true* (2). Two major subscales are derived from these questionnaires: EP (35 and 32 items for the parent and teacher forms, respectively) and IP (32 and 33 items). The EP scale comprises items related to antisocial behaviours and aggression while the IP scale includes items related to symptoms of anxiety, depression, social isolation, and somatic complaints. T-scores, standardized based on age and gender, are calculated based on informants' ratings and scores over 65 are considered of clinical severity. Psychometric properties (e.g., test-retest reliability, internal consistency, and inter-rater agreement) of these widely used questionnaires are well established (Achenbach & Rescorla, 2001). For the present sample, internal consistencies of the EP and IP subscales ranged from  $\alpha = .90$  to  $.97$  and  $\alpha = .84$  to  $.95$ , respectively. Mean scores of socioemotional difficulties are presented in Table 1. According to mothers' ratings, the percentages of children in the clinical range (93<sup>rd</sup> percentile) of EP and IP respectively were: 9.9% and 14% at T1, 10.8% and 17.1% at T2, 7.0% and 14.9% at T3. According to teachers' ratings, percentages of clinical EP and IP were: 11.3% and 15.1% at T1, 11.6% and 17.9% at T2, 12.7% and 12.7% at T3. Before their entry into the final set of path analyses, to omit overlap between IP and EP, both were residualized after regressing one upon the other.

## **Procedure**

Mothers' informed written consent was obtained at every measurement time for their own participation and the solicitation of teachers' participation. The demographic information questionnaire was completed over the telephone with a research assistant, and questionnaires were sent via regular mail to mothers and teachers. Questionnaires were then sent back to the research laboratory in prepaid envelopes. Measures used in the present study were part of a larger assessment package. Mothers received small financial compensations for their participation at every measurement occasion. All procedures were approved by the BLIND University Human Research Ethics Committee.

## Statistical Plan

Using SPSS 20, preliminary analyses were performed (assessing normality and transformation, identifying and treating outliers). Missing data analyses were also executed. Correlations between the study variables were also calculated. T-tests were performed to determine whether there were differences in the frequencies of parental aggression and in levels of socioemotional difficulties according to child sex.

The remainder of the statistical analyses included cross-lagged panel analyses conducted using Mplus 8.1 with robust estimation (MLR). Each model included associations between three variables assessed at three time points: mother reports of physical aggression, mother reports of verbal aggression, and child socioemotional difficulties. Four cross-lagged models were specified, one for each assessment of child behavior problems: (a) mother reports of child EP, (b) mother reports of child IP, (c) teacher reports of child EP, (d) teacher reports of child IP. For each of the four models, all possible associations were initially specified. Next, given our sample size, a model fitting process was followed where non-significant ( $p > .05$ ) longitudinal associations were trimmed. For all models, child sex was entered as a control variable. Lastly, to test if any identified longitudinal associations differed between males and females, follow up multiple group models were estimated with child sex as the grouping variable. Scaled chi-square difference tests identified significant differences in the strength of longitudinal associations across groups (sex). Any significant differences are reported.

Full Information Maximum Likelihood (FIML) procedure was used to maximize the use of available data. FIML is recognized as a state-of-the-art procedure to handle missing data as it has been shown to produce unbiased results (Little, Jorgensen, Lang, & Moore, 2014). Model fit was assessed using several fit indices. Following Kenny's guidelines (2015), a non-significant chi-square test, a Root Mean Square Error of Approximation (RMSEA) of .08 or less, a Comparative Fit Index (CFI) greater than 0.90, and a Standardized Root Mean Square Residual (SRMR) smaller than .08 were

considered good fit. Indirect effects were assessed using Bayesian estimation with 95% bias-corrected confidence intervals (CIs). Standardized estimates are reported for all results.

## Results

### Preliminary Analyses

Distributions of EP and IP T-scores were considered close enough to normality to prevent biases given that FIML has been proven to be robust under normality violation with data MCAR or Missing at Random (MAR; see Dong & Peng, 2013 for details). As expected with measures of violent behaviours, CTS1 scores were not normally distributed and therefore these data were transformed using square-root or logarithmic transformations. A small number of outliers (less than 5%) were brought to three *SDs* above the mean to reduce the bias they could introduce, without deleting them as they likely represent real but rare cases of more aggressive parents.

Missing value analyses showed Little's MCAR test was not significant ( $\chi^2 = 1035.09$ ,  $df = 967$ ,  $p = 0.063$ ;  $N = 157$ ), indicating that data were likely MCAR. However, T-tests revealed that mothers' level of education was associated with missingness, which is usually coherent with an MAR pattern. Lower levels of education were associated with more missing data. Consequently, mothers' level of education was entered as a covariate in the final models. Because they had missing data on all variables except the demographic information questionnaire, 21 participants were excluded from the analyses using parents' reports and 19 from those using teachers' reports, leaving final samples of  $n = 154$  and  $156$ . In terms of percentages, after excluding these cases, analyses revealed that 21.4% and 32.1% of CBCL and TRF scores were missing at T1, 27.9% and 39.1% at T2, and 26.0% and 49.4% at T3. CTS1 data at T1 were missing for 24.0-25.0% of cases, while it was 27.9-28.8-% for T2, and 24.7-26.3% for T3. T-tests revealed no significant differences on CBCL, TRF, and CTS1 scores at T1 between the full sample and the remaining families at T3.

Correlations between the study's variables are presented in Table 2. For the correlation table and t-tests, IP and EP were not residualized from each other. T-tests revealed no gender differences in the frequency of verbal aggression and physical aggression towards the children. When compared to females, mothers reported that males demonstrated higher levels of IP at T1 ( $t(131) = 2.04, p = .044, d = .35$ ), EP at T1 ( $t(111) = 2.16, p = .033, d = .37$ ), and EP at T2 ( $t(110) = 2.17, p = .032, d = .41$ ). Teachers also reported that, when compared to females, males demonstrated higher levels of IP at T2, ( $t(95) = 2.01, p = .047, d = .41$ ), EP at T2 ( $t(95) = 2.48, p = .015, d = .51$ ) and EP at T3 ( $t(72) = 2.53, p = .014, d = .58$ ).

- Table 2 here -

### **Cross-Lagged Panel Models with Mothers' Reports of Child Socioemotional Difficulties**

#### **(Objective 1)**

Final cross-lagged models investigating possible transactional processes between parental aggression and child socioemotional difficulties as assessed by mothers and accounting for autoregressive effects are presented in Figure 1. The two models identified continuity over time in socioemotional difficulties and in parental aggression, as well as positive concomitant associations between physical and verbal aggression. Only significant associations involving maternal reports of child IP or child EP, or child sex are described below.

- Figure 1 here -

Fit indices indicated that the final model including EP residualized from IP fit the data adequately ( $\chi^2 = 29.44, p = 0.20; N = 154; RMSEA = 0.038; CFI = 0.986; SRMR = 0.057$ ). This model explained 49.4% of the variance of EP, 40.9% of the variance of physical aggression, and 43.2% of the variance of verbal aggression at T3. Results revealed a significant positive association from EP at T1 to physical aggression at T2 ( $\beta = 0.170, CI [0.006, 0.342]$ ). Physical aggression at T2 was also positively associated with EP at T3 ( $\beta = 0.217, CI [0.044, 0.356]$ ). Indirect effect analyses were not

significant from EP at T1 to physical aggression at T2, to EP at T3 ( $\beta = 0.034$ , CI [-0.006, 0.089]). Child sex was positively associated with physical aggression ( $\beta = 0.215$ , CI [0.060, 0.369]) and with verbal aggression ( $\beta = 0.229$ , CI [0.072, 0.363]) at T1; parents of females reported higher levels of physical and verbal aggression. A follow up multiple group model (by child sex) revealed only one significant difference in longitudinal associations between males and females. While females demonstrated stability in maternal physical aggression from T1 to T2 ( $\beta = 0.654$ , CI [0.488, 0.820]), males demonstrated no stability ( $\beta = 0.043$ , CI [-0.380, 0.466]). Constraining associations that did not differ across sex to equality did not change the pattern of significant findings reported above.

The final model including IP residualized from EP also had good fit indices ( $\chi^2 = 22.54$ ,  $p = 0.61$ ;  $N = 154$ ; RMSEA = 0.000; CFI = 1.000; SRMR = 0.058). It explained 29.9% of the variance of IP, 40.2% of the variance of physical aggression, and 42.9% of the variance of verbal aggression at T3. Results revealed a significant positive association from IP at T1 to verbal aggression at T2 ( $\beta = 0.195$ , CI [0.048, 0.342]). There were no other significant cross-lagged associations involving IP. Physical aggression at T2 was positively associated with verbal aggression at T3 ( $\beta = 0.394$ , CI [0.238, 0.551]). A pattern of associations like the one found with EP between child sex and parental aggression was found in this model. Constraining associations that did not differ across sex to equality did not change the pattern of significant findings reported above.

### **Cross-Lagged Panel Models with Teachers' Reports of Child Socioemotional Difficulties**

#### **(Objective 2)**

Final cross-lagged panel models examining possible transactional processes between parental aggression and child socioemotional difficulties as assessed by teachers are presented in Figure 2. Only significant and new associations involving teacher reports of child IP or EP, and child sex are described.

- Figure 2 here -



Fit indices indicated that the final model including EP residualized from IP fit the data adequately ( $\chi^2 = 25.82$ ,  $p = 0.31$ ;  $N = 156$ ;  $RMSEA = 0.028$ ;  $CFI = .992$ ;  $SRMR = 0.054$ ). This model explained 28.8% of the variance of EP, 45.2% of the variance of physical aggression, and 45.5% of the variance of verbal aggression at T3. Results revealed a significant positive association from verbal aggression at T1 to EP at T2 ( $\beta = 0.217$ , CI [0.038, 0.396]). EP at T2 was positively associated with physical aggression at T3 ( $\beta = 0.224$ , CI [0.056, 0.391]). The indirect effect from verbal aggression at T1 to EP at T2 to physical aggression at T3 did reach statistical significance ( $\beta = 0.053$ , CI [0.008, 0.107]). A follow up multiple group models (by child sex) revealed females demonstrated significantly stronger stability for EP from T2 to T3 ( $\beta = 0.641$ , CI [0.466, 0.816]), when compared to males ( $\beta = 0.251$ , CI [0.190, 0.581]), however both paths were statistically significant.

Fit indices indicated that the final model including IP residualized from EP fit the data adequately ( $\chi^2 = 20.17$ ,  $p = .69$ ;  $N = 156$ ;  $RMSEA = .000$ ;  $CFI = 1.000$ ;  $SRMR = .059$ ). This model explained 21.4% of the variance of IP, 41.2% of the variance of physical aggression, and 44.7% of the variance of verbal aggression at T3. Results revealed that verbal aggression at T2 was positively associated with IP at T3 ( $\beta = 0.247$ , CI [0.059, 0.434]). A pattern of associations like the one found with EP between child sex and parental aggression was found in this model. A follow up multiple group model (by child sex) revealed only one significant difference in longitudinal associations between males and females. While females demonstrated stability in maternal physical aggression from T1 to T2 ( $\beta = 0.577$ , CI [0.346, 0.808]), males demonstrated no stability ( $\beta = 0.174$ , CI [-0.271, 0.618]). However, in the multiple group model the association from maternal verbal aggression at T1 to maternal physical aggression at T2 became non-significant for both males and females.

## Discussion

In the present study, we aimed to identify whether transactional processes were at play with parental physical and verbal aggression and EP and IP from school age to adolescence. Consistent with developmental psychopathology and transactional frameworks (Cicchetti, 2006; Olson & Lunkenheimer, 2009; Sameroff, 2009), our hypotheses were partially supported: when using mothers' reports of EP, a transactional process was identified with physical aggression. A positive child-driven effect was identified with IP at T1 as assessed by mothers predicting increased verbal aggression at T2. A transactional process was found between EP and parental aggression when using teachers' reports; verbal aggression at T1 was associated with increased EP at T2 and EP at T2 were associated with increased physical aggression at T3. Further, verbal aggression at T2 was linked to increased IP at T3. The transactional effect identified between mothers reports of EP and physical aggression is consistent with results from previous studies and with conceptual models highlighting the presence of deleterious feedback loops involving aggressive interactions between parents and their children (Cecil et al., 2012; Lee Wiggins et al., 2015; Lisenko et al., 2013; Patterson et al., 1984; BLIND, 2015; Xing et al., 2011). Similar to Lee Wiggins et al.'s results (2015), the transactional process that was uncovered in our study showed that EP at T1 were associated with increased physical aggression, which in turn was associated with increased EP later on. Similar to Lee Wiggins et al. (2015), no transactional process involving IP was found. Our results differ somewhat from those of BLIND (2015). Several reasons might have accounted for the differences between our results and those of previous investigations: 1) in BLIND's study, different parenting dimensions were studied - physical punishment and positive parenting - and socioemotional difficulties were assessed by teachers only; and 2) in the present study, as opposed to previous ones, we measured physical and verbal aggression by parents and studied them separately, within the same models.

The fact that different effects were identified with EP and IP might be due in part to the very nature of these types of difficulties. EP might elicit more physical displays of anger and hostility on

the part of the parents, given the aggressive, explicit, and potentially antisocial components of the behaviours (Mackler et al., 2015). In turn, parents might model under-regulation of emotions and behaviours when they react in a physically aggressive manner themselves, explaining the transaction between physical aggression and EP (Patterson et al., 1984; Thompson, 2013). Interestingly, for children presenting high levels of withdrawal, anxiety, and depressive symptoms according to their mothers (IP), only a child-driven effect between T1 and T2 was found with verbal aggression, and no cross-lagged associations appeared with physical aggression. Thus, internalizing symptomatology seems to elicit verbal aggression, but not physical aggression, on the part of the mothers, which could be explained by the more quiet nature of IP compared to EP. Past studies have shown that parents of children or adolescents presenting IP or anxiety are more likely to react with aversive or punitive behaviours, especially if they are anxious themselves (Jobe-Shields, Buckholdt, Parra, & Tillery, 2014; Williams, Kertz, Schrock, & Woodruff-Borden, 2012). Both European and Chinese mother were found to react with negative emotions to children's withdrawal in a cross-cultural study (Cheah & Rubin, 2004) and more recently, Liu and colleagues (2018) found that child shyness in a sample of Chinese children was longitudinally associated with increased maternal and paternal harsh parenting. Unfortunately, no models such as Patterson's Coercive Process Theory are available to explain transactions with IP and to provide potential explanations for our divergent findings with physical and verbal aggression, highlighting an important gap in the scientific literature.

Contrary to our expectations, parental aggression was not longitudinally associated with increasing mother-reported IP. There was only one parent-driven effect identified which was in the model using teachers' reports of IP: verbal aggression at T2 was associated with increasing IP at T3. Some previous studies have found parent-drive effects of harsh parenting on IP (e.g., Wang and Kenny, 2014). Of note, Wang and Kenny's study (2014) covered only one developmental period, adolescence, and looked specifically at depression, not at the general category of IP. On the other hand, our results

are consistent with other studies using cross-lag models that have not uncovered parent-driven or concurrent associations between parent-reported IP and harsh parenting (Lee Wiggins et al., 2015; BLIND, 2015).

A second objective of this study was to test whether transactional associations between parental aggression and children's socioemotional difficulties would also be identified when using teachers' reports of socioemotional difficulties. Even though teachers' ratings on the TRF, especially for EP, were correlated with verbal and physical aggression, few associations remained in the final models; that is, when previous levels of EP and IP and the association between types of parental aggression were controlled, the associations between parental aggression and socioemotional difficulties decreased. The only significant associations over time that were uncovered with EP indicated that teachers of children enduring more verbal aggression at 6-8 years old assessed them as presenting more EP at 9-11 years old, and those with higher levels of EP at 9-11 years old were in turn exposed to more mothers' physical aggression in adolescence (indirect effect were also significant). As mentioned earlier, in the model with teachers' ratings of IP, verbal aggression at 9-11 years old was found to be associated with increased levels of IP in adolescence. These results are coherent with those of previous studies (BLIND, 2015; Cecil et al. 2012). However, when comparing models, one noticeable difference is that the cross-associations found in models using teachers' reports are situated differently compared to those using the mothers' reports. For example, in the model using mothers' reports, a child-driven effect was identified with IP and verbal aggression between T1 and T2, while in the teachers' models, only a parent-driven effect was found, and it was between T2 and T3. Similar differences emerged with EP and parental aggression. These could reflect differing behaviours in children and adolescents across contexts.

While it was not the focus of this investigation, concurrent associations between physical and verbal aggression were uncovered as well as some longitudinal associations. Results from the models

using parents' reports of EP and IP indicate that physical aggression appears to fuel verbal aggression over time, but this finding could also reflect a change in disciplinary practices as children reach adolescence. Additionally, in the models using teachers' reports, transactional processes were uncovered with verbal aggression at T1 being associated with increasing physical aggression at T2, which in turn was associated with increasing verbal aggression at T3. Parents may use physical discipline more in middle childhood than in early childhood and adolescence, which could explain this finding. The co-occurrence of these forms of parental aggression is well documented (e.g., Finkelhor, Vanderminde, Turner, Hamby, & Shattuck, 2014; Kim et al., 2017), but this is far less the case for their longitudinal associations; these clearly warrant further study. Finkelhor, Ormrod, Turner, and Holt (2009) proposed four potential mechanisms explaining the phenomenon of poly-victimization – when children experience victimizations of different types (e.g., verbal and physical aggression). Three of these explanations are of potential interest regarding our specific results and sample: 1) polyvictims might be growing up in chronically dangerous environments that, among other things, places stress on family members and brings out coercive parental behaviours; 2) polyvictims might be growing up in families where multiple risk factors for abuse are present (e.g., chaos, mental health problems); and 3) polyvictims might have individual characteristics placing them at higher risk for victimization (e.g., difficult temperament, disruptive behaviours). The first and second potential explanations might apply to our results given the lower-income nature of our sample, the recruitment of the original sample (N = 1,774) from low-income neighborhoods of a major metropolitan area, and previous studies involving original participants from the BLIND Project (see BLIND, 2017). Some effects revealed in our models seem to support the third explanation. For example, children presenting more aggressive and disruptive behaviours, as well as more symptoms of depression, anxiety, and withdrawal in early school age experienced increased levels of physical and verbal aggression from their mothers in subsequent developmental periods. Testing these hypotheses could be a worthy

avenue for future studies. While examining both physical and verbal aggression allowed us to differentiate between these two types of parental behaviours, a more detailed analysis of the specific behaviours included in the physical and verbal subscales of the CTS1 (or its more recent version) would also be a worthy avenue for further investigations as some of these might be considered more normative and common (e.g., spanking, sulking), while others would be construed as abusive (e.g., insulting, threatening, kicking).

While no gender-specific patterns emerged regarding transactional associations, results worth briefly discussing were found when conducting sex difference analyses. Indeed, females were found to experience higher levels of physical and verbal aggression at 6-8 years old than males, and males appeared to experience more verbal aggression at 9-11 years old. Cross-sectional studies examining the prevalence of subtypes of child maltreatment usually show that males are at higher risk of physical abuse and neglect, while females are more exposed to sexual and emotional abuse (e.g., Finkelhor et al., 2014). However, longitudinal studies looking at patterns of maltreatment subtypes by sex are needed in order to further clarify our findings.

Taken together, our results allow for a more comprehensive understanding of the longitudinal and transactional associations between parental aggression and children's EP and IP. Our study has important strengths that highlight its contribution to the current literature such as assimilating multiple informants, integrating both verbal and physical aggression as distinct but correlated forms of violent parental behaviours, and multiple waves targeting various developmental periods over 10 years. The ages between 6 and 17 years cover an important part of childhood and parental aggression, as well as socioemotional difficulties, could compromise children's success in negotiating developmental transitions occurring in these 10 years (Cicchetti, 2006).

Despite its strengths, some limitations must be acknowledged. First, while the CTS1 self-report is a well-validated measure, underreporting of parental aggression might have occurred. The use of the

most recent version of the questionnaire (CTSPC) is advisable in future studies as the CTS1 had important limitations (e.g., scoring procedures as it is an ordinal scale) and was less adapted for measuring parent-to-child aggression. Future studies should include a variety of measures of parental aggression. Second, our sample size was limited, thus restricting statistical power, the possibilities for the inclusion of more predictors or covariates in the models. The percentage of missing teachers' evaluations at T3 was also quite high. Consequently, future studies should try to include more participants and to limit attrition even more. A deeper investigation of the potential mechanisms for the intergenerational transfer of risk regarding socioemotional difficulties and of the impact of child gender would also be of interest.

In addition to these research implications, our findings have a number of practical implications, especially if replicated. EP and IP are associated with long-term deleterious consequences (Colman et al., 2007; Erksine et al., 2016; Kremer et al., 2016; Reef et al., 2011; Vaillancourt et al., 2013; Whalen et al., 2016) and show high levels of continuity. Thus, preventing and treating these difficulties are essential. Our results could suggest that while directly treating socioemotional difficulties via individual psychotherapy can promote adaptation (e.g., cognitive-behavioural therapy; Durlak, Fuhrman, & Lampman, 1991), other targets for intervention, such as the parent-child relationship and interactions, could also produce gains. For example, parent training interventions, such as the Parent Management Training - Oregon Model (Forgatch & Patterson, 2010; Thijssen, Vink, Muris, & Rutter, 2017), could help parents to find adaptive ways to handle children's behaviours, therefore decreasing the use of physical and verbal aggression (National Academies of Sciences, Engineering, and Medicine, 2016). Increasing awareness on the part of parents regarding the impact of their aggressive behaviours on their children's behaviours (vicarious learning) and of their children's internalizing and externalizing behaviours on their own tendencies to react aggressively (child-driven effects) would also be a promising avenue. In terms of research implications, building on the results from our study

appears to be a promising direction in order to deepen our understanding of the mechanisms underlying the development and maintenance of socioemotional difficulties. Ultimately, this enhanced knowledge could have significant impact on the growth and wellbeing of the next generation of children and families.



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## Tables and Figures

Table 1

*Sociodemographic characteristics and participant scores on core measures*

Variable	<i>M (SD) / n (%)</i>
Child gender ( <i>n</i> = 175)	
Males	81 (46.3%)
Females	94 (53.7%)
T1 mother's education level in years ( <i>n</i> = 105)	12.05 (2.55)
T1 weekly family income in CAN \$ ( <i>n</i> = 106)	874.65 (505.54)
T1 mother's marital status ( <i>n</i> = 106)	
Married	91 (84.7%)
Not married	15 (15.3%)
T1 higher occupational prestige in family ( <i>n</i> = 99)	40.79 (10.66)
Child externalizing T-score (mothers; not residualized)	
T1 ( <i>n</i> = 121)	53.72 (9.55)
T2 ( <i>n</i> = 111)	51.93 (10.54)
T3 ( <i>n</i> = 114)	51.73 (9.18)
Child internalizing T-score (mothers; not residualized)	
T1 ( <i>n</i> = 121)	54.05 (11.14)
T2 ( <i>n</i> = 111)	55.11 (10.25)
T3 ( <i>n</i> = 114)	52.92 (10.37)
Child externalizing T-score (teachers; not residualized)	
T1 ( <i>n</i> = 106)	54.33 (9.15)
T2 ( <i>n</i> = 95)	53.36 (9.58)
T3 ( <i>n</i> = 79)	52.05 (10.30)
Child internalizing T-score (teachers; not residualized)	
T1 ( <i>n</i> = 106)	53.96 (10.23)
T2 ( <i>n</i> = 95)	54.80 (9.34)
T3 ( <i>n</i> = 79)	53.42 (10.20)
Physical aggression score	
T1 ( <i>n</i> = 117)	2.45 (2.42)
T2 ( <i>n</i> = 110)	1.90 (2.25)
T3 ( <i>n</i> = 115)	1.51 (2.79)
Verbal aggression score	
T1 ( <i>n</i> = 117)	6.71 (5.46)
T2 ( <i>n</i> = 111)	7.71 (5.51)
T3 ( <i>n</i> = 116)	6.83 (5.27)

*Note.* T1 = Time 1 (6-8 years old), T2 = Time 2 (9-11 years old), T3 = Time 3 (13-15 years old). CAN \$ = Canadian dollars.

Table 2  
Correlations between study variables

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
	[95% CI]	[95% CI]	[95% CI]	[95% CI]	[95% CI]	[95% CI]	[95% CI]	[95% CI]	[95% CI]	[95% CI]	[95% CI]	[95% CI]	[95% CI]	[95% CI]	[95% CI]	[95% CI]	[95% CI]
<b>Mothers</b>																	
1. Child IP T1	-																
2. Child IP T2	.58*** [.46, .71]	-															
3. Child IP T3	.53*** [.34, .71]	.59*** [.47, .72]	-														
4. Child EP T1	.68*** [.54, .82]	.37*** [.20, .54]	.35** [.15, .56]	-													
5. Child EP T2	.41*** [.24, .59]	.56*** [.43, .70]	.42*** [.26, .58]	.59*** [.45, .74]	-												
6. Child EP T3	.36*** [.19, .52]	.37*** [.20, .54]	.54*** [.40, .68]	.57*** [.44, .69]	.72*** [.62, .83]	-											
<b>Teachers</b>																	
7. Child IP T1	.17 [-.02, .35]	.19* [.00, .38]	.19 [-.05, .42]	.04 [-.16, .24]	.09 [-.10, .29]	.01 [-.20, .22]	-										
8. Child IP T2	.22* [.03, .41]	.30** [.10, .50]	.07 [-.18, .31]	.16 [-.02, .34]	.14 [-.06, .34]	.01 [-.20, .22]	.13 [-.08, .35]	-									
9. Child IP T3	.13 [-.08, .34]	.30** [.10, .50]	.35*** [.17, .54]	.30* [.06, .54]	.37** [.15, .58]	.29** [.07, .50]	-.01 [-.34, .32]	.29** [.07, .51]	-								
10. Child EP T1	.01 [-.18, .20]	-.05 [-.23, .14]	.04 [-.17, .25]	.19* [.02, .35]	.19 [-.01, .39]	.21* [.04, .39]	.37*** [.19, .56]	.03 [-.18, .24]	.00 [-.26, .25]	-							
11. Child EP T2	.17 [.00, .34]	.11 [-.08, .30]	-.06 [-.27, .16]	.45*** [.31, .58]	.51*** [.37, .64]	.46*** [.31, .62]	-.17 [-.39, .05]	.23* [.05, .42]	.12 [-.12, .37]	.38*** [.20, .56]	-						
12. Child EP T3	-.05 [-.31, .21]	.06 [-.18, .31]	.22* [.00, .44]	.21 [-.06, .49]	.40*** [.20, .60]	.48*** [.32, .63]	-.17 [-.46, .11]	.04 [-.22, .29]	.53*** [.38, .67]	.39*** [.21, .57]	.45*** [.25, .64]	-					
<b>Aggression</b>																	
13. Verbal T1	.04 [-.14, .23]	.19* [.02, .37]	.17 [-.02, .35]	.18 [-.01, .36]	.27** [.09, .44]	.30** [.11, .49]	.10 [-.08, .28]	.02 [-.28, .32]	.22* [.03, .41]	.09 [-.09, .27]	.28** [.08, .48]	.11 [-.08, .30]	-				
14. Verbal T2	.36*** [.18, .55]	.33*** [.18, .48]	.35*** [.19, .51]	.35*** [.19, .51]	.41*** [.24, .59]	.43*** [.27, .59]	.20 [-.04, .43]	.02 [-.18, .23]	.31** [.13, .49]	.00 [-.20, .20]	.22* [.03, .40]	.17 [-.04, .38]	.49*** [.24, .73]	-			
15. Verbal T3	.24* [.06, .43]	.29*** [.13, .45]	.35*** [.20, .50]	.21* [.02, .41]	.44*** [.26, .61]	.46*** [.31, .62]	.03 [-.18, .25]	-.01 [-.21, .20]	.23* [.04, .42]	.09 [-.11, .29]	.20* [.03, .38]	.30** [.13, .48]	.35** [.15, .56]	.62*** [.45, .79]	-		
16. Physical T1	.09 [-.07, .26]	.15 [-.02, .31]	.09 [-.09, .27]	.21** [.07, .35]	.24** [.07, .42]	.25** [.09, .41]	.17* [.00, .34]	-.04 [-.27, .20]	.04 [-.18, .26]	.32*** [.19, .45]	.29** [.08, .50]	.10 [-.13, .33]	.65*** [.56, .74]	.36*** [.18, .54]	.32** [.13, .50]	-	
17. Physical T2	.27*** [.11, .44]	.32*** [.16, .47]	.26** [.11, .41]	.40*** [.27, .53]	.47*** [.33, .61]	.49*** [.36, .62]	.06 [-.13, .26]	.12 [-.06, .29]	.28** [.07, .48]	.21* [.04, .38]	.44*** [.29, .59]	.35*** [.17, .52]	.48*** [.30, .66]	.62*** [.49, .74]	.61*** [.48, .74]	.59*** [.41, .76]	-
18. Physical T3	.16 [-.03, .34]	.28** [.08, .48]	.15* [.02, .28]	.25** [.08, .42]	.43*** [.27, .59]	.33*** [.15, .50]	-.01 [-.18, .17]	.11 [-.13, .34]	.21** [.06, .35]	.26*** [.12, .39]	.42*** [.25, .59]	.33*** [.16, .50]	.35** [.13, .58]	.45*** [.26, .64]	.65*** [.55, .76]	.42*** [.24, .61]	.65*** [.52, .78]

Note. N=157 mother-child dyads. IP = Internalizing problems, EP = Externalizing problems; T1 = Time 1 (6-8 years olds), T2 = Time 2 (9-12

years old), T3 = Time 3 (13-15 years old). 95% confidence intervals are presented in brackets. \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ .

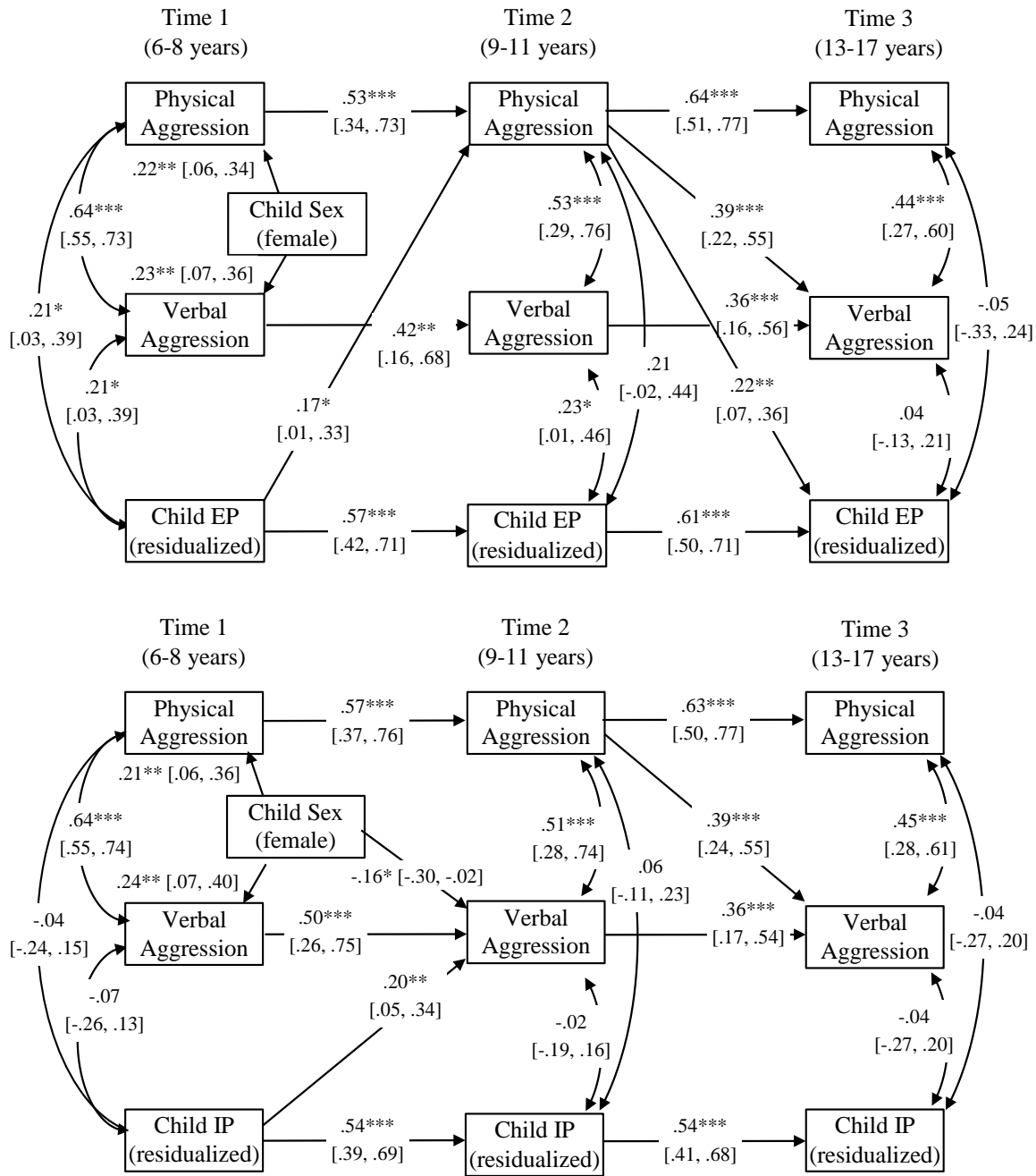


Figure 1. Cross-lagged panel models investigating the associations between internalizing and externalizing problems as assessed by mothers and parent physical and verbal aggression. Note.  $N = 154$ . EP = Externalizing problems; IP = Internalizing problems. Standardized results are reported. 95% confidence intervals are presented in brackets. \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$

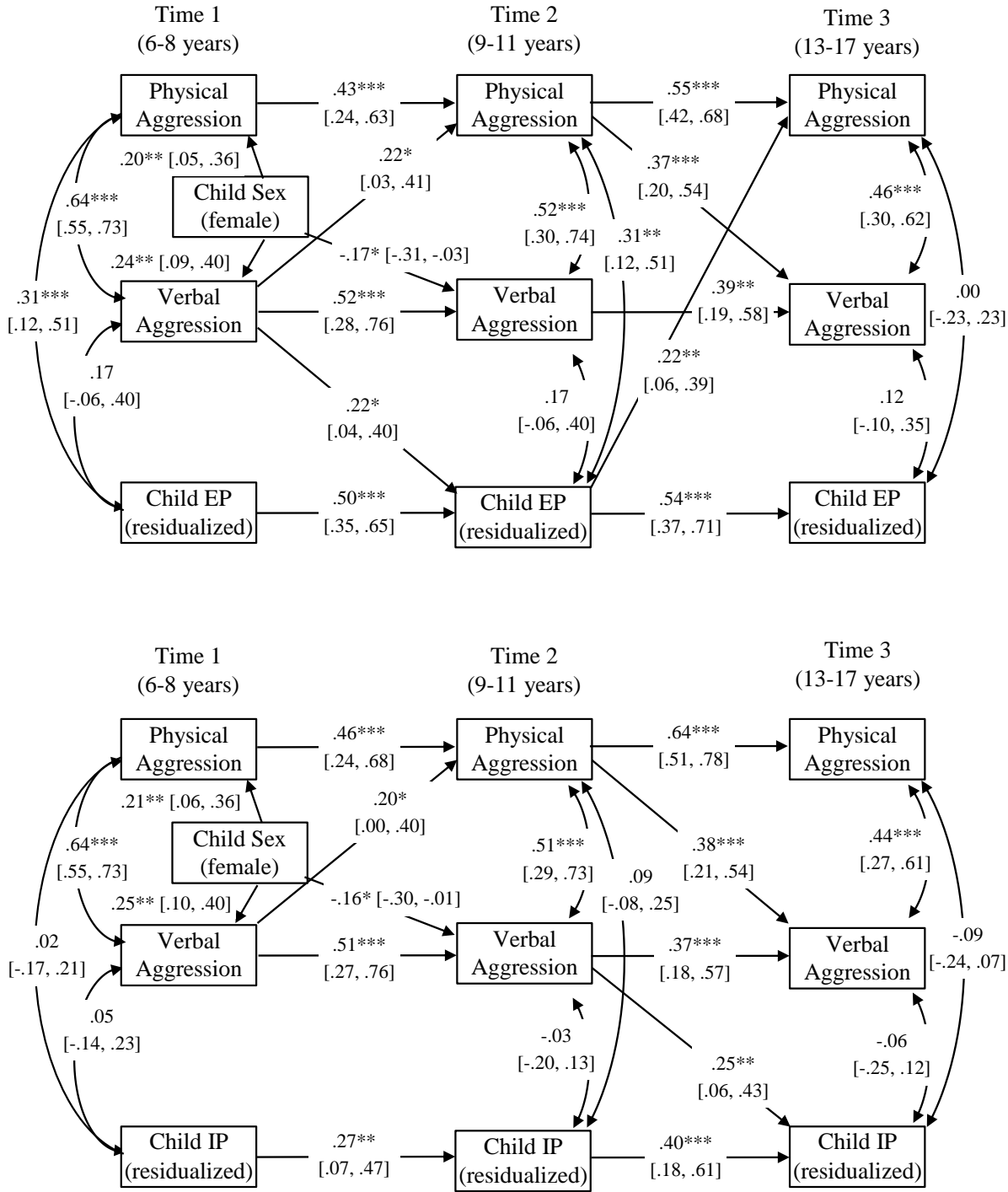


Figure 2. Cross-lagged panel models investigating the associations between internalizing and externalizing problems as assessed by teachers and parent physical and verbal aggression. Note.  $N = 156$ . EP = Externalizing problems; IP = Internalizing problems. Standardized results are reported. 95% confidence intervals are presented in brackets. \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$