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Running head: FRIENDSHIP QUALITY AND EARLY PHYSICAL AGGRESSION

Prospective Links between Friendship and Early Physical Aggression: Preliminary Evidence  
Supporting the Role of Friendship Quality through a Dyadic Intervention

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## Abstract

Positive friendships have been related to decreasing levels of children's physical aggression over time. While this evidence calls for interventions aimed at helping children build good-quality friendships, tests of causality through experimental manipulations are still needed. The goal of this study was to examine whether an intervention aimed to increase dyadic friendship quality could decrease children's physical aggression at the peer group level over a school year. Thirty-four aggressive children and their best friend were randomly assigned to two groups: an experimental condition where the members in each dyad participated together in 12 weekly intervention sessions and a no-intervention control condition. Multiple sources were used to evaluate changes in friendship quality and children's physical aggression. Results showed an indirect effect of the intervention on decreasing levels of physical aggression through the improvement of one specific feature of friendship quality: conflict resolution. These results point to the usefulness of including of this relational aspect in intervention programs targeting aggressive children.

Keywords: physical aggression, friendship quality, conflict resolution, mutual aid, positive affect, dyadic intervention.

Prospective Links between Friendship and Early Physical Aggression: Preliminary Evidence  
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Early physical aggression has been found to be stable across time and to be a high-risk predictor of other damaging forms of maladjustment later on, such as conduct problems (McEachern & Snyder, 2012), as well as depressive and delinquency symptoms (Cleverley, Szatmari, Vaillancourt, Boyle, & Lipman, 2012). Not only do aggressive children cause harm to victims, but they also cause harm to themselves by being deprived of positive social experiences with others, either at the group level (because they are often rejected) or at the dyad level (because of the oftentimes low quality of their friendships). Therefore, considerable research efforts have been directed at identifying ways to curb aggressive tendencies in young children (Barker, Vitaro, Lacourse, Fontaine, Carbonneau, & Tremblay, 2010).

To this end, several authors have argued that peer relationships can make substantial and unique contributions to young children's social development (e.g., Criss, Petit, Bates, Dodge, & Lapp, 2002; Witvliet, van Lier, Cuijpers, & Koot, 2009). At the dyad level, some researchers who investigated young children's perceptions about the quality of their friendships concluded that an intimate, trustworthy, caring and supportive friendship has the potential to positively influence school adjustment and prosocial behavior (e.g., Bretts & Rotenberg, 2007; Ladd, Kochenderfer, & Coleman, 1996; Proulx & Poulin, 2013). For instance, high-quality friendships are likely to serve as emotional and cognitive resources that help children adapt to stress and cope more successfully with social demands and interactions with classmates (Baker & Hudson, 2013). There is also evidence that measures of friendship quality that aggregate such features as cooperation, help, and conflict are related to a decrease in young children's physical aggression, independently of friends' or children's aggressive behavior level (Engle, McElwain, & Lasky,

2011; Salvas, Vitaro, Brendgen, Dionne, Tremblay, & Boivin, 2014; Salvas, Vitaro, Brendgen, Lacourse, Boivin, & Tremblay, 2011). Conversely, low quality-friendships that are high in negative features such as conflict or rivalry are linked to an overall negative style of interaction that promotes disruptive behavior and poor adjustment (Engle et al., 2011; Ladd et al., 1996). From better quality-friendships, aggressive children may thus derive several resources that enable them to interact more appropriately with peers and classmates. Several theoretical perspectives have been used to explain which aspects of friendship quality may play a role in this process.

### **Theoretical Framework Supporting the Effect of Friendship Quality on Aggression**

Past researchers have used theories of personality development (e.g., Selman & Schultz, 1990; Sullivan, 1953) or social constructivist theories (e.g., Piaget, 1965; Youniss, 1980) as frameworks for explaining the putative positive impact of high-quality friendships on young children's aggressive behaviors. According to these theoretical perspectives, a positive relationship with a close friend can serve attachment functions, as well as contribute to enhance children's social and cognitive functioning. Evidence in line with these notions comes mostly from cross-sectional data showing that, when establishing a close social bond and interacting positively, children feel more secure in their environment as well as accepted and connected to others (Ryan & Deci, 2000). Whereas personality theorists emphasize the positive internal states generated by a high quality friendship, social constructivists underline the importance of interpersonal skills that children acquire through high quality friendships. In support of the social constructivist view, some cross-sectional and longitudinal studies show that children experiencing high-quality friendships are incited to practice positive interpersonal skills both toward each other and at the peer group level (Engle et al., 2011; Pontarri, 2009). Interestingly, these results are achieved even when the children themselves or their friends are generally aggressive toward others (Berndt, 2004). It is also possible that children, whether aggressive or

not, who interact with a best friend are motivated to find strategies to resolve their occasional conflicts peacefully to preserve their high-quality friendships (Wentzel, Barry, & Caldwell, 2004). Once acquired, these new skills could generalize to relationships with other children or adults. Hence, improving the quality of the friendships of aggressive children could result in a reduction in aggression through emotional or instrumental pathways.

Experimental manipulations are necessary to ascertain the beneficial nature of friendship quality toward a decrease in children's aggression and to determine which features of improved friendship quality may play a role in this process. Although there is a long history of intervention research aimed at improving children's peer relationships, these interventions focus almost exclusively on promoting peer acceptance at the group level rather than on helping children establish friendships of high quality (Bagwell & Schmidt, 2011). Research aimed specifically at teaching children how to establish and maintain high-quality friendships, either in combination with improving social acceptance or as a goal in its own right, is rare. Therefore, the aim of the current study was to experimentally improve the quality of the relationship between an aggressive child and his/her best friend and examine whether this improvement at the dyad level would, in turn, be linked to a decrease in children's aggression at the peer group level. To the best of our knowledge, this study is the first to use an experimental design to test the beneficial effect of friendship quality on young children's aggressive behavior through a dyadic intervention.

Based on theoretical and empirical literature supporting the effect of friendship quality on aggression, three specific features of friendship were targeted in the dyadic intervention: a) the extent to which friends share, help and guide one another, b) the ease and readiness with which they resolve their conflicts, and c) the degree of positive affect that they experience in their relationship. These features were selected because they are central in young children's friendships. In turn, proximal improvements in these features of friendship quality were expected

to operate as putative intermediary variables in the pathway linking the intervention to a decrease in children's aggression at the peer group level.

## **Method**

### **Participants**

The 34 target children and their respective 34 friends who participated in this study were selected (as described below) from a community sample of 689 kindergarteners and first grade boys and girls enrolled in a regular classroom and attending seven French-speaking public elementary schools in Montreal (Quebec, Canada), six of which were located in low socioeconomic areas. Children's mean age at pretest (T1) was 5.9 years ( $SD = .69$ ). Fifty-two percent of the target children's parents were of European descent, 10% of African descent, 10% of Asian descent, 10% Arabic descent and 14% were of Hispanic descent. The remaining parents (4%) did not provide ethnicity information. The average yearly household income was \$35,000 CAN. The majority of parents of the target children had less than 14 years of schooling (58%). Two-thirds (70%) of the target children lived in an intact family (i.e., with their biological parents), whereas the others lived in a non-intact family (i.e., all other cases). This research was approved by the University of Montreal's ethics board as well as by each participating school. Informed verbal and written consent was obtained from parents of all participants, whereas informed verbal assent was obtained from all participating children.

### **Selection Criteria and Friendship Identification**

Two criteria were used to select the target children: their level of physical aggression at the beginning of the school year and their involvement in a friendship. Firstly, 39 teachers were asked to assess physical aggression in up to 5 children they identified as the most aggressive and unruly children in their classroom (see Figure 1, which illustrates the flow of participants through

each stage of the study). Participants were identified using a physical aggression threshold estimated from the Quebec Longitudinal Study of Child Development (QLSCD). The QLSCD includes a representative sample of 2,223 children born to mothers living in the province of Quebec (Canada) between October 1997 and July 1998 and followed up annually from the age of 5 months to 8 years old. In that study, teacher-ratings of physical aggression in kindergarten (mean age = 6.2 years) and grade one (mean age = 7.2 years) were collected using the Social Behavior Questionnaire (SBQ, Tremblay, Loeber, Gagnon, Charlebois, Larivée, & LeBlanc, 1991). Their physical aggression scale consisted of 3 teacher-rated items: ‘Since the beginning of the school year, how often would you say that this child ‘physically attacked others’, ‘hit, bit or kicked others’, and ‘was fighting with others’’, with a response scale ranging from 1 (never), to 2 (sometimes) or 3 (often). Reliability and validity of the SBQ have been established with kindergarten and first grade children (see Tremblay et al., 1991). Teacher-rated mean scores of physical aggression in the QLSCD sample, estimated separately for kindergarten and first grade boys and girls, were considered as normative levels of physical aggression. Forty-six children scoring more than one standard deviation above the QLSCD mean on the physical aggression scale of their respective aged and sex group (i.e., above the 90<sup>th</sup> percentile of the QLSCD sample) were classified as physically aggressive and thus selected as potential participants in the intervention.

Secondly, because the intervention program involved working with partnered friendship pairs, potential participants had to be involved in a friendship. To identify friendship partners, children were asked to nominate up to three best friends in the classroom. Reciprocated friendships were friendships where the first, second or third nominated friend also nominated the target child as their first, second or third friend. Using this criterion, 62% of the friendships were reciprocated. In addition to friendship nominations, children were also asked to nominate five

classmates with whom they most liked to play with. For target children who did not have a reciprocal friendship, a friendship partner was selected from the target child's nominated friends, with the additional constraint that the selected nominated friend had to have identified the target child as a preferred play partner (i.e., for 38% of the cases). The screening process identified 36 children from the total sample (25 boys and 11 girls). Two boys were excluded because of parental refusal. Therefore, the study sample consisted of 34 target children (23 boys and 11 girls) and 34 friends (20 boys and 14 girls).

### **Group Composition**

The present study utilized a randomized design. Target children ( $n = 34$ ) were randomly assigned to the intervention condition (i.e., children participating in the dyadic intervention program with a friend) or the control condition (i.e., children not participating in the intervention). The intervention condition included 20 target children (12 boys and 8 girls; 19 same-sex and 1 cross-sex dyads; 10 in kindergarten and 10 in grade one), whereas the control group included 14 target children (11 boys and 3 girls; 12 same-sex and 2 cross-sex dyads; 6 in kindergarten and 8 in grade one). We included both same-sex and cross-sex friendship dyads in our sample because a notable proportion of preschoolers have cross-sex friends (Proulx & Poulin, 2013). Two target children from the control group had missing data at either the first or the second post-test because they had left the school to move to a new neighborhood. Apart from these two exceptions, there was no intervention dropout reported in this study. Because of the relatively small sample size, we included all available participants in each analysis pretest (T1; in the Fall) = 34, immediate post-test (T2; by the end of Winter) = 33, and one-month follow-up (T3; in the Spring) = 32. Comparison of the two groups through independent sample  $t$  tests and chi-square tests revealed no significant differences (all  $p$  values  $> .22$ ) in regards to selection



criteria (i.e., initial level of physical aggression, friendship reciprocity), study variables at T1 (i.e., mutual aid, conflict resolution, and shared positive affect), or individual (i.e., child sex, grade, age at the beginning of the study), family (i.e., parental education, family income, family status) and friend's characteristics (i.e., friend's externalizing problems, physical aggression and prosocial behavior). The groups were therefore considered equal.

### **Dyadic Intervention Program**

The dyadic intervention program was developed by the authors and designed to improve the friendship quality of young children with aggression problems in a dyadic friendship context. Each of the 20 experimental dyads (i.e., an aggressive child and his/her best friend, one dyad at a time) was exposed separately to the intervention program under the guidance of a facilitator (graduate students in psychoeducation, i.e., applied developmental psychology). We used a dyadic intervention framework whose primary feature was the emphasis on creating an ongoing close relationship rather than on developing general relationship patterns of prosocial skills like those fostered in social skills training and social-cognitive programs (Bagwell & Schmidt, 2011; Selman & Schultz, 1990). Therefore, the dyadic program targeted three specific features of friendship quality: 1) *Mutual aid*, i.e., how to provide support to and receive help from their best friend, 2) *Dyadic conflict resolution*, i.e., how to resolve conflict constructively and 3) *Shared positive affect*, which refers to the degree of affection and satisfaction both friends experience within the relationship. The friendship dyads were engaged in weekly sessions, each designed to last 1 hour, for the duration of a 12-week period. In accordance with teacher planning, the sessions were taking place during classroom time, outside the classroom, in a private room.

Friendship dyads in the experimental condition engaged in a range of activities designed to help them learn and practice skills related to mutual aid and to conflict resolution, as well as strengthen the positive affect within the relationship. Each weekly session was divided in two

parts. The first part was dedicated to dyadic friendship skills training. Through the use of various learning strategies (e.g. oral demonstration, stories, games, hypothetical scenarios, role playing), the target child and his/her friend were taught how to express their own feelings and how to understand others' feelings (i.e., sessions 2 to 4), how to use pacifistic conflict resolution strategies (i.e., sessions 5 to 8), how to provide support to and receive help from their friend (i.e., sessions 9 to 11). In order to practice friendship skills related to conflict resolution, children were presented with three steps: (1) recognizing that a conflict exists and take a moment to breathe ('Stop. We have a conflict. We take three deep breaths'), (2) stating what we want and how we feel, and (3) inventing two or more optional solutions that maximize mutual gain, and pick one solution that is satisfying for both partners. The facilitator demonstrated how to use each step, and both the target child and the friend practiced using the procedure to jointly resolve hypothetical conflicts, as well as real conflicts that happened during the session. For example, we used a picture book that contained conflicts between two characters, and both the target child and the friend role-played conflict resolution strategies to resolve these conflicts. Other activities were realized to help children learn how to provide support to and receive aid from their friend. The target child and the friend were told that to build and maintain high-quality friendship, they have to be a 'good friend' for each other everyday. They were encouraged to adopt good friendship behaviors such as comforting their friend when he/she is sad, sharing personal things, caring, working together on difficult tasks, listening, helping, taking turns, being fair, or following their friend's lead. In practice, for example, both the child and the friend were asked to play with playdough together and behave as nicely towards their friend as possible; for each nice behavior, the facilitator rang a bell or played a musical note. In another activity, one child at a time was blindfolded and asked to find the end of a labyrinth with the help his/her friend. After each activity, the facilitator discussed and reinforced the good friendship behaviors.

The second part of each session was devoted to an art project, a technique used in peer pair therapy (Selman & Schultz, 1990). Specifically, the target child and the friend were told that they had to build a boat (i.e., a large toy-model boat, which was built with a plastic bottle and made to float). They were helped by the facilitator to make sure that they could achieve their plan. This boat could take any form they wanted, but had to please them both, and would be presented to other intervention dyads on the occasion of a varnishing-day (i.e., session 12). While encouraging positive affect and the practice of mutual aid in a pleasant context, this activity was also intended to encourage personal investment in a significant and rewarding joint project. The facilitator also used this activity to seize or create opportunities for resolving conflicts in a safe environment. Indeed, the materials needed to build the boat could be arranged so that a child must practice conflict resolution strategies. In one activity, for example, the child and his/her friend had to paint the boat hull, but received only one paintbrush. With guidance from the facilitator, they used the conflict resolution steps to resolve their conflict over both wanting to use or start first with the paintbrush.

### **Program Fidelity and Implementation Assessment**

To ensure program fidelity, facilitators received a two-day training session with respect to the specific intervention objectives, the intervention content and the dyadic intervention strategies. Facilitators also had access to an intervention manual describing in details the schedule to be followed, the verbatim to be used and the activities to be realized with the dyads. They also attended individual and group supervision meetings, with the first author monitoring their application of the dyadic intervention strategies. Some intervention sessions were videotaped (i.e., three sessions per facilitator for each assigned dyad). These videos were used during supervision meetings to emphasize specific aspects of the intervention. In addition, the facilitators systematically completed reports after each session in order to record the strategies

used and the program content covered. Analysis of these reports indicated no variability across participants, notably with respect to the content quantity covered in each session, the range of intervention strategies used by the facilitators during the sessions, and the total number of sessions (i.e., 100% of participants attended all 12 planned sessions).

## Measures

**Friendship Quality.** At T1 and T2, a research assistant individually administered a modified version of the Friendship Features Interview for Young Children (FFIYC, Ladd et al., 1996) and of the Friendship Qualities Scale (FQS, Bukowski, Hoza, & Boivin, 1994), as well as hypothetical socio-cognitive vignettes to each target child (in reference to his/her friend's behavior) and to each friend (in reference to the target child's behavior). The mutual aid and conflict resolution features of the friendship were also measured using teacher reports of an adaptation of the Friendship Quality Questionnaire (FQQ, Parker & Asher, 1993). This specific procedure has been used and validated in previous studies with samples of preschoolers and young school-aged children (e.g., Sebanc, Kearns, Hernandez, & Galvin, 2007).

*Mutual aid* was assessed through four items tapping the degree of help and assistance the friend provided to the target child (and vice versa) with respect to emotional and instrumental problems (e.g., 'If some kids at school were teasing you, would (friend's name) tell them to stop' or 'If your teacher yelled at you and it made you feel bad, would (friend's name) make you feel better'). Items could be rated 1 (a little), 2 (medium), or 3 (a lot). Cronbach's alphas for the mutual aid scale were, at T1 and T2 respectively, .70/.79 for the target children, and .85/.76 for the friends. The intra-class correlations between the target children's and the friends' perceptions of their partner's mutual aid were, respectively,  $r = -.03, p > .05$  at T1, and  $r = .63, p < .001$  at T2.

Teacher's perception of the degree of aid the friend provides to the target child (and vice versa) was measured on a 5-point scale using three items originating from the FQQ (Parker & Asher, 1993) (e.g., '(friend's name) helps (child's name) with schoolwork a lot' or '(friend's name) shares things with (child's name)'). The scale ranged from 1 (not at all true) to 2 (a little true) to 3 (somewhat true) to 4 (pretty true) to 5 (really true). The teacher completed the questionnaire twice, once for the target child and once for the friend (i.e., each child's name was embedded in each individual item). Cronbach's alphas were, at T1 and T2 respectively, .85/.74 for the target child, and .84/.78 for the paired friend. The intra-class correlations between the target child's and his or her friend's mutual aid as evaluated by the teacher were, respectively,  $r = .38, p < .05$  at T1, and  $r = .33, p < .05$  at T2.

*Dyadic conflict resolution* at T1 and T2 was assessed through the use of hypothetical socio-cognitive vignettes as well as teacher reports of dyadic conflict resolution strategies used by the target children and their friends when faced with interpersonal conflict. The socio-cognitive vignettes were based on a modified version of the Preschool Interpersonal Problem Solving Test (PIPS; Spivack & Shure, 1974). In this open-ended interview, both dyad partners (i.e., the target child and his/her friend) were asked to generate strategies to solve a hypothetical conflict situation that could occur between them. The conflict situation described how one partner (either the paired friend or the target child, depending on which child was interviewed) firstly a) seeks to take away a book that is being read by the other partner, and afterwards b) starts to push and insult the other partner. Both the target child and the paired friend were asked what he/she could do or say to solve this conflict with their friend. In order to reflect the target children's and their friends' most salient responses, only the first strategy suggested by each dyad member was used (see Brendgen, Bowen, Rondeau, & Vitaro, 1999, for a similar strategy). The responses were tape recorded and then transcribed. Suggested behavioral strategies were categorized later as prosocial

or not prosocial. Prosocial strategies referred to the child's and his/her friend's attempts to positively resolve the conflict and included responses such as confronting in a non-aggressive manner (e.g., ask to stop, ask for the book back) or negotiating a compromise (e.g., share, offer another book, take turns reading). For each dyad, the number of prosocial strategies was added across dyad members and across both parts of the situation to obtain the frequency of suggested prosocial strategies (T1: *range* = 0 to 4 and T2: *range* = 0 to 3). This represented the dyad's propensity towards the use of strategies that provide a constructive way to resolve their interpersonal conflict (i.e., self-assertion and compromise). The reliability and validity of the initial version of the PIPS have been established previously (see Spivack & Shure, 1974).

Teacher reports were also used to evaluate the ease and readiness with which both the child and his/her friend could resolve their conflicts when interacting together in the classroom. Three items originating from the FQQ (Parker & Asher, 1993) were used to tap into the dyad's ability to resolve conflicts quickly and amicably (e.g., 'make up easily when they have a fight' or 'talk about how to get over being mad at each other'). The response scale ranged from 1 (not at all true) to 2 (a little true) to 3 (somewhat true) to 4 (pretty true) to 5 (really true). Teachers completed the questionnaire in reference to the dyad's ability for conflict resolution, rather than in reference to each child's behaviors. Cronbach's alphas were .79 at T1, and .89 at T2.

Finally, *Positive affect* between the target children and their friends was measured using five items from the FFIYC (Ladd et al., 1996) and the FQS (Bukowski et al., 1994) (e.g., 'how glad are you that you are friends with (friend's name)' or 'do you feel happy when you are with (friend's name)'). These items focused on the sense of affection that the child experiences with the friend and the strength of the child's attachment to or bond with the friend (and vice versa). Items could be rated 1 (a little), 2 (medium), or 3 (a lot). Cronbach's alphas for the positive affect scale were, at T1 and T2 respectively, .94/.92 from the target child's perspective and .89/.90 from

the friend's perspective. The intra-class correlations between the target child's and his or her friend's positive affect scores were, respectively,  $r = .32, p < .05$  at T1, and  $r = .39, p < .05$  at T2.

***Data Reduction of Dyadic Features of Friendship Quality.*** Because studying the behavioral and emotional aspects of interpersonal relationships involves considering both partners as sources of information, and because the members of the friendship dyads seemed to agree, at least moderately, in regard to the features of their relationship, the target child's and his or her friend's scores were averaged to create composite scores between the two friends. Composite scores between the two friends were created at each assessment point, except for the mutual aid score at T1, because the correlation coefficient between target children's and friends' perception of mutual aid was not significant. We also created higher aggregated scores for the mutual aid and conflict resolution features by combining the child-friend composite scores (i.e., the dyad's scores) with teacher-rated scores. This procedure was used in order to fully exploit our multiple sources and raters design, while reducing data complexity and synthesizing results (e.g., see Hoza, Mrug, Pelham, Greiner, & Gnagy, 2003). To this end, the dyad and teacher-rated scores were first z-standardized across the sample and next averaged across raters at T2 on the basis of moderate correlations between teacher and dyad-rated scores:  $r = .33, p < .05$  for the mutual aid score, and  $r = .54, p < .001$  for the conflict resolution score. Composite scores between the raters could not be created, however, for the conflict resolution score or for the mutual aid score at T1 because of the non-significant correlation coefficients between the respective dyad's and teacher's scores.

***Aggressive Behaviors.*** Children's physical aggression was assessed using reports from both teachers and peers at T1 and T3. Teacher-rated aggression was measured using the three items from the SBQ (Tremblay et al., 1991) described in the selection criteria section, but responses were given on a 5-point scale instead of the original 3-point scale, i.e., 0 (never), 1 (rarely), 2

(sometimes), 3 (often), or 4 (really often). Cronbach's alpha was .93 at T1, and .94 at T3. Peer-rated aggression was assessed using three behavioral descriptors, i.e., 'gets into a lot of fights', 'hits and kicks other children' and 'throw things to other children'. Specifically, booklets of photographs of all the children in a given class were handed out to each child's participating classmates for whom parental consent was available (> 80% participation rate). Children were asked to circle the photos of up to five classmates who best fit each of the behavioral descriptors (see Vitaro, Brendgen, Boivin, Cantin, Dionne, Tremblay, Girard, & Pérusse, 2011, for a similar procedure). For each child in the class, the nominations received for each item were summed and z-standardized within the classroom to control for variations in classroom size, yielding a score for each target child as well as for each of the other participating children in their class. Next, the item scores were summed up to yield a global peer-rated aggression score, which were again z-standardized within the classroom. The correlations between teacher and peer-rated children's aggression scores were, respectively,  $r = .59, p < .001$  at T1, and  $r = .50, p < .001$  at T3; therefore, the peer- and teacher-rated aggression scores were first z-standardized across the sample and then averaged to create a composite aggression score, separately for T1 and T3.

## **Results**

### **Descriptive Data and Bivariate Correlations**

Means and standard deviations at each time assessment are detailed in Table 1. Bivariate correlation analyses were conducted first. Their purpose was a) to test whether intervention status was significantly related to friendship features and to target children's physical aggression and b) to determine the correlation among friendship features with aggression scores. Results are presented in Table 2. These preliminary analyses revealed only two significant correlations at T1. Importantly, intervention status was not correlated with any study variable at T1. In regard to post-test assessments, intervention status was correlated with dyadic conflict resolution at T2 ( $r =$



.35,  $p < .05$ ), indicating that target children from the intervention group used significantly more constructive strategies to resolve conflicts with their best friend when asked how to resolve a hypothetical conflict and when evaluated by their teacher who based their rating on real-setting observations. Moreover, dyadic conflict resolution was positively correlated with mutual aid ( $r = .57, p < .001$ ) and with shared positive affect ( $r = .50, p < .01$ ), which was also significantly related to mutual aid ( $r = .79, p < .001$ ). In turn, mutual aid, shared positive affect, and conflict resolution were all negatively correlated with children's physical aggression ( $r = -.40, p < .05$ ;  $-.44, p < .01$  and  $-.35, p < .05$  respectively). However, contrary to conflict resolution, mutual aid and shared positive affect were not correlated with intervention status.

Next, two-way repeated-measures analyses of variance (Group x Time of Assessment) were conducted to test both within and between group differences in conflict resolution (the only feature associated with the intervention status). Results indicated that children and their friends from the intervention group had significantly better dyadic conflict resolution strategies than those from the control group at T2 ( $t(30) = -2.06, p < .05$ ), but not at T1. Results also showed that conflict resolution improved from T1 to T2 within the intervention group but not the control group according to teacher ratings ( $F(1,27) = 9.1, p < .01$ ) and the dyad's joint responses to the hypothetical socio-cognitive vignettes ( $F(1,30) = 2.76, p = .05$ ). A similar repeated-measures ANOVA revealed no significant interaction between Group and Time of assessment with respect to aggression, but a main effect of the repeated factor: aggression diminished from T1 to T3 within both the intervention and the control group ( $F(1,31) = 8.63, p < .01$ ).

Finally, multivariate linear regression analyses were performed using PROCESS to examine whether conflict resolution at T2 (i.e., a proximal intervention target) may be considered a putative intermediary variable linking the intervention with aggression at T3 (i.e., the distal outcome). A bootstrapping method with 1,000 iterations as proposed by Hayes was used (2012).

Because the bivariate correlations had revealed that the intervention only affected conflict resolution at T2, indirect effects analyses did not consider other features of friendship quality as possible intermediary variables (see Figure 2). Results showed that intervention status was associated significantly and positively with conflict resolution at T2 ( $\beta = 1.32, SE = .64, p < .05$ ) and that conflict resolution at T2 was related significantly and negatively to children's physical aggression at T3 ( $\beta = -.16, SE = .08, p < .05$ ). Moreover, there was a significant indirect effect of the intervention on children's physical aggression through an improvement of the dyad's conflict resolution ability (indirect effect  $\beta = -.23$ , bootstrapped 95% CI based on 1000 iterations = [-.598; -.019]).

### **Discussion**

The aim of this study was to investigate the beneficial role of friendship quality in regard to the development of physical aggression during the early school years. Through the use of an experimental intervention design, intermediary effects of three features of friendship quality were examined (i.e., mutual aid, dyadic conflict resolution, and shared positive affect between friends). Our findings indicate that the effect of the dyadic friendship quality intervention on decreased levels of children's physical aggression was indirect and a function of the improvement in the quality of one friendship quality feature, namely, conflict resolution. These results are discussed in light of the theoretical perspectives that served to frame the objectives.

#### **Intermediary Effect of Dyadic Conflict Resolution: Potential Explanatory Processes**

The current findings support the beneficial role of one aspect of friendship quality by showing an indirect effect of the intervention on decreasing levels of children's aggression. Specifically, intervention participants manifested improved levels of dyadic conflict resolution skills after the end of the intervention, as reported by teachers, as well as measured by the use of hypothetical socio-cognitive vignettes with both children and friends. This improvement in their

conflict resolution skills was, in turn, related to lower levels of physical aggression one month later, as reported by teachers and peers. Thus, when compared to the control group, children in the intervention group were more able to adequately resolve interpersonal conflicts with their best friend, and thereafter, less likely to use aggressive behaviors toward other classmates. Children in the control group were also less likely to use aggression, but not as a consequence of their improved conflict resolution skills.

Specific processes that may explain the intermediate effect of the conflict resolution feature may be found in some mechanisms highlighted by the social constructivist perspective.

According to this perspective, the presence of conflicts, provided they are solved in a satisfactory and egalitarian manner, fosters interpersonal skills, such as mutual understanding, perspective-taking and empathy skills (Azmitia & Montgomery, 1993). Indeed, when two friends disagree, they are confronted with the fact that their partner may see the world differently than themselves. To protect their friend's happiness and satisfaction and ultimately the stability and the quality of their relationship, target children may be motivated to learn how to resolve conflicts with their friend. Once acquired and practiced in the context of the friendship dyad, these important skills may be used to resolve conflicts that arise with other peers and classmates. To the extent that friendships provide models for future relationships, positive friendship experiences in conflict resolution may serve as positive relationship templates to be used with the larger peer group (Berndt, 2004). Improvement in both the target children's and their friends' conflict resolution skills may also have lowered their exposition to and escalation in coercive interactions, which have been found to increase children's aggression (Snyder, Schrepferman, Brooker, & Stoolmiller, 2007; Vitaro et al., 2011).

### **Other Features Targeted but Not Affected by the Intervention**

We also hoped to improve the levels of mutual aid and shared positive affect between friends in order to test whether changes in these features would be related to decreasing levels of children's physical aggression. However, the intervention did not modify these components. Measures used to evaluate changes in these friendship features and the context of the intervention may, at least partially, explain why no changes were observed. In addition to teacher-rated measures, dyadic conflict resolution was evaluated through a hypothetical test of children's and their friends' capacities to resolve their conflicts, i.e., the number of prosocial strategies produced in response to a hypothetical conflict situation. In contrast, mutual aid and shared positive affect were evaluated through self-ratings. Because most children from both the intervention and control groups reported high positive ratings in regards to these features at the beginning of the study, a ceiling effect may have prevented any possible gain for the intervention children. This tentative explanation calls for the inclusion of direct observational measures of friendship quality in future studies, such as experimental tasks in the context of a collaborative game or free play.

### **Strengths and Limitations**

This study is the first to implement an experimental intervention program to improve the quality of the friendships between young aggressive children and their best friends, as a means to test predictions made by different theoretical perspectives. The current study offers several strengths: the use of a randomized controlled trial, a high rate of program fidelity and adherence, and the use of aggregate scores across different raters. Correlations between raters' scores were too low to aggregate measures of mutual aid and conflict resolution at time 1, however. The contrast between these non-significant correlations at time 1 and the moderate-to-strong correlations at T2 may be explained by the fact that the repeated measures and the vocabulary used during the training helped children understand more easily the friendship-related questions.

Alternatively, children's maturation may also have fostered their capacity to reflect about friendship quality.

Like usual, our study also has limitations that might affect its significance, as well as the conclusion that may be drawn from its results. The sample size was small, limiting our power to detect statistically significant differences between the groups and preventing us from using more sophisticated analyses, such as multi-level dyadic analyses. A small sample size also precluded the possibility to examine children's or friends' characteristics as moderating variables, such as child sex, friendship reciprocity, as well as friend's behavior. In addition, the experimental manipulation was also relatively short, which may have precluded significant changes in positive friendship features (i.e. mutual aid and positive affect). In turn, the reduction in aggressive behavior within the control group remains unexplained. The addition of a comparison group of friendless children or of non-friend dyads could help disentangle whether this reduction reflects a positive consequence of having a friend, a nonspecific effect of our training program, or a methodological artifact. Besides, teachers' knowledge of the children's intervention status (i.e., experimental or control) may had an impact on their ability to serve as informant in regard of children's behavior. Yet, we minimized that risk by also relying on peer reports of children's aggression. Finally, our measure of physical aggression did not take into consideration the specific peers who could be targeted. Interestingly, this could be done in future studies using Card & Hodges' (2010) dyadic approach to peer evaluation, which allows children to identify the target(s) of their own aggressive behavior and, conversely, also those peers who aggress them.

In spite of its preliminary nature, this study showed that our intervention program targeting friendship dyads had an indirect effect on decreasing physical aggression through the improvement of dyadic conflict resolution. It could serve as a template for future studies aimed at harvesting the motivational and instrumental power of friendships to help at-risk children

improve their behavioral repertoire, and to test theoretical propositions about the role of friendship by the same token.

## References

- Azmitia, M., & Montgomery, R. (1993). Friendship, transactive dialogues, and the development of scientific reasoning. *Social Development, 2*, 202-221.
- Bagwell, C.L., & Schmidt, M.E. (2011). *Friendships in childhood and adolescence*. New York: The Guilford Press.
- Baker, J.R., & Hudson, J.L. (2013). Friendship quality predicts treatment outcome in children with anxiety disorders. *Behaviour Research and Therapy, 51*, 31-36.
- Barker, E.D., Vitaro, F., Lacourse, E., Fontaine, N.M., Carbonneau, R., & Tremblay, R.E. (2010). Testing the developmental distinctiveness of male proactive and reactive aggression with a nested longitudinal experimental intervention. *Aggressive Behavior, 36*, 127-140.
- Berndt, T.J. (2004). Children's friendships: Shift over a half-century in perspectives on their development and their effects. *Merrill-Palmer Quarterly, 50*, 206-223.
- Brendgen, M., Bowen, F., Rondeau, N., & Vitaro, F. (1999). Effects of friends' characteristics on children's social cognitions. *Social Development, 8*, 41-51.
- Bretts, L.R., & Rotenberg, K.J. (2007). Trustworthiness, friendships and self-control: Factors that contribute to young children's school adjustment. *Infant and Child Development, 16*, 491-508.
- Bukowski, W.M., Hoza, B., & Boivin, M. (1994). Measuring friendship quality during pre- and early adolescence: The development and psychometric properties of the friendship qualities scale. *Journal of Social and Personal Relationships, 11*, 471-484.
- Card, N.A., & Hodges, E.V.E. (2010). It takes two to fight in school, too: A social relations model of the psychometric properties and relative variance of dyadic aggression and victimization in middle school. *Social Development, 19*, 447-469.

- Cleverley, K., Szatmari, P., Vaillancourt, T., Boyle, M., & Lipman, E. (2012). Developmental trajectories of physical and indirect aggression from late childhood to adolescence: sex differences and outcomes in emerging adulthood. *Journal of the American Academy of Child and Adolescent Psychiatry, 51*, 1037-1051.
- Criss, M.M., Petit, G.S., Bates, J.E., Dodge, K.A., & Lapp, A.L. (2002). Family adversity, positive peer relationships, and children's externalizing behavior: A longitudinal perspective on risk and resilience. *Child Development, 73*, 1220-1237.
- Engle, J.M., McElwain, N.L., & Lasky, N. (2011). Presence and quality of kindergarten children's friendships: concurrent and longitudinal associations with child adjustment in the early school years. *Infant and Child Development, 20*, 365-386.
- Hayes, A.F. (2012). PROCESS: A versatile computational tool for observed variable mediation, moderation, and conditional process modeling. Retrieved from <http://www.afhayes.com/public/process2012.pdf>.
- Hoza, B., Mrug, S., Pelham, W.E., Greiner, A.R., & Gnagy, E.M. (2003). A friendship intervention for children with Attention-Deficit/Hyperactivity Disorder: Preliminary findings. *Journal of Attention Disorders, 6*, 87-98.
- Ladd, G.W., Kochenderfer, B.J., & Coleman, C.C. (1996). Friendship quality as a predictor of young children's early school adjustment. *Child Development, 67*, 1103-1118.
- McEachern, A.D., & Snyder, J. (2012). Gender differences in predicting antisocial behaviors: developmental consequences of physical and relational aggression. *Journal of Abnormal Child Psychology, 40*, 501-512.
- Parker, J.G., & Asher, S.R. (1993). Friendship and friendship quality in middle childhood: Links with peer group acceptance and feelings of loneliness and social dissatisfaction. *Developmental Psychology, 29*, 611-621.



- Piaget, J. (1965). *The moral judgment of the child*. New York: Free Press (Originally published, 1932).
- Pontarri, B.A. (2009). Appearing socially competent: the effects of a friend's presence on the socially anxious. *Personality and Social Psychology Bulletin*, 35, 283-294.
- Proulx, M-F., & Poulin, F. (2013). Stability and change in kindergartners' friendships : Examination of links with social functioning. *Social Development*, 22, 111-125.
- Ryan, R.M., & Deci, E.L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist*, 55, 68-78.
- Salvas, M.C., Vitaro, F., Brendgen, M., Dionne, G., Tremblay, R.E., & Boivin, M. (2014). Friendship Conflict and the Development of Generalized Physical Aggression in the Early School Years: A Genetically Informed Study of Potential Moderators. *Developmental Psychology*, 50, 1794-1807.
- Salvas, M.C., Vitaro, F., Brendgen, M., Lacourse, E., Boivin, M., & Tremblay, R.E. (2011). Interplay between friend's aggression and friendship quality in the development of child aggression during the early school years. *Social Development*, 20, 645-663.
- Seban, A.M., Kearns, K.T., Hernandez, M.D., & Galvin, K.B. (2007). Predicting having a best friend in young children: Individual characteristics and friendship features. *The Journal of Genetic Psychology*, 168, 81-95.
- Selman R.L., & Schultz, L.H. (1990). *Making a friend in youth. Developmental theory and pair therapy*. Chicago: The University of Chicago Press.
- Snyder, J.J., Schrepferman, L., Brooker, M., & Stoolmiller, M. (2007). The roles of anger, conflict with parents and peers, and social reinforcement in the early development of physical aggression. In T.A. Cavell, & K.T. Malcolm (Eds.), *Anger, Aggression, and*

- Interventions for Interpersonal Violence* (pp. 187-214). New Jersey: Lawrence Erlbaum Associates.
- Spivack, G., & Shure, M.B. (1974). *Social adjustment of young children: A cognitive approach to solving real-life problems*. Oxford, England: Jossey-Bass.
- Sullivan, H.S. (1953). *The interpersonal theory of psychiatry*. New York: W.W. Norton & Company.
- Tremblay, R.E., Loeber, R., Gagnon, C., Charlebois, P., Larivée, S., & LeBlanc, M. (1991). Disruptive boys with stable and unstable high fighting behavior patterns during junior elementary school. *Journal of Abnormal Child Psychology*, *19*, 285-300.
- Vitaro, F., Brendgen, M., Boivin, M., Cantin, S., Dionne, G., Tremblay, R. E., Girard, A., & Pérusse, D. (2011). A monozygotic twin difference study of friends' aggression and children's adjustment problems. *Child Development*, *82*, 617-632.
- Wentzel, K.R., Barry, C., & Caldwell, K. (2004). Friendships in middle school: Influences on motivation and school adjustment. *Journal of Educational Psychology*, *96*, 195-205.
- Witvliet, M., van Lier, P.A.C., Cuijpers, P., & Koot, H.M. (2009). Testing links between childhood positive peer relations and externalizing outcomes through a randomized controlled intervention study. *Journal of Consulting and Clinical Psychology*, *77*, 905-915.
- Youniss, J. (1980). *Parents and peers in social development*. Chicago: The University of Chicago Press.

Table 1. Means and Standard Deviations (*M*, *SD*) at Baseline (T1), and Post-Test Assessments (T2 and T3)

	Control group (n = 14)			Intervention group (n = 20)		
	T1	T2	T3	T1	T2	T3
	<i>M</i> ( <i>SD</i> )	<i>M</i> ( <i>SD</i> )	<i>M</i> ( <i>SD</i> )	<i>M</i> ( <i>SD</i> )	<i>M</i> ( <i>SD</i> )	<i>M</i> ( <i>SD</i> )
C Z - Mutual aid	NA	-.11 (.85)		NA	.07 (.89)	
<i>Child self-report</i>	2.20 (.67)	2.18 (.82)		2.29 (.59)	2.35 (.65)	
<i>Friend self-report</i>	1.95 (.58)	2.12 (.75)		2.00 (.82)	2.24 (.65)	
<i>Child teacher-report</i>	2.87 (.89)	2.68 (.68)		2.91 (.88)	2.70 (.97)	
<i>Friend teacher-report</i>	2.59 (.79)	2.36 (.74)		2.63 (.92)	2.52 (.85)	
C Z - Dyadic conflict resolution	NA	-.76 (1.3)		NA	.56 (1.9)	
<i>Dyad child/friend-report</i>	1.21 (.89)	1.17 (.72)		1.60 (1.3)	2.00 (1.2)	
<i>Dyad teacher-report</i>	3.24 (.84)	2.83 (.71)		3.06 (.58)	3.26 (.85)	
C - Shared positive affect	2.51 (.58)	2.66 (.41)		2.73 (.31)	2.68 (.52)	
<i>Child self-report</i>	2.69 (.59)	2.93 (.24)		2.72 (.53)	2.70 (.61)	
<i>Friend self-report</i>	2.34 (.77)	2.43 (.67)		2.74 (.31)	2.66 (.58)	
C Z - Children's physical aggression	1.01 (.72)		.68 (.91)	.92 (.67)		.61 (.76)

<i>Peer-report</i>	1.06 (.99)	1.35 (1.1)	1.22 (.99)	1.23 (1.1)
<i>Teacher-report</i>	3.24 (.93)	2.23 (1.2)	2.88 (.70)	2.20 (.89)
C Z - Friend's physical aggression	.06 (.88)	- .09 (.62)	.02 (.71)	.16 (.99)
<i>Peer-report</i>	.02 (.79)	.06 (.88)	.13 (.64)	.18 (.91)
<i>Teacher-report</i>	1.69 (.98)	1.26 (.37)	1.52 (.76)	1.57 (.90)

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C refers to composite scores from multiple informants. Z refers to standardized scores.

NA: Not available

Table 2. Bivariate Correlations Between Study Variables at Baseline Assessment (T1 - bottom diagonal) and at Post-Test- Assessments (T2 and T3 - top diagonal)

	1	2	3	4	5	6	7	8
1. Intervention status	–	–.20	–.07	.10	.35*	.02	–.06	.18
2. Child sex	–.20	–	–.15	–.14	–.23	.04	.39*	.14
3. Child grade	–.07	–.15	–	–.26	–.06	–.24	.31	.03
4. Mutual aid	.03	–.12	.03	–	.57***	.79***	–.40*	–.15
5. Dyadic conflict resolution	–.13	.11	.32	.21	–	.50**	–.35*	–.09
6. Shared positive affect	.24	.02	–.31	.13	–.02	–	–.44**	–.21
7. Children's physical aggression	–.06	.65***	.14	–.09	.19	–.14	–	–.01
8. Friend's physical aggression	–.18	.37*	–.04	–.25	–.14	–.19	.22	–

\*\*\*  $p < .001$ , \*\*  $p < .01$ , \*  $p < .05$

Estimate = Standardized coefficients. Each aggression and friendship features are aggregated measures, except for the mutual aid and conflict resolution scales at T1 (teacher only). Coded (0) for control and (1) for intervention group. Coded (0) for girls and (1) for boys.

Figure 1. CONSORT Diagram Explaining the Flow of Participants from Recruitment to Analyses

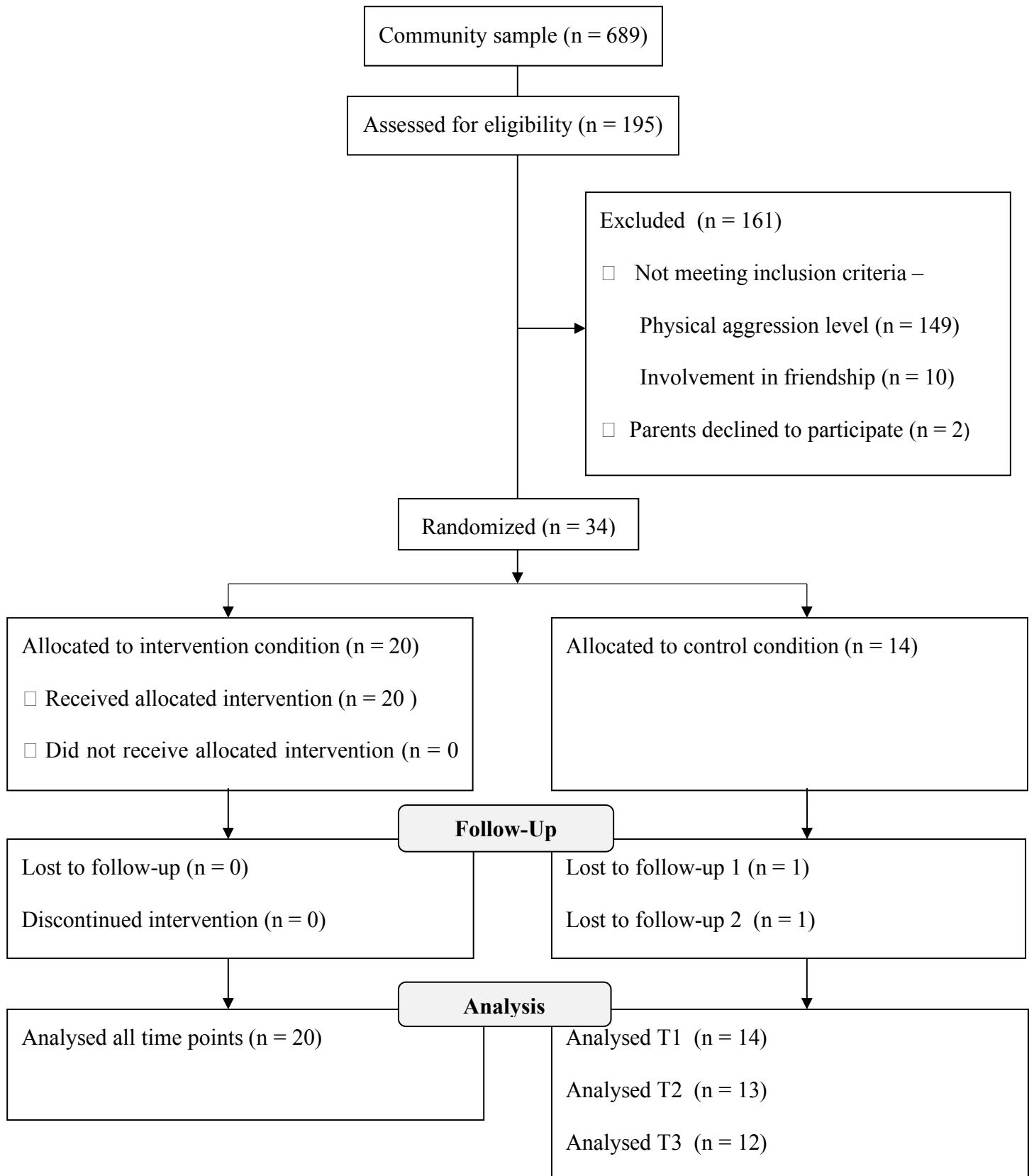


Figure 2. Results from the Resampling Method Using Multivariate Linear Regressions Showing an Indirect Effect of the Intervention on Children's Physical Aggression at the Peer Group Level

