

Aggression and Learning Behavior during the Transition from Preschool to
School. Relations among Parent, Preschool Teacher and School Teacher
Ratings

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Abstract

Children's aggressive and learning behavior, academic skills and cognitive development before school and in school, and children's adjustment in school is studied, using parent, preschool teacher and school teacher reports. Data were collected twice – first, in spring in preschool and, second, in fall in school. The participants were 151 6–7-year-old children (77 boys and 74 girls), their parents, preschool and school teachers. Preschool aggression and learning behaviors were related to school behaviors, skills and victimization. In addition to preschool teachers' reports, parents' reports had an additional predictive value for aggression. The concordance between preschool teachers' and parents' evaluations was not high.

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1. Introduction

It is widely recognized that preschool children's academic skills predict their later school achievement (Tiedeman & Faber, 1992). Recently, more attention has been paid on the negative role of externalizing behavior (e.g. aggression) and the positive role of learning behavior (e.g. attention/persistence) in their academic and social adjustment (e.g. Arnold, 1997; Hinshaw, 1992; Normandeau & Guay, 1998). Aggressive behavior as well as learning behavior are at least partly learnt at home and in preschool – both parents and teachers are important socializing agents for these young children. In school, children meet new challenges and have to adjust to new situations, peers, and adults, and this is quite difficult for many children. To make the transition from preschool to school smoother and less problematic to all the children, cooperation among parents, preschool teachers and class teachers is of importance, but also, more information about the preschool- and home-related factors predicting later social and academic (mal)adjustment is needed. Several studies have been carried out with teachers, but parents' views have been rarely used for predicting school adjustment. Thus, the short-term longitudinal study aims at investigating children's aggressive and learning behavior, academic skills and cognitive development before school and in school, and children's adjustment in school using parent, preschool teacher and school teacher reports.

Aggressive behavior in young children. Physical and verbal aggression is quite frequent among young children as they have not yet learnt other ways of coping and handling conflicts. This kind of behaviour is suppressed and negative attitudes towards it stressed by adults from very early on; besides, more adequate ways of behaving are

taught. Still, aggression has remained among the most worrisome problems in schools, and, actually, its frequency is growing and severe problems occur in earlier ages (Kazdin, 1997). Several studies have shown the association between direct aggression and academic difficulties in school-age children (see review by Hinshaw, 1992). Relations between physical aggression and language deficits have been found also in preschool children (Arnold, 1997; Estrem, 2005). Children high in overt aggression belong to the risk group for social maladjustment (Crick, Casas, & Mosher, 1997; Crick & Grotpeter, 1995). Even in preschool, aggression is related to relatively low levels of prosocial behavior (Crick et al., 1997) and to peer rejection (Ladd, Price, & Hart, 1988).

Currently, indirect (Björkqvist, Österman & Kaukiainen, 1992; Lagerspetz, Björkqvist & Peltonen, 1988), relational (Crick & Grotpeter, 1995; Crick, Bigbee, & Howes, 1996), and social aggression (Galen & Underwood, 1997) have been studied besides direct aggression. All three concepts emphasize slightly different aspects of hurtful manipulation but these all have common features; Archer and Coyne (in press) argue that the three terms essentially cover the same form of aggression. In the present paper, we refer to this form of aggression as indirect. It is intended to cause harm by using others, gossiping and spreading rumors, by ignoring others, or excluding them from the group. The shift towards studying indirect forms of aggression started in older children and adolescents who are developmentally more able to use such kind of manipulation (e.g. Björkqvist et al., 1992; Crick & Grotpeter, 1995; Galen & Underwood, 1997; Lagerspetz et al., 1988). Although indirect aggression has been shown to be relatively more frequent in adolescents as compared with their younger counterparts (Björkqvist et al., 1992; Lagerspetz et al., 1988), it has been determined already in preschool children (Crick, Casas & Ku, 1999; Crick et al., 1997; Hart, Nelson, Robinson, Olsen, & McNeilly-Choque, 1998).

Boys tend to be more directly aggressive than girls and girls more indirectly aggressive than boys; this tendency has been found for young children as well (e.g. Bonica, Arnold, Fisher, Zeljo & Yershova, 2003; Hawley, 2003; Russell, Hart, Robinson, & Olsen, 2003; Sebanc, 2003). However, such results have not been found in all studies and according to all types of ratings. Crick et al. (1997) determined the girls' higher indirect aggression according to teacher ratings but not according to peer ratings. Tomada and Schneider (1997), studying 8–10-year-old Italian schoolchildren, could not differentiate between relational (indirect) and physical aggression and found that boys were more relationally and physically aggressive than girls. McEvoy, Estrem, Rodriguez and Olson (2003) studied preschool children's indirect and direct aggression by teacher and observer ratings as well as peer nominations. According to all three methods, boys were rated as more physically and indirectly aggressive than girls. Still, the majority of the studies have found differences in the relative frequency of different forms of aggression in boys and girls. Namely, boys tend to use direct forms of aggression more frequently than indirect forms and girls, on the contrary, indirect forms of aggression more frequently than direct forms (McEvoy et al., 2003, Peets & Kikas, 2006).

Relations of indirect aggression to academic and social difficulties are more controversial than those of direct aggression. Some studies have shown negative correlations between indirect aggression and language skills (Estrem, 2005); however, others (e.g. Bonica et al., 2003) have determined positive relations between indirect aggression and language development. Moreover, indirect aggression has found to be correlated positively and significantly with social intelligence in schoolchildren (Kaukiainen et al., 1999). Indirectly aggressive children report significantly higher levels of loneliness, and they are more frequently rejected by peers (Crick & Grotpeter, 1995; Crick et al., 1997). However, Crick et al. (1997) also found that for boys, relational

aggression was significantly associated with relatively higher levels of peer acceptance. Salmivalli, Kaukiainen, and Lagerspetz (2000) also found that when the level of direct aggression was kept constant, increases in indirect aggression did not explain the variance in peer rejection scores; on the contrary – the use of indirect aggression contributed to peer acceptance, especially among boys. So, some preschoolers may have a positive attitude toward indirect aggression. Also, the peer status of some indirectly aggressive children may be controversial (for school-age children, see Crick & Grotjeter, 1995).

Assessment of aggression in preschool and elementary school. Numerous researchers have stressed the importance of using multi-informant method but also the necessity to assess behaviors in different settings (McEvoy et al., 2003). A child's behavior differs from context to context, and different informants add different aspects (see McConnell & Odom, 1999).

Most frequently, aggression has been studied by teacher and peer reports (Archer & Coyne, in press; Crick & Grotjeter, 1995; Crick et al., 1997; McEvoy et al., 2003). The usage of teacher ratings is justified because teachers supervise children in preschool, and, accordingly, the majority of aggressive acts have to be visible to them. However, the limitations of this method include relational biases, and non/accurate estimations of quantitative data (see Ladd & Proflet, 1996). In preschool age groups, the correlations between teacher reports and peer nominations have been found to be quite small for both types of aggression (Crick et al., 1997; McNeilly-Choque, Hart, Robinson, Nelson, & Olsen, 1996). Bonica et al. (2003) also studied the inter-rater agreement between teachers and found it to be quite moderate ($r=.36$) for indirect aggression. Preschoolers, although they are more involved in various incidents, may not be very reliable informants due to their developmental level (see Archer & Coyne, in press).

Some studies have used direct observations (McEvoy et al., 2003; McNeilly-Choque et al., 1996). The correlations between teacher and observer reports and peer nominations have been found to be quite small for both types of aggression (Crick et al., 1997; McEvoy et al., 2003; McNeilly-Choque et al., 1996). Although agreement is larger for direct than for indirect forms, there are also differences between boys and girls. McEvoy et al. (2003) found that teachers, peers and observers agreed more often about girls' indirect aggression and about boys' physical aggression than about girls' physical aggression and boys' indirect aggression. Crick et al. (1997) found that for boys, teachers and peers agreed to a greater extent in their assessments of direct aggression than in their assessments of indirect aggression. In contrast, for girls, the association between teacher and peer reports was significant for both types of aggression.

Surprisingly, parents' evaluations of aggression have been rarely used. Vaillancourt, Brendgen, Boivin and Tremblay (2003) argue that parents are less likely than teachers to know about children's social relations outside school. However, parents are important socializing agents and may add a unique and important perspective in assessing children's behavior just because they see their children in different situations (see Achenbach, McConaughay, & Howell, 1987; McConnell & Odom, 1999). Generally, concordance among parents' and teachers' ratings has been shown to be quite low (for meta-analysis, see Achenbach et al., 1987), however, differences exist between specific behaviors under study. In general, concordance among different reports is higher for externalizing (including aggressive) as compared with internalizing problems (e.g., Achenbach et al., 1987; Hinshaw, Han, Erhardt, & Huber, 1992). Hinshaw et al. (1992) studied the concordance among parents' and teachers' ratings and behavior observations for externalizing and internalizing problems. They found that teacher ratings were more predictive of externalizing behaviors (noncompliant and aggressive actions) and parent

ratings of internalizing behaviors (isolation and withdrawal).

Learning behaviors in young children. It has been stressed that learning behaviors and skills (also, attention/persistence, motivation, learning-related social skills, approaches to learning) in young children are predictive of their later academic and social adjustment in school. However, terminology and concepts described are quite diverse. For assessment, various behavioral rating scales have been used in formal settings (see Cooper & Farran, 1991; Gresham & Elliott, 1990; McDermott, Leigh, & Perry, 2002).

Cooper and Farran (1988) identified two subcategories of social behavior – interpersonal skills (e.g. sharing, respecting others) and learning-related social skills. Learning-related social skills cover such areas as independence, responsibility, self-regulation, these include behaviors like listening and following directions, staying on task, participating in group work, taking turns (McClelland, Morrison, & Holmes, 2000). Poor learning-related social skills in turn predict school maladjustment (Cooper & Farran, 1988; McClelland et al, 2000). McClelland and Morrison (2003), using teacher ratings, found that learning-related skills develop very early – already in 3–4-year-old children. They also showed that these skills remained relatively stable within one year.

Fantuzzo, Bulotsky-Shearer Fusco, & McWayne (2005) studied preschool children's approaches to learning using the Preschool Learning Behavior Scale (McDermott et al., 2002). These scales differentiate between three constructs: Competence Motivation (willingness or reluctance to take tasks), Attention Persistence (following instructions, paying attention), and Attitude Toward Learning (willingness to be helped). They found that children with higher aggression tended to be less attentive and cooperative. Arnold (1997) showed that attention difficulties may be a possible mediator of academic difficulties and externalizing behavior problems. Namely, the lack

of attention may lead to less learning, which, in turn, may lead to even greater attention and externalizing problems in the future.

Aims and hypotheses. To summarize, earlier research has shown the important role of preschool children's direct aggression, learning behavior, and academic skills in their (mal)adjustment in school. The role of indirect aggression, however, seems to be more dependent on contextual factors, and its effect may be different. So far, children's behavior and skills have been studied mainly by teacher reports, parents' views have remained unspecified (cf. McEvoy et al., 2003). Parents' views may, however, add valuable information to teachers' reports as they see children in different situations and activities. Also, parents' views are important to know in developing home-school cooperation and in planning interventions with maladjusted children.

In the current study, children's direct and indirect aggression were first assessed by parents and preschool teachers and then – half a year later – by school teachers. Children's learning behavior (more specifically, attention/persistence) was also assessed by these three reporters. Children's language and mathematics skills were assessed twice and conceptual knowledge was assessed in preschool. School teachers additionally evaluated children's victimization.

The first aim was to analyze if direct and indirect aggression differentiated in parent, preschool teacher and school teacher reports. We hypothesized that preschool teachers might be the best informants to differentiate between two types of aggression as they see children playing in peer groups where conflicts arise. Also, earlier studies have determined these two types of aggression already in children so young (Crick et al., 1997; Hart et al., 1998). The differentiation was assumed to be less visible in school teachers' reports as they knew children for a short time only. We were also interested to find out if girls were reported to be indirectly more aggressive than boys or not (cf.

Bonica et al., 2003; Crick et al., 1997; Hawley, 2003; McEvoy et al., 2003; Russell et al., 2003). In an earlier study with older schoolchildren in Estonia, boys were found to be both directly and indirectly more aggressive than girls (Peets & Kikas, 2006).

The second aim was to analyze the concordance among parents' and preschool teachers' reports on children's aggression and learning behavior. We assumed the concordance to be generally not high (cf. Crick et al., 1997; McEvoy et al., 2003; McNeilly-Choque et al., 1996).

The third aim was to determine which variables and whose reports predict children's adjustment in school the best. We assumed that in addition to children's academic skills and conceptual knowledge, teacher-rated learning behavior and aggression predict aggression and learning behavior in school, but that parents' evaluations have predictive power as well (cf. Hinshaw et al., 1992).

As the study was a part of a larger research project, subjects completed several different questionnaires, of which only the scales relevant to this study will be discussed in the following section.

2. Method

2.1. Participants and procedure

Data for the study were collected twice – first, in spring in preschool and, second, in fall in school. The participants were 6–7-year-old children, their parents, preschool and school teachers. In Estonia, child care institutions before school include crèches (until the age of 3) and kindergartens or preschools (3–7 years); education in this age period is voluntary. Children start their obligatory education usually at about the age of 7 years. At the first time of assessment, children attended the most senior groups in 8 preschools, at the second time of assessment they studied in the first grades in 13 schools. Preschools

and schools were of different sizes and located in different regions of Estonia.

Permission to conduct the studies was asked from the preschool principals and teachers. After that, informed consent letters were sent to the parents. Altogether 226 children received the permission to participate in the research project; three parents refused. Two parents did complete the questionnaires, but did not allow their children to be tested; some did not complete the questionnaire. Some children did not complete all the questionnaires and tests.

At the first time of assessment, complete data were collected for 157 children (85 boys and 72 girls), their parents and preschool teachers. Altogether, 28 teachers (mean age 43 years, all females), 126 mothers, 19 fathers and 2 caretakers participated in the study; in 10 cases, the mother and the father filled out the questionnaires together. At the second time of assessment, teacher reports were collected for the same 151 children (77 boys and 74 girls).

At the first time, parents and preschool teachers rated children's direct and indirect aggression and learning behavior; teachers additionally evaluated children's competence in language and mathematics. Parents filled out the questionnaires at home and returned them in closed envelopes to the researchers. Teachers filled out the questionnaires in preschool. Children completed the conceptual development test in small groups. At the second time, schoolteachers rated children's direct and indirect aggression, learning behavior, competence in language and mathematics as well as how often they are victimized.

2.2. Measures

The child's aggressive behavior was assessed with the same questionnaire for parents, preschool and school teachers. Six descriptions of specific types of aggressive

behaviors were given and respondents had to evaluate the frequency of the behavior on 4-point scale (never, seldom, sometimes, quite often). These included the descriptions of two aggression types – direct (physical and verbal) and indirect (e.g. “The child hits and kicks others to get what he/she wants”; “The child agitates other children against each other to get what he/she wants”).

The child's learning behavior, skills, and adjustment. The parents were asked four questions about the child's learning behavior (or academic behavior, attention/persistence, e.g. reversed items: “The child is in difficulties in understanding instructions”, “The child is absent-minded”). Teachers were asked additional two questions about lesson behavior (e.g. “The child needs individual guidance”). Internal consistencies of the Learning behavior scales were good ($\alpha = .77, .86, .85$, respectively for parents', preschool teachers', and school teachers' reports). School teachers additionally evaluated children for the frequency of being victimized (one question) on a 4-point scale (never, seldom, sometimes, quite often). As nobody was assessed to be victimized “quite often” and only one child “sometimes”, we categorized children into two groups: never victimized (with a score of 0) and seldom/sometimes victimized (with a score higher than 0; 18 children; 133 children). All the teachers evaluated the child's competence in language and mathematics on a 3-point scale (low, normal, high). We use the three scores: Language, Mathematics, and Academic skills (the sum of Language and Mathematics).

The children's conceptual knowledge was assessed with a group test – Controlled Drawing Observation (CDO, see Liikanen, 1987). CDO is used in Estonia for evaluating children's school readiness (see Kikas, in press); it assesses children's conceptual knowledge (elementary mathematical concepts, numbers, geometric figures) with drawing tasks. Children were given an A4 paper and they were first asked to write their

name on the back of the paper. The test consisted of 14 tasks (see Appendix 1), all of which were scored either correct or not. All the instructions were given orally and only once. The internal consistency of the test was good ($\alpha = .84$). In the analyses, we used the total score Concepts (the sum of the correct answers).

3. Results

3.1. Direct and indirect aggression

Confirmatory factor analyses were conducted separately with parents', preschool teachers' and school teachers' evaluations of aggression. The parameters of the models were estimated using the maximum likelihood procedure with non-normality robust standard errors and chi-square test statistic (MLM) (Muthén & Muthén, 1998). Fit indices Bentler's Comparative Fit Index (CFI) and Root Mean Square Error of Approximation (RMSEA) were employed to assess the adequacy of the measurement model. CFI values greater than .90 indicate an adequate fit of the model to the data, RMSEA values below .05 indicate a good fit and values below .08 a moderate fit of the model to the data.

The model with parents' results showed acceptable fit indices if one correlation was allowed between two items in Direct aggression scale, CFI = .96, RMSEA = .07. Models with teachers' results did not have so acceptable fit indices: RMSEA = .14, CFI = .96 (for preschool teachers) and RMSEA = .14, CFI = .94 (for school teachers). Correlation between direct and indirect aggression were quite high: .56, .83, .73, respectively for parents, preschool teachers and school teachers. Except for the description of means and sex differences we therefore used one aggression score for each informant: Aggression_{Parents} (parents), Aggression_{Pre} (preschool teachers), Aggression_{School} (school teachers). The internal consistencies of these scales were good (Cronbach $\alpha =$

.73, .92, .90 respectively for parents, preschool teachers and school teachers).

3.2. Descriptive statistics

The means and standard deviations of various aggression scores, learning behavior, academic skills, and conceptual knowledge are presented in Table 1 for two time points, for the total sample, and separately for boys and girls. It is seen that boys scored significantly higher than girls in all aggression scores except in Indirect Aggression as assessed by preschool and school teachers. Also, Direct Aggression scores were significantly higher ($p < .001$) than Indirect Aggression scores both in boys, and girls, according to all ratings. Girls scored higher than boys in learning behavior, conceptual knowledge, and language skills, but also in mathematics in school.

Insert Table 1 about here

3.3. Concordance among different ratings

Correlations among different variables in spring are provided in Table 2. The correlation between parent- and preschool-teacher-rated aggressive behavior was low (.23), but higher for learning behavior (.39). Correlations between aggression and learning behavior were low but significant for parent reports (-.18) but nonsignificant for preschool teachers. The highest correlations were found between preschool-teacher-rated learning behavior and academic skills (.60).

Insert Table 2 about here

As we were specifically interested in the concordance among ratings for aggressive behavior, we formed groups both according to parents' and teachers' ratings. Children whose score was one standard deviation lower than the mean score belonged to the low-aggression group, those who scored higher than one standard deviation above the

mean to the high-aggression group; the rest of the children belonged to the medium-aggression group. Table 3 shows the distribution of children in all the groups according to parent and preschool teacher ratings. It is seen that 24 children belong to the high-aggression group according to both raters but 25 children belong to the high group according to one rater but to the low group according to the other rater.

Insert Table 3 about here

In fall, correlations between aggression and learning behavior as assessed by school teachers were high ($r = -.49$, $p < .001$), the correlation of academic skills with aggression was medium ($r = -.31$, $p < .001$) and with learning behavior high ($r = .78$, $p < .001$). Correlations were generally significantly higher in the second testing in fall than in the first testing in spring.

Associations between variables at different time points are shown in Table 4. Correlations among aggression and learning behavior scores were higher for preschool teacher reports as compared with parent-reports. Academic skills and conceptual knowledge in preschool correlated highly and significantly with academic skills and learning behavior in school.

Insert Table 4 about here

3.3. Hierarchical Multiple Regression Analyses

Hierarchical Multiple Regression Analyses were carried out to examine how much of the variance in aggression, learning behavior, and academic skills in the beginning of the first grade were accounted for by the variables assessed before school. At Step 1, child-related variables (sex, academic skills and conceptual knowledge in preschool) were entered into the analyses. At Step 2, preschool-teacher-assessed variables (aggression and learning behavior) were entered. At Step 3, parent-rated

variables (aggression and learning behavior) were included. In this way, we could determine how much of variance in each dependent variable was accounted for by parent reports in addition to teacher reports. Analyses were conducted separately for aggression, learning behavior, and academic skills. Detailed results of the analyses are given in

Table 5.

Insert Table 5 about here

Inspection of data in Table 5 reveals that 39% of the variance in aggression was accounted for by the variables. The most significant predictor was preschool teacher reported aggression. However, both parent-reported aggression and learning behavior additionally accounted for 6% of the R^2 change. Conceptual understanding in preschool was also a significant predictor of school aggression. 41% of the variance in learning behavior and 38% in academic skills were accounted for by the variables in the models. For these three variables, child-related variables (specifically, academic skills and conceptual knowledge in preschool) accounted for the majority of the variance. Additionally, teacher rated behaviors accounted to additional 9% for learning behavior and 3% for academic skills.

3.4. School results of children belonging to different aggression groups

Additionally we analyzed the aggression, learning behavior and academic skills in school in children belonging to different aggression groups according their spring ratings (see Table 3). For this analysis, we formed the following four groups: Group 1 (73 children belonging either to the low aggression groups according to both raters or to the low group according to one rater but to the medium group according to the other rater); Group 2 (25 children with controversial ratings, belonging to the low group according to one rater but to the high group according to the other rater); Group 3 (34 children

belonging to the high aggression group according to one rater but to the medium group according to the other rater); Group 4 (24 children belonging to the high aggression group according to both raters).

Analyses of Variance showed that these groups did not differ significantly in their conceptual knowledge and academic skills in preschool. The mean effect of group was found for school-teacher-reported aggression, $F(3, 126) = 20.40, p < .001$, learning behavior $F(3, 126) = 5.53, p = .001$, and academic skills $F(3, 126) = 7.18, p < .001$. Post-hoc analyses carried out by means of the Scheffé test revealed that school-teacher-reported aggression was significantly higher and learning behavior and academic skills were significantly lower in Group 4 as compared with all the other groups.

3.5. Victimization, aggression, learning behavior and academic skills

A small number of children (18) was assessed by school teachers as being victimized either seldom or sometimes. Analyses of Variance showed that children of this group had significantly higher scores than other children in aggression, $F(1, 129) = 4.27, p = .04$ (parents' reports), $F(1, 148) = 10.51, p = .001$ (preschool teachers' reports), $F(1, 149) = 22.04, p < .001$ (school teachers' reports). In contrast, they scored lower in learning behavior, $F(1, 149) = 14.96, p = .002$ and academic skills, $F(1, 149) = 13.90, p = .003$, but only according to school teachers' reports. Eight of these children belonged to Group 4 – the group of children who had been rated as aggressive both by parents and preschool teachers (see above).

4. Discussion

As expected, preschool aggression and learning behaviors were related to school behaviors, skills and victimization. In addition to preschool teachers' reports, parents'

reports had an additional predictive value for aggression. As assumed, the concordance between preschool teachers' and parents' evaluations was not high. However, we were not able to differentiate between direct and indirect aggression factors in teachers' reports.

The scale for assessing direct and indirect aggression in preschool and elementary school in the Estonian sample was developed. Six items describing direct and indirect aggression in reactive and proactive form were used (cf. Crick et al., 1997; Crick & Dodge, 1996). Differently from the majority of earlier studies (e.g. Crick et al., 1999; Crick et al., 1997; Hart et al., 1998), direct and indirect aggression were not differentiated according to teachers' ratings (for similar results see Tomada & Schneider, 1997). Various factors might influence the results.

School teachers had known children for too short a time. Indirect aggression is difficult to detect for outsiders as it takes place in peer groups and is hidden from others. Also, the process of development for indirect aggression strategies in a new group (i.e., the first grade) may take a longer time than for direct aggression. Manipulation is most effective with closer friends and significant relationships, the development of which takes time. Actually, it was assumed that preschool teachers could assess indirect aggression the best. However, this was not the case. Teachers see children playing in groups where conflict situations may arise; they have experience with many similar-age children. It seems that these teachers interpreted the manipulations differently, they might hold a more integrated view of aggression – the correlation between two factors was the highest just for preschool teachers. In teachers' ratings possible influences of child's reputation, recall of the more salient events must be considered. Surprisingly, parents' data revealed the best two-factor solution; also, correlation between the two factors was not very high. Parents see children playing with themselves or siblings, but

also with friends in small groups. They have seen conflicts between the child and themselves and assess the respective behavior. But also, children may talk about their conflicts and manipulations to parents more frequently than to teachers.

We analysed indirect and direct scores separately to study if girls in this Estonian sample are indirectly more aggressive than boys or not. In general, the level of aggression was reported to be quite low by all reporters. According to all three ratings, girls were not assessed as more indirectly aggressive than boys; parents even reported boys to be more indirectly aggressive than girls. In contrast, as in all the earlier studies, boys were assessed to be more directly aggressive than girls by all the reporters (see Crick et al., 1997; Crick & Grotjahn, 1995; Lagerspetz et al., 1988; McEvoy et al., 2003; Peets & Kikas, 2006; Russell et al., 2003; Tapper & Boulton, 2004; Tomada & Schneider, 1997). Actually, results about indirect aggression have been controversial. Some studies have shown girls to use the indirect strategy more frequently than boys (Crick et al., 1997; Crick & Grotjahn, 1995; Lagerspetz et al., 1988; Russell et al., 2003); in other studies, boys have outperformed girls or no gender differences have emerged at all (McEvoy et al., 2003; Ostrov, Woods, Jansen, Casas, & Crick, 2004; Peets & Kikas, 2006; Tapper & Boulton, 2004; Tomada & Schneider, 1997). The results of this study are similar to those found in older Estonian schoolchildren (Peets & Kikas, 2006).

The majority of studies on preschool children's aggression have relied on teachers' and peers' reports; also, observational studies have been conducted (Ostrov et al., 2004, Hart et al., 1988, McEvoy et al., 2003). Parental reports have been less utilized, and there is relatively little information about concordance between parental reports and other sources in children's aggression ratings (see discussion in McEvoy et al., 2003). Also, children's learning behavior has been mainly assessed by teachers (e.g. Cooper & Farran, 1991; Gresham & Elliott, 1990; McDermott et al., 2002). In our study, parents'

reports were used besides teachers' reports. As assumed, preschool teachers' and parents' ratings of aggression did not correlate highly. A meta-analytic study by Achenbach et al. (1987) showed that there is a stronger concordance between the ratings of informants who see children in similar situations (e.g. teacher-teacher, parent-parent) than between different informants (e.g. teacher-parent, parent-mental health worker). These latter correlations were of similar level as those found in our study. The concordance between parents' and preschool teachers' ratings of learning behavior was higher. So, children may solve problems and conflicts differently with different peers and situations. However, their attention and concentration is possibly assessed mainly in academic tasks in which children behave similarly. According to both parents' and teachers' ratings, aggressive behavior was negatively correlated with learning behavior, and this correlation was even higher according to parents' ratings.

Of primary interest to the researchers were the associations between the variables before school and in school. Aggression has generally been shown to be quite stable behavior across life span but also during the transition from preschool to school (see Huesmann & Guerra, 1997; Rose, Rose, & Feldman, 1989). As assumed, preschool teacher-rated aggression was the most significant predictor of school-teacher-rated aggression. However, parents' ratings had additional predictive value as well. Preschool and school teachers see children in quite similar situations where they have to cope with peers, defend themselves in groups and solve conflicts. Parents see children in different situations and groups. In the beginning of school, children meet new challenges; in difficult situations they tend to use old, more habitual behavior patterns (e.g., ways of solving conflicts). In predicting the aggressive way of behavior, both preschool teachers' and parents' information seems to be of importance. Quite informative was also the analysis of groups of children with different aggression scores according to parents' and

teachers' ratings. Namely, the only group that differentiated from others was with children who belonged to the high aggression group both according to preschool teachers' and parents' ratings. So, just these children may have habitual ways of aggressive behavior, and they proceed to use it in school as well. It must be stressed that this group was found to show high aggression, low learning behavior and low academic skills just in the beginning of school (cf. Rose et al., 1989). Also, about half of these children were reported by school teachers to have been victimized. So, namely children who behave aggressively in different situations before school seem to be at a risk for later maladjustment (cf. Crick et al., 1997; Crick & Grotjahn, 1995; Ladd et al., 1988). Children who behave aggressively only in some situations adjust to school demands better.

Additionally, low conceptual knowledge was also a significant predictor of aggression. Earlier studies have shown deficits in the verbal functioning of aggressive individuals in older age (Cole, 2001; Estrem, 2005; Feshbach & Price, 1984; Richman & Lindgren, 1981). In reactive situations, children have to analyze the situation and choose an appropriate response, and these analyses may be too demanding for children with a low level of cognitive functioning.

Learning behavior (more specifically, academic behavior and persistence on tasks), however, was predicted by preschool academic skills, conceptual knowledge and preschool teachers' (not parents') reports of learning behavior and aggression. Earlier studies have also shown that children with higher aggression tended to be less attentive and cooperative (see Arnold, 1997; Fantuzzo et al., 2005). As assumed, the best predictors of academic skills were preschool academic skills, the second good predictors were conceptual knowledge and low aggression as reported by preschool teachers (cf. Hinshaw, 1992).

Transition from preschool to school is a difficult period for several but not for the majority of children; besides cognitive abilities, learnt – aggressive and academic – behaviors influence the process of adjustment. The habitual way of aggressive behavior may inhibit smoother adjustment (cf. Arnold, 1997; Hinshaw, 1992). Namely children who before school tended to be aggressive in different situations (i.e., were assessed as more aggressive by different reporters), were found to be more aggressive and more frequently victimized in the first months in school. These behaviors do not account for all maladjustment problems; however, these behaviors are malleable, and appropriate intervention can help later academic failure and social problems. To help children cope better, it is important to know their behavior patterns in different situations. The study showed the importance of parents' reports beside teachers' evaluations, specifically in assessing aggression.

One of the limitations of the study is the use of questionnaires for adults only. As was seen, teachers and parents „see” children's behavior differently; also, indirect forms of aggression (gossiping, telling bad or false stories, saying bad things behind the other's back, trying to get others to dislike the person) were not differentiated in teachers' reports. In future, self- and peer-evaluations should be collected as well. It is also necessary to develop a more comprehensive questionnaire for assessing direct and indirect aggression, taking into account the peculiarities of behavior of young children.

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Table 1

Means, Standard Deviations, and Differences Between Boys and Girls

Variable	Total			Boys			Girls			t	p
	M	SD	N	M	SD	N	M	SD	t		
Direct Aggression _{Parents}	.55	.43	85	.67	.46	72	.40	.33	4.05	<.001	
Indirect Aggression _{Parents}	.17	.35	85	.22	.41	72	.11	.24	2.04	.04	
Aggression _{Parents}	.42	.35	85	.52	.38	72	.31	.30	4.04	<.001	
Direct Aggression _{Pre}	.71	.69	101	.83	.72	85	.56	.63	2.67	.008	
Indirect Aggression _{Pre}	.40	.61	101	.40	.63	85	.39	.59	.02	.98	
Aggression _{Pre}	.60	.63	101	.68	.65	85	.51	.59	1.96	.05	
Direct Aggression _{School}	.54	.74	77	.74	.86	74	.34	.52	3.59	<.001	
Indirect Aggression _{School}	.16	.41	77	.22	.51	74	.10	.26	1.80	.07	
Aggression _{School}	.41	.59	77	.57	.70	74	.25	.39	3.40	<.001	
Learning behavior _{Parents}	3.41	.51	85	3.29	.57	72	3.54	.40	-3.12	<.001	
Learning behavior _{Pre}	2.92	.57	101	2.78	.66	85	3.09	.40	-3.79	<.001	
Learning behavior _{School}	3.09	.81	77	2.88	.88	74	3.30	.68	-3.28	<.001	
Language _{Pre}	2.18	.73	101	2.06	.72	85	2.33	.71	-2.56	.01	
Mathematics _{Pre}	2.24	.67	101	2.18	.68	85	2.32	.64	-1.43	.16	
Academic _{Pre}	4.42	1.32	101	4.24	1.34	85	4.65	1.26	-2.13	.03	
Language _{School}	2.23	.73	77	2.04	.73	74	2.42	.68	-3.29	<.001	
Mathematics _{School}	2.34	.65	77	2.22	.66	74	2.46	.62	-2.28	.02	
Academic _{School}	4.56	1.27	77	4.26	1.28	74	4.88	1.19	-3.07	<.001	
Concepts	9.12	2.48	97	8.76	2.60	82	9.55	2.27	-2.14	.03	

Note. Parents: according to the ratings of parents, Pre: according to the ratings of preschool teachers, School: according to the ratings of school teachers.

Table 2

Correlations Among Variables during the First Assessment

Variable	2	3	4	5	6
1. Aggression _{Parents}	.23**	-.30***	-.28***	-.18*	-.10
2. Aggression _{Pre}		-.10	-.18*	-.09	-.01
3. Learning behavior _{Parents}			.39***	.29***	.17*
4. Learning behavior _{Pre}				.60***	.22**
5. Academic _{Pre}					.30***
6. Concepts					

Note. *p<.05; **p<.01; ***p<.001. Parents: according to the ratings of parents, Pre: according to the ratings of preschool teachers.

Table 3

Distribution of Children in Parent- and Preschool-Teacher-Rated Aggression Groups

Teacher-ratings	Low _{Pre}	Medium _{Pre}	High _{Pre}
Parent-ratings			
Low _{Parents}	13	24	7
Medium _{Parents}	9	22	10
High _{Parents}	18	24	24

Note. Parents: according to the ratings of parents, Pre: according to the ratings of preschool teachers.

Table 4

Correlations Among Variables in the First and Second Assessment

School				
Preschool	Aggression	Learning behavior	Academic skills	
Aggression _{Parents}	.34***	-.25**	-.29*	
Aggression _{Pre}	.52***	-.29***	-.26**	
Learning _{Parents}	-.29***	.19*	.19*	
Learning _{Pre}	-.22*	.50***	.41***	
Academic _{Pre}	-.16	.51***	.56***	
Concepts	-.20*	.35***	.32***	

Note. *p<.05; **p<.01; ***p<.001. Parents: according to the ratings of parents, Pre: according to the ratings of preschool teachers.

Table 5

Results of Hierarchical Regression Analyses

	Beta	ΔR^2	F	Beta	ΔR^2	F	Beta	ΔR^2	F
	Aggression			Learning behavior			Academic skills		
Step 1		.09	4.01***		.31	18.77***		.34	21.54***
Sex	-.06			.00			.04		
Academic _{Pre}	.06			.26**			.43***		
Concepts _{Pre}	-.17*			.21**			.18*		
Step 2		.24	12.14***		.09	16.27***		.03	14.90***
Aggression _{Pre}	.46***			-.18*			-.17*		
Learning behavior _{Pre}	-.04			.25***			.07		
Step 3		.06	11.16***		.01	12.09***		.01	10.55***
Aggression _{Parents}	.17*			-.13			-.05		
Learning behavior _{Parents}	-.18*			-.02			-.01		
R ²		.39			.41			.38	

Note. *p<.05; **p<.01; ***p<.001. Parents: according to the ratings of parents, Pre:

according to the ratings of preschool teachers.