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School Outcomes of Aggressive-Disruptive Children: Prediction From Kindergarten Risk Factors and Impact of the Fast Track Prevention Program

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Abstract

A multi-gate screening process identified 891 children with aggressive-disruptive behavior problems at school entry. Fast Track provided a multi-component preventive intervention in the context of a randomized-controlled design. In addition to psychosocial support and skill training for parents and children, the intervention included intensive reading tutoring in first grade, behavioral management consultation with teachers, and the provision of homework support (as needed) through tenth grade. This study examined the impact of the intervention, as well as the impact of the child's initial aggressive-disruptive behaviors and associated school readiness skills (cognitive ability, reading readiness, attention problems) on academic progress and educational placements during elementary school (Grades 1–4) and during the secondary school years (Grades 7–10), as well as high school graduation. Child behavior problems and skills at school entry predicted school difficulties (low grades, grade retention, placement in a self-contained classroom, behavior disorder classification, and failure to graduate). Disappointingly, intervention did not significantly improve these long-term school outcomes.

Keywords

aggressive-disruptive children; school outcomes; school readiness; preventive intervention

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INTRODUCTION

The academic difficulties of children with “early starting” aggressive-disruptive conduct problems are well-established. Aggressive-disruptive behaviors in the early elementary years predict later academic under-achievement, need for special education, and increased likelihood of school dropout (Coie & Dodge, 1998; Shelley-Tremblay, O'Brien, & Langhinrichsen-Rohling, 2007). These school difficulties, in turn, amplify the long-term social handicaps experienced by many aggressive children, including underemployment, limited occupational options, financial stress, and poor quality of social relationships (Kokko & Pulkkinen, 2000; Windle & Windle, 1995).

Multiple factors and mechanisms may contribute to the school maladjustment of aggressive children. Cognitive deficits, including lower levels of cognitive ability, attention problems, and difficulties learning to read have figured centrally in developmental models linking early aggression with underachievement and special education (Hinshaw, 1992; Maguin, Loeber, & LeMahieu, 1993). In addition, developmental research has identified behavioral and social factors that contribute to the stability of aggression over time and undermine learning, including conflict with teachers, peer difficulties, and low levels of learning engagement (Chen, Huang, Chang, Wang, & Li, 2010; Stipek & Miles, 2008).

The Fast Track prevention program included multiple components designed to address the behavioral, social, and academic needs of children starting school with high rates of aggressive behavior (see Conduct Problems Prevention Research Group [CPPRG], 1992). Goals included the promotion of parental support and effective behavior management skills, child social competence and positive peer relations, teacher support and effective classroom management skills, and child reading readiness and school engagement. Short-term effects during the initial elementary years were positive, including improved scores on measures of social cognitions, peer relations, reading readiness, and reduced aggression (see CPPRG, 1999, 2002). In addition, analyses of late adolescent outcomes document lower levels of criminal arrest among children in the intervention than control group (CPPRG, 2010a) and lower rates of conduct disorder diagnosis among the youth with the highest levels of initial risk who received intervention (CPPRG, 2011).

The purpose of this paper was to examine broader, long-term indices of children's school progress and educational outcomes, including grades, grade retention, special education placement in a self-contained classroom, behavior disorder classification, and high school graduation. The two major aims were: (i) to identify the unique contributions that early cognitive and behavioral child characteristics (cognitive ability, reading readiness, inattention, and aggressive-disruptive behavior) made to school maladjustment during the elementary and secondary school years in a sample of high-risk aggressive children, and (ii) to evaluate the impact of the Fast Track prevention program on these school outcomes.

DEVELOPMENTAL PROCESSES ASSOCIATED WITH EARLY AGGRESSION AND UNDERACHIEVEMENT

Children who exhibit elevated aggression at school entry (e.g., fighting, yelling, harming others) often show concurrent oppositional behavior and rule violations (e. g., refusing to comply with adult requests, difficulty following directions, temper outbursts) (Coie & Dodge, 1998). Many also show elevated impulsive or hyperactive behaviors, and display high rates of off-task behaviors (Hinshaw, 1992). Developmental research regarding the links between early aggression and later school maladjustment has focused alternatively on the role played by the cognitive skill deficits that often accompany aggressive behavior, and/

or on the role of a negative socialization and motivational cascade evoked by early aggression, including intensive interpersonal conflict and subsequent school disengagement.

Cognitive factors often associated with aggressive-disruptive behavior include lower IQ, attention problems, and low reading readiness (Maguin et al., 1993). Based upon a comprehensive review of studies examining the link between externalizing problems and academic underachievement, Hinshaw (1992) concluded that inattention-hyperactivity is specifically linked to reading underachievement in early and middle childhood. Similarly, after analyzing longitudinal data on the large Dunedin sample, Moffitt (1993) identified neuropsychological deficits (low IQ, attention problems) as key predictive risks associated with stable early-starting aggressive conduct problems and associated learning difficulties. Maguin et al. (1993) found that the combination of early attention problems and reading difficulties characterized many delinquent youth. Although these cognitive skills (low IQ, attention problems, poor reading readiness) are implicated in the school difficulties experienced by young aggressive children, the relative roles that they play in contributing to various aspects of school maladjustment is not well-understood. Prior research suggests that these cognitive factors may play a greater role in predicting school maladjustment during the elementary school years than in the secondary school years (Hinshaw, 1992; Huesmann, Eron, & Yarmel, 1987) and may be more important determinants of academic progress (e.g., grades, grade retention) than of school behavior problems or educational placement (e.g., behavior disorder classification, placement in self-contained classrooms).

In addition to cognitive skills, behavioral, and social factors appear to play a key role in undermining the school adjustment and learning engagement of young children who are aggressive. In a longitudinal study modeling developmental influences during the early elementary years, Chen et al. (2010) found that aggression had unique effects on later social competence and academic achievement after controlling for earlier levels of social competence and achievement. Similarly, in their long-term longitudinal study, Huesmann et al. (1987) found that, although low IQ in the early years predicted elevated aggression through age 8, levels of aggression (rather than IQ) predicted intellectual achievement in adulthood. They hypothesized that, in early childhood, low intelligence impairs the learning of aggression control, thereby increasing levels of aggression during the early elementary school years. Aggressive behavior then impedes learning and intellectual development in the secondary school years and early adulthood.

These findings lend support to a negative cascade model in which early aggression undermines school adjustment over time through both direct and indirect processes (see also Dodge, Greenberg, Malone, & CPPRG, 2008). Aggression at school entry often evokes negative social reactions from peers and adults, increasing interpersonal conflict, reducing social support, and thereby fueling negative attitudes towards school. For example, following children over the course of the elementary school years, Stipek and Miles (2008) documented transactional influences between child aggression and teacher conflict, with the effects of aggression on achievement partially mediated by conflictual relationships with teachers. Controlling for family and neighborhood demographics, White and Loeber (2008) found that aggressive behavior increased peer dislike and social marginalization and, along with poor academic achievement, significantly increased the likelihood of special education placement.

Unfortunately, school-based interventions designed to help struggling students sometimes increase feelings of alienation and exacerbate aggressive behavior problems. For example, Jimerson and Ferguson (2007) examined the impact of grade retention on aggressive behavior. Their statistical analyses, which controlled for prior levels of aggression, revealed that students who were retained in grade, or placed into a “transition classroom” to give

them an extra year of early elementary school became more aggressive than non-retained students in middle school and more likely to drop out. The increased aggression levels among retained students may reflect feelings of frustration regarding their decreased academic status, as well as increased peer relationship challenges faced by students after grade retention. Some research suggests that placement in special education classes is also linked to the escalation of aggressive behavior due to peer contagion (Visser, Kunnen, & Van Geert, 2010), although not all studies find this negative impact (White & Loeber, 2008).

The relative impact of cognitive versus social and motivational factors on the school maladjustment of aggressive children may change with age, with cognitive factors playing a greater role in the initial elementary years, and social, behavioral, and attitudinal factors playing a greater role in the secondary school years (Huesmann et al., 1987). By preadolescence, unpleasant confrontations with teachers and peers create a situation in which high-risk children, who have had histories of poor school performance and poor peer relations in elementary school, make the transition to middle school feeling alienated from adults and disengaged from school (Hawkins, Catalano, & Miller, 1992). After the middle-school transition, youth experience reductions in parent and teacher support and monitoring, allowing them more autonomy and more time with peers. This freedom increases the risk that children with low levels of commitment to school will initiate adolescent problem behaviors, including truancy, substance use, and antisocial activities that further undermine their academic performance (Dishion, Piehler, & Meyers, 2008; Hawkins et al., 1992).

RATIONALE FOR MULTI-COMPONENT SCHOOL-BASED INTERVENTIONS

Given the multiple developmental processes associated with the poor school outcomes experienced by early-starting aggressive children, effective preventive interventions likely need to address multiple skill domains (CPPRG, 1992). Prior research suggests that interventions that combine academic tutoring addressing the cognitive delays of early-starting aggressive children with social competence training addressing their self-control and prosocial skills can improve their school adjustment in the short term (Coie & Krehbiel, 1984). Prior research also suggests that training teachers in positive classroom management skills can reduce aggressive-disruptive behaviors and improve the on-task behavior of children with cognitive delays (Hawkins, Catalano, Kosterman, Abbott, & Hill, 1999; Metropolitan Area Research Group [Eron et al.], 2002; Walker, 1996). Finally, universal social-emotional learning programs have proven effective in promoting positive classroom climate, and in some studies, enhancing peer relations and reducing classroom rates of aggression, which might reduce the peer influences that make aggressive behavior functional in the classroom (Durlak et al., 2011; Greenberg et al., 2003).

THE FAST TRACK INTERVENTION

Based on prior development and intervention research, the Fast Track prevention program included multiple components, combining several approaches that had prior evidence of efficacy in reducing child externalizing behavior problems and promoting child self-regulation skills. Described further in the methods section, the Fast Track prevention program included a “universal” social-emotional learning program implemented by classroom teachers in Grades 1–5, the PATHS (Promoting Alternative THinking Strategies) Curriculum (Greenberg & Kusche, 1993) along with the provision of consultation and support to classroom teachers in the development and implementation of positive behavior management programs. Target children (e.g., those who screened into the high-risk sample based upon parent and teacher ratings of aggressive-disruptive behaviors) were invited to attend extracurricular group meetings which included social skills training for them and parent management training for their parents. To enhance the generalization of the social

skill training program, high-risk children also received a “peer-pairing” program to support positive peer relations at school. To address delays in reading readiness, all high-risk children received tutoring in reading skills during first grade, using an evidence-based phonics approach. Based on annual discussions with teachers and individualized case plans, target children were eligible to receive additional academic support in subsequent years through Grade 10, primarily focused on support for homework completion.

Prior studies have documented the positive impact of the Fast Track Program on youth behavioral, social, and academic adjustment intheinitial elementaryschoolyears. At the end of first grade, in comparison to the high-risk control children, the high-risk intervention children displayed positive improvements in social-cognitive skills (e.g., emotion recognition, emotion coping, and social problem solving skills), observed positive interactions with peers at school, and improved sociometric social preference scores. Teachers rated the intervention children as having significantly lower rates of aggressive, oppositional behaviors in the school setting (CPPRG, 1999). Academically, children in the intervention condition demonstrated improved word attack skills, attained higher languageartsgrades,andreceivedfewerminutesofspecial education services during Grade 1. At the end of third grade, intervention children received lower teacher ratings of conduct problems compared with children in the control group, and continued to show improved social cognitive skills. However, incontrast tothe effectsnoted attheend of the first grade, the intervention effects were no longer evident on reading achievement tests at the end of third grade (CPPRG, 2002).

THE PRESENT STUDY

The purpose of this paper was to examine broader, long-term indices of children's school outcomes, including grades, grade retention, special education placement in a self-contained classroom, behavior disorder classification, and high school graduation. A key question was whether the significant intervention effects observed on dimensional measures in the early elementary years affected substantive school outcomes in later years, in ways that might have cost savings for schools and life-course impact for the participants. Given evidence for possible differences in the determinants of school adjustment in the elementary and secondary school years, we examined academic outcomes at two periods of time—during elementary school (Grades 1–4) and during the secondary school years (Grades 7–10), as well as rates of high school graduation. Because we were interested in markers of school maladjustment that had low base rates and interdependencies across years (e.g., grade retention, special education classification and placement), we examined the occurrence of these events within each broad period of time (elementary years; secondary years), rather than on an annual basis.

This study examined the impact of the intervention, as well as the impact of the child's initial aggressive-disruptive behaviors and associated school readiness skills (cognitive ability, reading readiness, attention problems) on academic outcomes in the elementary and secondary school years. The two major aims were: (i) to identify the unique contributions that early cognitive and behavioral child characteristics made to school maladjustment during the elementary and secondary school years in a sample of high-risk aggressive children, and (ii) to evaluate the impact of the Fast Track prevention program on these school outcomes. We hypothesized that cognitive factors (low IQ, inattention, poor reading readiness) would be important unique predictors of school maladjustment in the elementary school years, particularly grades, grade retention, and placement in a self-contained classroom. We further hypothesized that the severity of aggressive- disruptive behavior would be an important unique predictor of all forms of school maladjustment in the secondary school years, and would also contribute uniquely to the classification as behavior

disordered in the elementary school years. Based upon the positive intervention findings on reduced aggression, improved peer relations, and improved reading readiness at the end of first grade, we expected positive intervention effects on the measures of school adjustment and attainment.

METHOD

Participants

Fifty-five schools were identified at four demographically diverse sites (Nashville, TN; Durham, NC; Seattle, WA; and rural central PA), selected as high risk based on crime and poverty statistics. Over three consecutive years (1991–1993), the aggressive-disruptive conduct problems of all 9,594 kindergarteners attending these schools were rated by teachers, using the Teacher Observation of Child Adjustment-Revised (TOCA-R) Authority Acceptance Scale (Werthamer-Larsson, Kellam, & Wheeler, 1991). The parents of children scoring in the top 40% within cohort and site were then solicited for the next stage of screening; 91% agreed to complete an interview which included ratings of child aggressive-disruptive behaviors, drawn primarily from the Child Behavior Checklist (Achenbach, 1991) (for further details, see Lochman & CPPRG, 1995). The teacher and parent screening scores were standardized and combined to yield a total severity-of-risk screen score.

Within each site, participating schools were divided into sets matched for demographics (size, percentage free or reduced lunch, ethnic composition), and the sets were randomly assigned to intervention or control conditions. Children were selected for inclusion into the study based on their screen score, moving from the highest score downward until desired sample sizes were reached within sites, cohorts, and conditions. Deviations were made when a child failed to matriculate in the first grade at a core school ($n = 59$) or refused to participate ($n = 75$), or to accommodate a rule that no child would be the only girl in an intervention group. The outcome was that 891 children (n's = 445 for intervention and 446 for control) participated. The mean age of the high-risk children was 6.5 years ($SD = 0.48$) at the time of identification. Across all sites, the sample was 51% African American, 47% European American, and 2% of other ethnicity (e.g., Pacific Islander and Hispanic), reflecting the ethnic diversity of the population at the four sites. Sixty-nine percent were boys. Fifty-eight percent of the high-risk children came from single-parent families, 29% of the parents were high school dropouts, and 35% of the families were in the lowest socioeconomic class as determined by Hollingshead scoring (Hollingshead, 1975). On the kindergarten Teacher's Report Form of the Child Behavior Checklist (TRF; Achenbach, 1991), the average Externalizing T-score (available for 88% of the high risk sample) was 66.4, and 76% of these children scored above a T-score of 60, indicating sub-clinical to clinical levels of externalizing behavior problems.

In addition to the high-risk sample, a stratified normative sample of 387 children was identified from the control schools to represent the population at each site. These children were not a part of the intervention analyses reported here, but were included to provide a normative reference point for child outcomes. Informed parental consent was obtained for all participants, following APA guidelines for ethical research.

Intervention Procedures

PATHS Curriculum—In Grades 1–5, classroom teachers implemented the PATHS (Promoting Alternative THinking Strategies) Curriculum, a universal social-emotional learning program designed to promote a positive classroom climate and enhance children's social skills, emotional awareness, and self-control (Greenberg & Kusche, 1993). Teachers

received detailed manuals and materials and participated in 3-day workshops led by certified trainers during the summer months.

Teacher consultation—Fast Track Educational Coordinators [ECs] (described below) made weekly visits to each classroom. They also met with teachers each month either individually or in small groups. ECs reviewed the implementation of PATHS with teachers, modeled classroom lessons, and discussed classroom management challenges, offering support in planning and implementing positive behavior management programs.

Individual tutoring—In first grade, all children received the Wallach reading tutoring program (Wallach & Wallach, 1976), delivered by paraprofessionals in three half-hour sessions per week. This highly structured one-on-one tutoring program was designed for use by paraprofessionals to serve low-readiness children from disadvantaged backgrounds. The program emphasized a phonics-based, mastery-oriented approach to the development of initial reading skills. In later years, as noted below, academic tutoring was provided to a subset of children who showed on-going academic difficulties and fell in the bottom third of the class in reading skills. Once children had mastered the Wallach program, tutoring focused on homework completion and other learning activities recommended by the classroom teacher.

Peer pairing—In first grade, all children received peer pairing sessions, delivered by paraprofessionals in one half-hour session per week. Following a scripted manual, these supervised play sessions gave target children an opportunity to practice social skills with classmates (partners rotated over the course of the year), to support skill generalization and foster a positive peer reputation. In second grade, peer-pairing was offered to the subset of children who continued to experience peer rejection or exhibit high rates of aggression toward peers at assessments conducted at the end of first grade. In the later elementary years (Grades 3–5) peer support was offered to children with ongoing social needs, in the context of a weekly “social club” or “lunch club” offered after school or during an indoor recess period.

Middle school transition program—At the point of transition into middle school (which happened following Grade 4, 5, or 6 for youth in this sample), students were offered a set of eight small group experiences. These included orientation and tours of the middle school, and discussion activities designed to provide support in the weeks immediately preceding and following the transition.

Academic support in the secondary school years—Individualized case assessments were used to determine the need for academic support in the later school years (Grades 6–10). Primarily, secondary services for children with academic needs focused on homework support, vocational interest exploration, and in some cases, working with parents and teachers to address behavioral or attendance issues.

Extracurricular parent training and child social skill training groups—Parent management skill training groups focused on improving parent–child relationships and parenting that provided positive support, consistent and non-punitive limit-setting, monitoring and communicating with their child. Child social skill training groups focused on promoting prosocial and self-regulation skills. These groups were held during 2-hour extracurricular sessions held outside of the school context. Groups met weekly in Grade 1 (22 sessions) and bi-weekly in Grade 2 (14 sessions), followed by monthly “booster session” groups in Grades 3–5 (9 sessions each year). In addition, families received individual home visits (with varied frequency, based upon criterion-referenced assessments of need) to

promote the generalization of skills presented in the group and to address individual needs (for more detail, see Bierman, Greenberg, & CPPRG, 1996; McMahon, Slough, & CPPRG, 1996).

Education Consultants (ECs)—The ECs at each site were experienced classroom teachers who had expertise working with behaviorally challenging children. They received 3 days of cross-site training each year, and followed detailed manuals describing the assessment and intervention protocols for each of the key program components. They were supervised in weekly meetings at each site; supervisors participated in weekly cross-site phone calls with the principal investigators who oversaw the key program components. ECs delivered the social skill training to target children, consulted with classroom teachers on PATHS implementation and classroom management issues, and supervised paraprofessionals in the implementation of the tutoring and peer-paring programs.

Intervention participation—Only a few families (6% of the sample) declined to initiate participation in the parent or child groups in Grade 1. Of the 94% participating, 79% of the parents and 90% of the children attended at least 50% of the sessions offered. Participation in the intervention decreased gradually across the years, particularly as families moved. By the middle school years, approximately 15% of the youth in the sample were rated as low risk and recommended for minimal services each year, but a majority of youth continued to receive some services through tenth grade.

In terms of the school-based intervention services, during first-grade, the program protocol called for three tutoring sessions per week for all children assigned to the intervention condition. All except for three children got some tutoring in first grade, with an average of 50 sessions delivered (73% of the planned amount). In the subsequent years, ECs met with teachers to discuss children's academic progress and determine their need for tutoring. When teachers felt that children were performing “in the bottom third” of the class, children qualified for ongoing tutoring sessions, scheduled 1–2 times per week. On average, two-thirds of the children in the sample qualified for tutoring each year (range from 60% to 74%), and over 80% of those who qualified received tutoring each year. Some could not be served, primarily due to moves out of the service area, and this number increased by about 5% each year. Of those who received tutoring, the average number of sessions was 40 per year during the elementary years and 10 per year during the secondary years.

All analyses are based upon an “intent to treat” model which reflects the assignment of children and families to intervention versus control conditions, regardless of the degree to which children and families actually engaged in the intervention, or the amount of intervention received.

Child Characteristics at School Entry: Predictors of School Outcomes

Four measures assessed child cognitive and behavioral school readiness at school entry. These were examined as predictors of school difficulties.

Cognitive ability—The Vocabulary and Block Design subtests from the Wechsler Intelligence Scales for Children-Revised (WISC-R; Wechsler, 2002) were administered individually to all children when they were in kindergarten. The scale scores were standardized and averaged to form a composite estimate of cognitive ability, based upon prior research suggesting that these two subtests are significantly correlated with the full scale IQ (*r*s = .74 and .68, respectively; Sattler, 1992).

Reading readiness—The Letter-Word Identification subtest from the Woodcock-Johnson Psycho-Educational Battery-Revised (Woodcock & Johnson, 1989) assessed reading readiness in kindergarten. Five items on this subtest assessed the child's ability to match a pictorial representation of a word with an actual picture of an object; the remaining items assessed the child's ability to identify letters and words. Based upon its predictive validity, this subtest has been used by other researchers as a measure of early reading ability (Wood & Felton, 1994). The number of items answered correctly on this subtest served as our measure of early reading achievement.

Inattention—The Attention Problems subscale of the Child Behavior Checklist—TRF (Achenbach, 1991) was used to assess inattention. This scale includes 15 items describing concentration difficulties and task-oriented behavior problems, each rated on a 3-point scale. In prior research, the Attention Problems scale has demonstrated adequate internal consistency, with alphas ranging from .82 to .90. Preliminary analyses revealed that inattention had a non-linear relationship with several of the academic outcomes in this study. For this reason, it was trichotomized, with severe levels of inattention indicated by a T-score of 70 or higher (severe inattention = 2), and moderate levels of inattention indicated by a *T*-score between 65 and 70 (moderately inattentive = 1), and normative levels of inattention indicated by a T-score below 65 (not inattentive = 0). Applying these criteria, 16% of the children in the high-risk sample showed moderate inattention in kindergarten, and 17% showed severe inattention in kindergarten.

Aggressive-disruptive behavior—The TOCA-R Authority Acceptance scale (Werthamer-Larsson et al., 1991) was used as a measure of aggressive-disruptive behavior in the school. The scale includes 10 items describing aggressive, disruptive, and oppositional behaviors, each rated on a 6-point scale ($\alpha = .94$). Scores represent the average item rating that children received on this scale.

Outcome Measures of School Maladjustment

Following each academic year, data regarding grades and special education were collected from school records. The schools varied widely in the timing of the transition between elementary school and middle school or junior high. Most transitioned after fifth grade, but many transitioned after sixth grade, and a small proportion transitioned after fourth grade. Initial inspection of the data suggested that grades and special education services were strongly affected by the transition. In order to create comparability across the large number of schools, we focused on grades and special education status during the two periods of stability in school context, the elementary years (Grades 1–4), and the secondary years, after all children had made the transition into a larger school context (Grades 7–10).

Grade point average—Each academic year, grades were recorded for four core academic subjects: math, language arts/English, social studies/history, and science. Grades were scored using a 4-point system (A = 4, B = 3, C = 2, D = 1, E/F = 0). They were averaged across subjects and years to create a GPA index representing academic grades in elementary school (Grades 1–4) and secondary school (Grades 7–10). Note that, due to retentions, some children had more than 4 years of data to contribute to these averages.

Retention—School records were coded for retention. These data were collapsed into the categories of “ever retained” during Grades 1–4 and “ever retained” during Grades 7–10.

Behavior disorder classifications—School records were coded for IEP and diagnostic classification. These data were collapsed into the categories of “ever” classified as having a

Behavior Disorder during Grades 1–4 and "ever" classified as having a Behavior Disorder during Grades 7–10.

Self-contained Placement—School records were coded for classroom placement. A youth was considered to be in "self-contained" placement when they spent a majority of their day in a special-education "self-contained" classroom, or when they were placed in a special school setting, such as a day treatment or residential program. These data were collapsed into the categories of "ever" placed in a self-contained setting during Grades 1–4 and "ever" placed in a self-contained setting during Grades 7–10.

Assessment Procedures

At the end of the kindergarten year, teachers completed the TRF, which provided an index of inattention at school entry. In the fall of the first grade year, teachers completed the TOCA-R, which provided an index of aggressive behavior at school entry. At both time points, a research assistant delivered the measures to teachers, explained them, and left them for teachers to complete and return to the project. Teachers received $10 per child for completing these measures.

During the summer following kindergarten, two trained interviewers visited each family home. Interviewers were naïve regarding the intervention versus control status of the families they were assigned to interview. While one research assistant interviewed the primary caregiver (usually the mother), a second assistant interviewed the child in a separate room, and administered individual tests and questionnaires, including the measures of cognitive ability and reading readiness. Parents and teachers were compensated financially for their participation.

Attrition and missing data

A total of 660 youth (out of an original 891) had complete academic data; the others were missing data for one or more years. Attrition analyses comparing the pre-intervention scores of the 660 youth with complete data with the 231 youth who had missing data revealed a few significant differences. Youth with missing data had higher reading readiness scores and higher cognitive ability than youth with complete data, but the two groups did not differ on initial aggression or inattention. Youth with missing data were most likely to be from the Seattle site (37% with missing data) and least likely to be from the central Pennsylvania site (16% with missing data), reflecting the differential population stability at these sites. Youth with missing data did not differ from those with complete data on race or gender. In the analyses, multiple imputation was used to address missing data. Missing data were multiply imputed (Schafer, 1999) using SAS Proc MI. Independent analyses were performed on 20 imputed data sets. Parameter estimates and variances were then combined to obtain an unbiased estimate of the population values.

RESULTS

Descriptive Analyses

Descriptive statistics are presented in Table I. Initially, *t*-tests were conducted to identify variables that significantly differentiated the high-risk youth (the intervention and control groups who exhibited elevated conduct problems at school entry) from the normative sample of youth attending the same schools as the children in the control sample. These preliminary analyses were undertaken to determine the degree to which high-risk children who were selected on the basis of elevated aggressive-disruptive behavior problems also exhibited significantly lower levels of school readiness at kindergarten entry compared to the normative sample drawn from the same schools. Significant differences emerged, with

aggressive-disruptive children exhibiting lower levels of cognitive ability and reading readiness, and higher levels of teacher-rated inattention and aggression than the normative sample (see Table I). Based upon the two scale scores, the IQ estimate for youth in the normative sample drawn from these high-risk schools was 95.10 (*SD* = 18.39), whereas the IQ estimate for youth in the aggressive high-risk sample was 85.90 (SD = 16.65). These high-risk children went on to experience school maladjustment at higher rates than the normative sample during both the elementary and secondary school years, including lower grades, higher rates of behavior disorder classification and self-contained placement, and lower rates of high school graduation. Only grade retentions did not differentiate the high-risk aggressive and normative children. Interestingly, these findings also illustrate a general increase in the prevalence of school problems experienced by children (both high risk and normative comparison groups) in the secondary school years compared to the elementary school years. Whereas mean GPAs for the high-risk youth hovered in the B/C range in Grades 1–4, they plummeted to the C/D range in Grades 7–10. Between the elementary and secondary school years, high-risk youth experienced a twofold increase in rates of Behavior Disorder classification (from 8.5% to 16.5%), and nearly a threefold increase in rates of self-contained classroom placements (from 11% to 28%). By high school, the high-risk youth were five times more likely than normative comparison children to be classified as Behavior Disordered (16.5% vs. 4%) and three times more likely to be placed in a self-contained classroom (28% vs. 10%). They also had lower GPAs (1.73 vs. 2.02), and were significantly less likely to graduate from high school (55.5% vs. 66%). These findings replicate prior studies documenting that children who enter school with aggressive conduct problems are at increased risk for school maladjustment, in areas of academic learning as well as social-behavioral adjustment.

Predictive correlations documenting the associations between the school readiness measures collected at kindergarten entry (cognitive ability, reading readiness, inattention, and aggression) and the later school outcomes are shown in Table II. Each of the kindergarten measures showed robust predictive power, despite the constrained sample that included only children at high-risk due to elevated behavior problems.

Correlations computed among the academic outcome measures are presented in Table III. Negative outcomes showed moderate continuity across the elementary to secondary school years for all outcomes except retention, with cross-time correlations ranging from $r = .31$ for GPA to $r = .54$ for Behavior Disorder classification, ps < 001. In addition, having a Behavior Disorder classification was significantly associated with a self-contained placement, both concurrently and prospectively, rs = .52 and .33, but was not associated with grade retention or GPA.

Intervention Effects

Multi-level, hierarchical regression analyses (Raudenbush & Bryk, 2002) were used to assess the impact of early-starting conduct problems and the preventive intervention on negative academic outcomes experienced during the elementary and secondary school years. These models accounted for the non-independence of the data at the level of initial school placement (where the intervention was randomized and delivered), treating it as a Level 2 random effect. Child sex and race were included as Level 1 covariates, and site was included as a Level 2 covariate. Continuous responses, specifically the GPA outcomes, were assessed using PROC MIXED (SAS) and binary outcomes were assessed using PROC GLIMMIX. To assess the impact of the Fast Track prevention program and the impact of cognitive and behavioral school readiness, the models estimated the unique contributions of the child's kindergarten cognitive ability, reading readiness, inattention, and aggression, as well as the main effect for intervention on each of the school outcomes.

Results for the elementary school outcomes of GPA and grade retention are shown in the top part of Table IV. Each of the school readiness factors studied made significant unique contributions to the prediction of elementary GPA, with β in the .06–.18 range, all $p < .001$. GPAwas coded on a 5-point scale (e.g., A = 4 to F = 0), so children with the kindergarten characteristics had GPAs that were, on average, .06–.18 of a grade point higher (cognitive ability, reading readiness) or lower (African American ethnicity, inattention, aggression) than children who did not share the kindergarten characteristic. When elementary grade retention was considered (right top side of Table IV), inattention was the only kindergarten characteristic that made unique contributions. The magnitude of impact was notable: 40% of the severely inattentive children and 38% of the moderately inattentive children experienced a grade retention between Grades 1–4, compared with only 17% of the children without attention problems, odds ratio = 2.94 for moderate inattention and 4.01 for severe inattention, ps < .001. Results for these two outcomes at the secondary school level are shown in the bottom part of Table 4. Child sex and kindergarten cognitive ability were the only significant unique predictors of GPA in the secondary school years, with males receiving lower grades than females, β = .22, $p < .001$, and lower Kindergarten cognitive ability predicting lower grades, β = .08, $p < .01$. Kindergarten aggression was the only significant unique predictor of grade retention during the secondary school years β = .22, $p < .05$, odds ratio = 1.25.

Intervention did not have a significant effect on any of these school outcomes.

Results for the elementary school outcomes of Behavior Disorder classification and placement in a self-contained special education classroom are shown in the top part of Table V. Behavior Disorder classification in elementary school was more likely for boys, β = .85, $p < .05$, odds ratio = 2.34, and for aggressive children, β = .89, $p < .001$, odds ratio = 2.44, but less likely for children with adequate kindergarten reading readiness, β = .41, $p < .01$, odds ratio = .66. Placement in a self-contained classroom in elementary school was also more likely for boys, β = 1.07, $p < .05$, odds ratio = 2.92, for aggressive children, β = .89, $p < .001$, odds ratio = 2.05, for children with moderate or severe inattention, β = 1.64, 1.20, respectively, $p < .01$, odds ratio = 5.16 and 3.32, but less likely for children with adequate kindergarten reading readiness, β = .61, $p < .01$, odds ratio = .54.

Results for the secondary school outcomes of Behavior Disorder classification, placement in a self-contained special education classroom, and high school graduation are shown in the bottom part of Table 5. Kindergarten aggression was the only unique predictor of Behavior Disorder classification in the secondary school years, β = .77, $p < .001$, odds ratio = 2.16. Similar to elementary school, placement in a self-contained classroom in secondary school had multiple unique predictors, and was more likely for boys, β = .79, $p < .01$, odds ratio = 2.20, for African American children, β = .77, $p < .05$, odds ratio = 2.16, for aggressive children, β = .69, $p < .001$, odds ratio = 1.99, for children with moderate or severe inattention, β = .69, .73, respectively, $p < .05$, odds ratio = 1.99 and 2.08, but less likely for children with adequate kindergarten reading readiness, β = –.49, $p < .001$, odds ratio = .61. Finally, both reading readiness (β = .24, $p < .01$, odds ratio = 1.27) and moderate inattention (β = .45, β < .05, odds ratio = .64) made unique contributions to the prediction of high school graduation, as did sex, as boys were less likely to graduate than girls, β = .42, $p < .05$, odds ratio = .66. In neither the elementary nor secondary years, did any significant main effects emerged for intervention on these outcomes.

DISCUSSION

These study findings replicate and extend developmental models that identify multiple factors contributing to the school maladjustment of children who exhibit high rates of

aggressive-disruptive behavior at school entry. The aggressive-disruptive children in this sample showed significantly lower levels of school readiness than a normative comparison sample drawn from the same disadvantaged schools, including lower levels of cognitive ability, inattention, and reading readiness. They went on to experience significantly higher levels of school maladjustment than their normative classmates, including lower grades in both the elementary and secondary school years, more frequent classification as Behavior Disordered, more frequent placement in self-contained special education classrooms, and lower rates of high school graduation. Cognitive factors (cognitive ability, inattention, reading readiness) as well as initial aggression at school entry each made unique contributions to their later school maladjustment, demonstrating the complex and multi-determined nature of the school difficulties of young, early-starting aggressive-disruptive children. Notably, the severity of a child's early aggression and deficits in the various cognitive skills studied had different implications for different facets of school adjustment (e.g., GPA vs. self-contained placement) at different developmental periods (the elementary vs. secondary school years). As discussed below, these findings may have implications for understanding the developmental course of the school difficulties experienced by young aggressors, as well as for the design of effective prevention programs. Unfortunately, despite evidence that the Fast Track intervention improved reading attack skills, reduced aggression, and improved peer relations by the end of first grade (CPPRG, 1999), the intervention did not have a significant effect on any of these broad and important school outcomes. The developmental and prevention implications of the findings are discussed further in the following sections.

Developmental Processes Linking Early Aggression With School Maladjustment

This study examined the degree to which various facets of the school readiness of aggressive-disruptive children measured at school entry predicted their school maladjustment in the later elementary and secondary school years. At school entry, correlations between severity of aggression and the three cognitive skills (cognitive ability, inattention, and reading readiness) were all statistically significant, but only small to moderate in magnitude.

As expected, the kindergarten assessment of cognitive ability (WISC-R Vocabulary and Block Design) was correlated with all of the later school outcomes. With the other indices of school readiness controlled, however, kindergarten scores on these WISC-R subtests made a significant unique contribution only to GPA. Teacher-rated inattention also made a significant unique contribution to the prediction of GPA during the elementary (but not the secondary) school years, and inattention was the only kindergarten skill that uniquely predicted grade retention in elementary school. In the secondary school years, cognitive ability was the only kindergarten skill that uniquely predicted GPA. At neither grade level did cognitive ability nor inattention make unique contributions to Behavior Disordered classification, but inattention did make unique contributions to the likelihood of self-contained classroom placement during both elementary and secondary years. Apparently, cognitive ability uniquely affects learning and school performance (GPA). Controlling for cognitive ability, inattentive behavior increases the likelihood of special classroom placement, including grade retention and/or self-contained classroom placement.

In contrast, reading readiness and severity of initial aggression emerged as the two unique predictors of classification as Behavior Disordered during the elementary years, and also each increased risk for placement in a self-contained classroom. Kindergarten reading readiness remained a significant unique predictor of placement in a self-contained special education setting in the secondary schools, along with aggression and inattention, although only severity of kindergarten aggression predicted a Behavior Disorder classification in Grades 7–10. Even with the three cognitive skills controlled, level of kindergarten

aggression made a unique contribution to elementary school GPA and to secondary grade retention, as well as uniquely predicting Behavior Disorder classification and self-contained special education placement.

These findings are consistent with the model proposed by Moffitt (1993) and the conclusions drawn by Hinshaw (1992), in which neuropsychological deficits, particularly inattention, play a critical role in the underachievement and learning difficulties experienced by aggressive children. At the same time, the current findings extend this earlier research in two ways. First, they indicate an important role for reading readiness skills in predicting the future school difficulties of aggressive children, even after controlling for their cognitive ability and attention problems. Second, they indicate that the severity of initial kindergarten aggression significantly contributes to multiple aspects of school difficulty (low GPA in the elementary years, grade retention in the secondary years, self-contained classroom placement) even with concurrent cognitive skills including attention problems controlled, and it is the primary predictor of special education classification as Behavior Disordered.

These findings are correlational, and hence do not support causal conclusions. However, they are consistent with developmental models that suggest that both cognitive and behavioral processes contribute to the school maladjustment of aggressive children, and that early experiences prior to school entry contribute to the delays in school readiness that set the stage for later school problems. Many of the family factors that increase risk for child aggressive-disruptive behavior problems, including financial hardship, low levels of maternal education, single parenthood, and maternal depression also affect the quality of parent–child verbal interaction and support. In turn, the frequency and quality of parent–child verbal interaction dramatically affects children's oral language skills and early literacy development, as does the quality of language use in child-care and preschool settings (Hart & Risley, 1995). Low levels of language stimulation and associated delays in language skill development may be a particularly important precursor of later school difficulties, because of the important role that language skills play in reading comprehension, understanding information and directions provided in class, and developing and maintaining positive relations with teachers and peers (Catts, Fey, Zhang, & Tomblin, 1999).

Family adversity and low-quality stimulation may also delay the development of the executive function and self-regulation skills that foster adaptive approaches to learning in school, including the capacity to participate cooperatively in classroom activities, follow teacher directions, focus attention, and sustain task involvement (Blair, Zelazo, & Greenberg, 2005; McClelland, Acock, & Morrison, 2006). Delays in executive function skill development are reflected in deficits in inhibitory control, planning, decision-making, and social problem-solving skills that frequently accompany aggressive behavior (Shelley-Tremblay et al., 2007). It is likely that both genetic and environmental experiences contribute to delays in the early development of these cognitive skills, resulting in poor readiness and vulnerability to maladjustment at school entry.

Although the results of the present study validate the important role of early delays in these cognitive skills for school functioning, they also indicate an independent predictive role for the impact of the severity of a child's aggressive-disruptive behavior problems on later school outcomes. Notably, even in this sample that was selected for elevated aggressive-disruptive behaviors (and thus constricted in distribution), the severity of those behaviors made unique contributions to children's school outcomes. The Fast Track intervention design was based upon a near-consensual model of the cascading negative impact that aggressive behaviors have on interpersonal relations with parents, peers, and teachers, and the corresponding disruption it causes in the development of prosocial and adaptive school behaviors (CPPRG, 1992). In this developmental model, temperament and early experiences

contribute to the development of behaviors and social-cognitions that predispose some children to react against and resist adult authority, defy conventions, and engage in a range of rule-breaking activities (Udry, Kovenock, Morris, & van den Berg, 1995; Willoughby, Chalmers, & Busseri, 2004). These rebellious tendencies are strengthened over time by responses of peers and parents, who model counter-aggression, and either positively reward (by laughing or giving in) or negatively reinforce (by reducing demands) aggressive and rule-breaking behaviors (see also Dodge, Bates, & Pettit, 1990; Dishion, French, & Patterson, 1997).

An interesting finding of the present study involved the magnification of school problems observed in the secondary school years (when rates of school problems doubled), predicted by the severity of early aggression. This finding is consistent with the predictions of problem behavior theory, which suggest that early rebelliousness subverts social controls and undermines the socialization efforts of parents and teachers, escalating into serious problem behaviors at the transition to adolescence when youth gain greater autonomy and mobility (Udry et al., 1995).

Decoupling Aggressive Behavior and School Success

Although the developmental course of aggressive behavior correlates with the developmental course of school success, the findings reported here indicate that the Fast Track intervention that improved aggressive behavior did not improve long-term school success. Random assignment to the intervention did lead to lower self-reported serious antisocial behavior in high school (CPPRG, 2007) and less involvement in juvenile arrests (specifically, intervention delayed the onset of arrest, decreased the probability of arrest for a severe (level 4/5) crime, and lowered the juvenile arrest severity index score, CPPRG, 2010a). Apparently, improvements in antisocial behavior do not ensure improvements in academic outcomes.

The Challenges of Effective Prevention

By the end of first grade, the Fast Track prevention program had successfully modified the key factors implemented in the negative cascade model of school maladjustment. That is, children in the prevention group had higher reading achievement scores and higher language arts grades, more positive social skills and peer relations, and reduced rates of aggressive-disruptive behavior at school than children in the control group. In addition, the intervention included the on-going delivery of academic support services through tenth grade, albeit at reduced levels and only for children assessed with academic needs. Hence, it was disappointing to find that the early academic gains dissipated over time and failed to impact the longer-term school adjustment of the participating children. The dissipation of academic gains was evident quite early, as intervention effects on reading achievement were no longer significant at the end of third grade (CPPRG, 2002). However, reductions in aggressive-disruptive behavior at school remained significant through the early elementary years (CPPRG, 2002), yet failed to significantly impact the broad school outcomes assessed here. This raises questions regarding why the intervention was not more successful at changing academic outcomes, and how future prevention studies might be modified to strengthen their impact on academic outcomes.

One possible reason for the lack of impact on the later academic outcomes is that the kind of academic support that was provided by Fast Track was not effective, or alternatively, that it was provided at too low a dose or intensity to be effective. In the first year of academic tutoring (and until children mastered the skills), Fast Track used the evidence-based Wallach tutoring program (Wallach & Wallach, 1976). However, after children mastered that program, Fast Track focused tutoring on the areas of need suggested by classroom teachers.

Often, this included an emphasis on helping with homework completion. Prior studies suggest that children with reading disabilities benefit most from intensive tutoring, utilizing well-informed and evidence-based programs that incorporate a systematic progression of skills and teaching techniques, led by certified teachers (Wasik & Slavin, 1993). The weekly or bi-weekly homework support by paraprofessionals that Fast Track provided may have been too little and too unfocused to remediate the core cognitive deficits undermining the school maladjustment of many of the high-risk youth.

In addition, careful analyses of the Fast Track tutoring program in the early school years suggested that it was most effective for children who had reading skill delays without concurrent attention problems; the treatment effect size was much smaller for children with concurrent attention deficits (Rabiner, Malone, & CPPRG, 2004). Improving the achievement of children with attention problems is a ubiquitous challenge, and the difficulty of doing so suggests that the Fast Track program may have been insufficient to meet the significant academic needs of the approximately 30% of the sample with clinically elevated attention deficits. Additional or alternative intervention approaches are likely needed to address the attention problems of this sub-group of aggressive children, focused on promoting their cognitive development and processing, although it is not yet clear which intervention approaches will work. Among children with ADHD, longitudinal studies have suggested that early and sustained medication may improve academic achievement (Scheffler et al., 2009), but rigorous, randomized trials have not documented positive medication effects on achievement (Molina et al., 2008), making it unclear whether medication could foster improvements in school success among aggressive children with severe, comorbid attention deficits. In recent years, a growing area of research has focused on early childhood interventions designed to foster the development of executive function skills (e.g., working memory, attention control) (for reviews, see Bierman & Torres, in press; Diamond & Lee, 2011). The goal of these early interventions is to promote growth in attention control during the developmental period when the prefrontal cortex is undergoing rapid growth. Clearly, these are areas of prevention research that are important to pursue, with a particular focus on their utility with children who have the combined problems of serious attention deficits and aggressive behavior.

One of the unfortunate consequences of many current school-based interventions designed to help students who enter school unprepared for the academic and social demands involves unintended and negative long-term effects. For example, Jimerson and Ferguson (2007) examined the impact of elementary school grade retention or placement in a “transition K-1” program to provide children with more time to mature and adjust to school demands. Controlling for initial levels of aggression, students who were recommended for the transition classroom, but promoted, displayed lower aggression in eighth grade, compared to both groups of retained students. Their research and other studies suggest that grade retention can have short-term gains, but increase risk for aggressive behavior and high school drop-out in later years. Similarly, causal modeling of the Fast Track data using propensity score methods suggests that placement in a self-contained classroom in the secondary school years increased the likelihood that youth would end school with a conduct disorder diagnosis (Powers, Coffman, & Bierman, 2011). The reasons for these adverse effects are not clear, but they may reflect peer contagion effects associated with placements that increase interactions with other high- risk aggressive youth or changes in teacher perceptions, expectations, and treatment once youth have been identified as in need of retention or other special education services (Dishion et al., 2008). It is possible that the positive early effects of Fast Track were undermined in later years, as the intervention may have inadvertently increased the visibility of the participating students’ academic and behavioral deficiencies, leading to reduced academic expectations or biased attributions on the part of teachers and school personnel regarding their capacity to learn.

It is also possible that the timing of preventive interventions requires more careful consideration. Fast Track provided the most intensive set of services at school entry, based upon the hope that a good start in school would set children on a positive path that reduced the negative developmental cascade so often associated with aggressive behavior. Due to a concern about possible iatrogenic effects of group intervention at the transition into adolescence (Dishion et al., 2008), Fast Track shifted to a primary reliance on individualized services during the middle school years. The current data suggest that the transition into middle school is a particularly challenging time for aggressive children; in this high-risk sample, grades plummeted and rates of Behavior Disorder classification and self-contained placements doubled post-transition. So, although the intensive Fast Track prevention efforts at school entry produced a number of positive and significant effects, they did not buffer high-risk children sufficiently from the challenges of the middle school experience and transition into adolescence (see also CPPRG, 2010b). Research is needed to identify effective preventive interventions that focus on aggressive youth during the preadolescent and early adolescent years as they prepare for and make this critical transition.

Finally, although Fast Track employed an adaptive intervention design in order to individualize the provision of academic intervention services, this aspect of the design was not highly structured. ECs met with classroom teachers to discuss students' needs for intervention. A more elaborated system for evaluating students' academic needs and linking them with evidence-based academic support components might have strengthened the intervention impact (see Collins, Murphy, & Bierman, 2004 for more discussion of this issue).

Limitations and Future Directions

Fast Track was designed primarily to apply psychosocial interventions to promote the early competencies of aggressive-disruptive children, and thereby reduce their risk for long-term antisocial outcomes. Recent analyses demonstrate that Fast Track was effective in reducing antisocial outcomes, promoting significant reductions in juvenile arrests (CPPRG, 2010a) and, among the most aggressive youth, reducing adolescent diagnoses of conduct disorder (CPPRG, 2011). However, simply reducing aggression did not result in improved school outcomes, nor did the academic tutoring provided by Fast Track result in long-term gains. These are sobering findings, and worth considering in terms of the "lessons learned" for future prevention efforts.

It should be noted that the models run here focus solely on prediction from children's kindergarten readiness scores and Fast Track intervention, and do not take into account the multitude of additional factors that influenced children's progress through school. The Fast Track data do not include information about the quality of educational services that children received within their schools. Quite likely, the quality of classroom teaching, remedial support, and special education services varied considerably across the schools studied here, and had an impact on youth outcomes in ways that are not represented in this study. In addition, this was not a normative sample; all of the children in the high-risk sample studied here had elevated aggression at school entry. While a focus on this high-risk sample likely attenuated some relations that would be evident in a sample that included non-aggressive children, the ability to model diversity in the academic outcomes of a large sample of aggressive children allowed for a closer examination of heterogeneity in cognitive skill levels within the high-risk group, providing a more nuanced understanding of the unique contributions of particular skill deficits to the range of school outcomes experienced by children who shared the early risk of elevated aggression.

In addition, the schools studied here were not typical schools, but rather schools selected because they were in high-crime neighborhoods (or, in the case of rural Pennsylvania,

because they were in small towns characterized by economic disadvantage.) The high school graduation rates of the normative sample is lower than the national average, reflecting the general disadvantage and risk of the student body for academic difficulties. Possibly, the Fast Track intervention was not sufficient to overcome the environmental disadvantages faced by youth in these schools, and it is possible that the results may have been different in different school or neighborhood contexts.

The findings reported here raise as many questions as they answer, particularly in terms of the implications for preventive interventions. They underscore the complexity of the factors contributing to the poor school outcomes of early-starting aggressive children, and the significant challenge associated with preventing their school maladjustment.

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TABLE I

Descriptive Statistics for Youth in the High Risk and Normative Samples

Measures	High risk intervention, mean (*SD*)	High risk control, mean (*SD*)	Normative, mean (*SD*)
Kindergarten readiness			
Cognitive ability	–.04 (.80)	–.11 (.78)	.19 (.87)
Reading readiness	13.05 (4.98)	12.87 (4.01)	13.83 (4.68)
Inattention	.82 (.53)	.81 (.52)	.43 (.53)
Aggressive-disruptive	1.73 (1.07)	1.63 (1.18)	.73 (.84)
Elementary Grades 1–4			
GPA	2.40 (.60)	2.40 (.63)	2.77 (.67)
Grade retentions	27%	21%	20%
Behavior disorder Dx.	10%	7%	2%
Self-contained classroom	12%	10%	4%
Secondary Grades 7–11			
GPA	1.74 (.85)	1.72 (.87)	2.02 (1.04)
Grade retentions	20%	22%	21%
Behavior disorder Dx.	17%	16%	4%
Self-contained classroom	28%	28%	10%
High school graduation	56%	55%	66%

Note. Means are presented, with standard deviations in parentheses. The two high-risk groups differ from the normative sample ($p < .01$) on all variables except retention.

TABLE II

Correlations Between Kindergarten Adjustment and Academic Outcomes

	Kindergarten adjustment			
	Cognitive ability	**Reading readiness**	**Inattention**	**Aggression**
Reading readiness	.41**			
Inattention	–.30**	–.24**		
Aggression-disruption	–.13**	–.10*	.07*	
Elementary school outcomes				
GPA	.41**	.38**	–.39**	–.21**
Grade retention	–.11**	–.11**	.33**	.03
Behavior disorder Dx.	–.13**	–.14**	.12**	.28**
Self-contained class	–.16**	–.17**	.19**	.21**
Secondary school outcomes				
GPA	.21**	.15**	–.20**	–.13**
Grade retention	–.11**	–.06	.08*	.13**
Behavior disorder Dx.	–.11**	–.15**	.08*	.30**
Self-contained class	–.24**	–.28**	.27**	.29**
High school graduation	.14**	.17**	–.23**	–.09*

* $p < .05$.

** $p < .01$.

TABLE III

Correlations Among Academic Outcomes

	Elementary years				Secondary years			
	2	**3**	**4**	**5**	**6**	**7**	**8**	**9**
Elementary years								
1. GPA	–.27**	–.03	–.08*	.31**	–.17**	–.12**	–.31**	.28**
2. Retained		.06	.05	–.16**	.01	.05	.13**	–.21**
3. BD Dx			.52**	–.01	.03	.54**	.33**	–.08*
4. Self-Contained				.01	.04	.31**	.42**	–.11**
Secondary years								
5. GPA					–.44**	–.05	–.07	.42**
6. Retained						.13**	.17**	–.31**
7. BD Dx.							.52**	–.19**
8. Self-Contained								–.27**
9. Graduation								

*$p < .05$.

**$p < .01$.

TABLE IV

Initial Child Characteristics and Intervention Effects on Grades and Grade Retention

	GPA			Grade retention		
	Std β	*SE*	*t*-Value	Std β	*SE*	*t*-Value
Elementary outcomes: Grades 1–4						
Sex (male = 1)	–.02	(.04)	–.52	.58	(.21)	2.77***
Race (Black = 1)	–.17	(.05)	–3.45***	.48	(.26)	1.83
Cognitive ability	.14	(.02)	6.93***	–.07	(.11)	–.67
Reading readiness	.15	(.02)	7.68***	–.01	(.11)	–.06
Moderate inattention	–.18	.05	–3.60***	1.08	(.25)	4.37***
Severe inattention	–.18	(.05)	–3.68***	1.39	(.23)	5.92***
Aggression	–.06	(.02)	–3.33***	–.11	(.09)	–1.19
Intervention	–.04	(.04)	–.93	.40	(.21)	1.90
Secondary outcomes: Grades 7–10						
Sex (male = 1)	–.22	(.06)	–4.04***	.27	(.23)	1.14
Race (Black = 1)	–.11	(.07)	–1.61	.04	(.25)	.15
Cognitive ability	.08	(.03)	2.92**	–.06	(.11)	–.57
Reading readiness	.02	(.03)	.58	.05	(.12)	.45
Moderate inattention	.01	(.07)	.17	–.27	(.27)	–.98
Severe inattention	–.09	(.07)	–1.38	–.09	(.26)	–.35
Aggression	–.04	(.02)	–1.63	.22	(.09)	2.37*
Intervention	.02	(.05)	.43	–.09	(.19)	–.49

Note. Hierarchical models are nested in elementary school.

* $p < .05$.

** $p < .01$.

*** $p < .001$.

TABLE V

Initial Child Characteristics and Intervention Effects on Behavior Disorder, Self-Contained Placement, and High School Graduation

	Behavior disorder			Self-contained			High school graduation		
	Std β	*SE*	*t*-Value	Std β	*SE*	*t*-Value	Std β	*SE*	*t*-Value
Elementary outcomes: Grades 1–4									
Sex (male = 1)	.85	(.44)	1.93*	1.07	(.49)	2.20*	—	—	—
Race (Black = 1)	–.09	(.46)	–.18	.39	(.52)	.75	—	—	—
Cognitive ability	–.34	(.55)	–1.73	–.36	(.21)	–1.69	—	—	—
Reading readiness	–.41	(.58)	–2.09*	–.61	(.20)	–3.02**	—	—	—
Mod. inattention	–.73	(.61)	1.87	1.64	(.40)	4.14***	—	—	—
Severe inattention	–.44	(.20)	1.12	1.20	(.41)	2.93**	—	—	—
Aggression	.89	(.19)	5.59***	.72	(.16)	4.41***	—	—	—
Intervention	.34	(.39)	1.01	.28	(.37)	.74	—	—	—
Secondary outcomes: Grades 7–10									
Sex (male = 1)	.56	(.32)	1.79	.79	.(29)	2.76**	–.42	(.17)	–2.44*
Race (Black = 1)	.15	(.38)	.40	.77	(.31)	2.48*	–.03	(.22)	–.15
Cognitive ability	–.14	(.15)	–.98	–.26	(.15)	–1.76	.15	(.08)	1.75
Reading readiness	–.25	(.17)	–1.44	–.49	(.15)	–3.33***	.24	(.09)	2.63**
Mod. inattention	.52	(.31)	1.69	.69	(.28)	2.45*	–.45	(.22)	–2.06*
Severe inattention	–.49	(.36)	–1.37	.73	(.27)	2.75**	–.41	(.22)	–1.84
Aggression	.77	(.12)	6.50***	.69	(.11)	6.34***	–.05	(.08)	–.66
Intervention	.07	(.24)	.31	.13	(.21)	.59	.03	(.17)	.18

Note. Hierarchical models are nested in elementary school.

* $p < .05$.

** $p < .01$.

*** $p < .001$.