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The Effects of a Multiyear Universal Social–Emotional Learning Program: The Role of Student and School Characteristics

Conduct Problems Prevention Research Group

Abstract

Objective—This article examines the impact of a universal social–emotional learning program, the Fast Track PATHS (Promoting Alternative Thinking Strategies) curriculum and teacher consultation, embedded within the Fast Track selective prevention model.

Method—The longitudinal analysis involved 2,937 children of multiple ethnicities who remained in the same intervention or control schools for Grades 1, 2, and 3. The study involved a clustered randomized controlled trial involving sets of schools randomized within 3 U.S. locations. Measures assessed teacher and peer reports of aggression, hyperactive–disruptive behaviors, and social competence. Beginning in first grade and through 3 successive years, teachers received training and support and implemented the PATHS curriculum in their classrooms.

Results—The study examined the main effects of intervention as well as how outcomes were affected by characteristics of the child (baseline level of problem behavior, gender) and by the school environment (student poverty). Modest positive effects of sustained program exposure included reduced aggression and increased prosocial behavior (according to both teacher and peer report) and improved academic engagement (according to teacher report). Peer report effects were moderated by gender, with significant effects only for boys. Most intervention effects were moderated by school environment, with effects stronger in less disadvantaged schools, and effects on aggression were larger in students who showed higher baseline levels of aggression.

Conclusions—A major implication of the findings is that well-implemented multiyear social–emotional learning programs can have significant and meaningful preventive effects on the population-level rates of aggression, social competence, and academic engagement in the elementary school years.

Keywords

prevention; school; aggression; social competence; academic engagement

In the past few decades, it has become clear that both child characteristics and ecological factors influence the development of well-being and psychopathology. The interactional nature of child processes and ecologies has been central for understanding the role of risk and protective factors and the development of preventive interventions. For example, poor outcomes are most likely among those children who both show individual risks (early aggressive behavior, difficult temperament, low IQ) and experience stressful family circumstances (low socioeconomic status [SES], family violence; Dodge & Pettit, 2003; McLoyd, 1998). Children who enter school with elevated levels of risky behavior problems

Correspondence concerning this article should be addressed to Mark T. Greenberg, Prevention Research Center, Henderson S-112, Pennsylvania State University, University Park, PA 16802. mxg47@psu.edu.

For additional information concerning Fast Track, see www.fasttrackproject.org/. Requests for reprints should be addressed to Seattle Fast Track, University of Washington, Box 351525, Seattle, WA 98195-1525

and attend poorly resourced schools that serve a high percentage of disadvantaged students are likely to show poorer outcomes than those who attend more well-resourced schools with socioeconomically diverse student populations (Rutter, 1983). Emerging evidence suggests that both individual characteristics and school characteristics may likewise influence the effectiveness of school-based preventive interventions (Hughes, Cavell, Meehan, Zhang, & Collie, 2005; Metropolitan Area Child Study Research Group [MACS], 2002). Yet, to date there have been no studies of sufficient scale to examine how student characteristics, school characteristics, and their interactions affect the outcomes of universal preventive interventions in the elementary years.

Recent meta-analyses of universal school-based preventive interventions indicate that programs that focus on social–cognitive and emotional processes and that provide adequate opportunities to practice new skills improve social competence and reduce aggressive behavior (Beelmann, Pfingsten, & Losel, 1994; Denham & Almeida, 1987; Losel & Beelmann, 2003) Although universal interventions have been evaluated for almost 30 years, most evaluations have assessed programs that have lasted 1 school year or less. In contrast, it has been well recognized that educators perceive the need for multiyear programs that are of sufficient duration and are integrated with other multigrade curricula (Greenberg et al., 2003). Answering this need are numerous multiyear social and emotional learning programs designated as exemplary (Collaborative for Academic, Social, and Emotional Learning, 2003), yet no randomized trials have investigated developmental effects by examining students who have received more than 2 years of a such a program.

The current study is unique in that it addressed both of the above “second-generation” issues in school-based prevention. It (a) examined the impact of a 3-year-long universal prevention program in a large longitudinal sample of children in a large sample of schools and (b) examined how both child characteristics (baseline aggression and gender) and school disadvantage (student economic disadvantage as measured by percentage of students receiving free lunch) may moderate the impact of the universal intervention. This study is part of the larger Fast Track model, which integrates universal and selective interventions (Conduct Problems Prevention Research Group [CPPRG], 1992, 2000).

School Disadvantage

For many at-risk children, a critical factor in the early development of antisocial behavior is that they attend schools that have a high density of high-risk children like themselves; thus, they present the classroom teacher with substantial educational and social challenges, including managing classroom order. Prior research has documented that high levels of economic disadvantage among the student body are associated with elevated levels of student aggression (Colder, Mott, Levy, & Flay, 2000; McLoyd, 1998; Rutter, 1983), perhaps due to the concurrent association with neighborhood violence and support for aggression in the peer group (Barth, Dunlap, Dane, Lochman, & Wells, 2004; Kellam, Ling, Merisca, Brown, & Ialongo, 1998). The combination of high-risk child and school disadvantage can have negative synergistic consequences for both the child and peers. The disruptive behavior of children with early externalizing problems can undermine the social and academic environment for other children (Dodge & Pettit, 2003). In addition, a less stimulating and orderly learning atmosphere can reinforce the disruptive child rather than compensate for his or her emotional, social, and cognitive deficits. Peer contagion processes have been documented in groups that contain many aggressive children, with social norms supporting aggressive–disruptive behaviors and peer responses reinforcing them (Barth et al., 2004; Boivin, Dodge, & Coie, 1995; Snyder, 2002; Stormshak et al., 1999).

It is also possible that the disruptive climates that often characterize classrooms that serve many disadvantaged children may affect the utility of different approaches to preventive intervention. For example, in an intriguing brief report,Hughes et al. (2005) suggested that the demands of social–emotional learning and behavioral management programs designed for teacher implementation may overwhelm the resources of teachers at highly disadvantaged schools, resulting in poor implementation and low impact. Less intensive interventions that are more easily implemented and that target changes in student norms regarding aggression may be relatively more effective in highly disadvantaged schools (Hughes et al., 2005). These hypotheses emerged from a secondary analysis of the Prime Time trial, conducted in an attempt to better understand the lack of significant main effects for intervention. When intervention effects were examined separately for different schools, Prime Time (a multifaceted cognitive–behavioral intervention for aggressive children that linked school-based and home-based interventions) appeared to reduce student aggression primarily in schools characterized by low levels of disadvantage (e.g., low levels of playground aggression and student poverty). In contrast, the control condition (providing college student lunch buddies to aggressive children) appeared more effective in schools characterized by high levels of disadvantage. Because their findings were based on post hoc analyses of differential intervention effects in a small set of schools,Hughes et al. (2005) considered the findings to be preliminary. They encouraged the examination of the school context in future school-based intervention trials, to provide better understanding of the possible impact on intervention effectiveness. Indeed, two other school-based interventions have documented moderating effects of context, in which the impact of the intervention varied with the characteristics of students in participating classrooms.

The Good Behavior Game is a behaviorally focused group intervention designed to change peer norms and derail peer deviancy training through the systematic application of group rewards for appropriate school behavior. It had its strongest effects on boys who were enrolled in classrooms with higher levels of overall aggression (Kellam et al., 1998). In contrast, evaluation of the Resolving Conflict Creatively Program (RCCP), a teacher-led classroom curriculum that focuses on promoting children’s social problem-solving and conflict-resolution skills, showed positive effects only in classrooms characterized by children with low levels of normative beliefs about aggression (Aber, Jones, Brown, Chaudry, & Samples, 2002). In the Good Behavior Game and RCCP studies, intervention lasted only 1 year, and the sample size precluded an examination of school-level effects. Hence, the hypothesis generated by these studies and by theHughes et al. (2005) secondary analysis—that school-level disadvantage affects the impact of universal social–emotional interventions— has never been tested empirically. These prior studies provide a basis for hypothesis generation, as they suggest that universal classroom programs that focus on social skill building will be most effective in schools serving more stable and less disadvantaged children and that higher levels of school disadvantage will impair the implementation and attenuate the impact of these programs.

Investigators have also raised questions regarding the impact of initial levels of individual aggressive behavior problems on student response to school-based prevention programs (Kellam & Rebok, 1992; MACS, 2002). For example in the MACS (2002) study, which included universal school-based prevention programming along with more intensive intervention for students with high levels of initial aggression, significant reductions in aggression were found only for the high-risk, aggressive children and not for the less aggressive peers who participated in the universal program with them. In theory, universal social–emotional learning programs should work to enhance the prosocial competencies of all children in the classroom, but careful assessment of the degree to which these programs affect prosocial skill acquisition and aggression reduction for children who vary in initial levels of behavior problems is needed. In the current study, we addressed these additional

issues by examining schools at different levels of disadvantage and using a multiyear intervention to investigate whether children with varying levels of pretest aggression are differentially affected by the universal intervention.

The Fast Track Prevention Model

The primary goal in the Fast Track program was to integrate the provision of universal services (all children) and selective services (children at some risk) into a comprehensive model that involved the child, school, family, and community (Institute of Medicine, 1994). Fast Track was designed to provide two levels of child intervention simultaneously during the elementary school years. Children demonstrating the greatest degree of early conduct problems were selected, through a multistage screening process involving both teacher and parent reports during kindergarten, for a series of interventions that included weekly parenting support classes, small-group social-skills interventions, academic tutoring, and home visiting (Bierman, Greenberg, & the CPPRG, 1996; McMahon, Slough, & the CPPRG, 1996). Such interventions are believed to be necessary both to reduce risk factors and to promote protective factors in children who are showing the “early-starter” model of conduct problems (CPPRG, 1992; Loeber, 1990; Moffitt, 1993). Findings to date indicate some success of the Fast Track program on the reduction of aggressive behavior in the children with the highest rate of early conduct problems (CPPRG, 1999a, 1999b, 2002, 2004, 2007).

The universal intervention (the Fast Track Promoting Alternative Thinking Strategies [PATHS] curriculum and behavioral consultation) was started in the classroom concurrent with the initiation of these interventions for the high-risk children and families. There are two central reasons why integrated delivery of universal and indicated interventions should provide an additive effect. First, it is unlikely that effects of the selective interventions with the children and families will generalize to the school and classroom setting without providing support for these new skills in the school (Kazdin, 1993). By providing similar skills, cues, and a common language in the selective and preventive interventions, teachers and other school staff are able to promote the generalization of skills to the classroom. Second, a universal intervention intended to promote social and emotional learning in all children should lead to an improved classroom atmosphere that supports improved interpersonal relations for all students (Battistich, Solomon, Watson, Solomon, & Schaps, 1989; Elias et al., 1998). In addition, more intensive intervention with the highest risk children in the same classrooms may serve to reduce their highly disruptive impact on the classrooms and thus make it easier for the remaining children to respond to the universal intervention.

In a previous report, we examined the effect of the universal intervention model at the end of first grade (CPPRG, 1999b). These analyses used a multilevel model that examined classroom level effects at the end of first grade and excluded the students with the highest levels of aggression. Such students either were getting the complete Fast Track service model described above or had similar, very high rates of problem behavior in the control schools. Results indicated that, relative to classrooms in the control schools, classrooms that received the universal intervention showed lower mean levels of peer-nominated aggression and hyperactivity and higher numbers of peer-nominated prosocial students. Furthermore, independent observers rated classrooms that received the universal intervention as having more positive classroom atmospheres. In addition, teachers who were rated as implementing the universal model with higher fidelity had classrooms with the most positive outcomes.

The Universal Intervention Model

The central component of the universal intervention is the Fast Track version of the PATHS curriculum (Greenberg, Kusche, & Speltz, 1991; Kusche & Greenberg, 1995). The PATHS curriculum model synthesizes the domains of self-control, emotional awareness and understanding, peer-related social skills, and social problem solving to focus on promoting social and emotional competence. In addition to a person-oriented model that focuses primarily on developmental integration, an ecobehavioral systems orientation (Weissberg, Caplan, & Sivo, 1989), which places primacy on the manner in which the teacher generalizes the use of the curriculum model throughout the day, is incorporated in the intervention model. That is, program impact may be the greatest when teachers generalize support for curriculum-based skills during the day and build a healthy classroom atmosphere that support children's use and internalization of skills.

The Fast Track PATHS curriculum was designed for delivery by teachers with support from project staff. Two to three lessons were presented on a regular basis throughout most of the school year, and daily activities were used to promote generalization. At the school level, Fast Track staff also consulted with the school principal to bring the philosophy of PATHS to the entire school; various efforts resulted (on a school-by-school basis), such as placing PATHS posters in school hallways, implementing new school behavior guidelines, and painting problem-solving "stoplights" on school playgrounds. In addition, Fast Track staff provided behavioral consultation to teachers regarding both the high-risk children and the remaining classroom students.

Previous field trials with different versions of the PATHS curriculum involving typically developing children and both children with deafness (Greenberg & Kusche, 1993, 1998) and special needs (Greenberg, Kusche, Cook, & Quamma, 1995; Kam, Greenberg, & Walls, 2003; Riggs, Greenberg, Kusche, & Pentz, 2006) have shown that use of the PATHS curriculum is associated with improved social cognitions and more socially competent behaviors. Findings in both normal and special needs populations indicated significant reductions in both internalizing and externalizing behavior at 1 year postintervention (Kam et al., 2003; Riggs et al., 2006). Although effects have been found across populations (regular education; children who are learning disabled, hard of hearing, or deaf), no previous study has been able to examine the effects of school characteristics or child characteristics with sufficient power.

The Present Investigation

In the current longitudinal study, we hypothesized that the universal prevention program would show greater impacts in schools with lower levels of disadvantage. In theory, children require consistent implementation and support to learn the skills taught in the PATHS curriculum. Furthermore, these skills must have positive outcomes when used in generalized settings with peers so they can "take hold" in children's repertoires. Our assessment examined whether levels of school disadvantage affect the implementation and outcomes associated with the universal social–emotional learning program. Student socioeconomic disadvantage (the percentage of children in the school who qualified for free or reduced lunch) served as an indicator of overall school disadvantage and a proxy for correlated factors, including student aggression and classroom disruptiveness (Colder et al., 2000; McLoyd, 1998). Further, we hypothesized that all students should benefit from the universal program in terms of the acquisition of prosocial skills but that the reduction of aggressive behaviors would be greatest among those students showing initial elevations in aggressive behavior.

Method

Participants

The participating schools were selected from three areas of the country, each representing a different cross section of the American population: (a) Nashville, Tennessee, a moderate-sized city with a mix of low-to-middle-SES, African American and European American families; (b) Seattle, Washington, a moderate-sized city with a low-to-middle-SES, ethnically diverse population; and (c) central Pennsylvania (PA), a mostly rural area with low-to-middle- SES, European American families. In the Seattle site, both an urban and a suburban district were chosen; in rural PA, three small school districts participated.

Within each site, approximately 12 elementary schools in high-risk neighborhoods (or towns in the case of rural PA) were invited to be involved in the Fast Track intervention model.[1] High-risk status was defined from estimated rates of delinquency and juvenile arrest in the neighborhoods. The full Fast Track prevention model was initially described to principals and teachers at each school. After faculty discussion, school-based decisions were made regarding participation. Schools were aware that once they decided to participate, they had a 50% chance of being randomized as a comparison school. After consensus to participate was obtained, schools were divided into matched "sets," which were equivalent on school sizes, achievement levels, poverty, and ethnic/ racial diversity. These sets of schools were then randomly assigned to intervention and control groups. The intervention was conducted in three successive years with three cohorts of first graders. In each grade there were approximately 190 intervention classrooms and 180 matched comparison classrooms across the three cohorts.

The longitudinal sample included any students who remained in the same school building from the beginning of Grade 1 to the end of Grade 3 and had complete Grades 1–3 information on the Social Health Profile (SHP; CPPRG, 1998) and sociometric outcomes. The longitudinal sample included a total of 2,937 children: 1,696 from rural PA, 759 from Seattle, and 482 from Nashville. Children who were selected in kindergarten for additional intervention services from the Fast Track project (and their high-risk control counterparts) were not included in the present sample.

Retention of the sample was highly affected by student mobility, particularly within the two urban school districts. For example, in Nashville, only 30.9% of the original sample of 1,560 children remained in the same school over 3 years. Some of this mobility was due to a planned desegregation busing program that shifted students across neighborhoods after Grade 2. Seattle also showed substantial levels of student mobility, with only 41.6% of the original sample of 1,825 children remaining in the same schools from first to third grade. Seattle's student mobility reflected both new school construction and the implementation of a new school choice/busing program during the study. In contrast, relatively high stability in the student population was observed in rural PA, where 75% of the 1,696 children originally in the sample remained in the same schools from first to third grade. In addition to its greater stability, the student population in the rural PA schools tended to be less poor than those in the city schools and included many fewer minority students.

[1]The fourth site for the Fast Track Program was Durham, North Carolina. However, 2 years into the trial the Durham city and county schools merged, and children were assigned to school in a manner that fully confounded the universal aspect of the trial. Hence, the Durham site could not be included in the analyses of the universal program component. As Nashville schools were substantially larger in size, fewer schools were picked at this site.

School Disadvantage

Although there were substantial differences between sites in the degree of risk shown by their respective school locations, there was considerable risk in the typical school selected for this intervention. Table 1 presents information by site and condition for the variables of poverty, ethnicity, and achievement. The percentage of children receiving free or reduced lunch was 57% (ranging from 39% in rural PA to 78% in Nashville). The mean percentage of ethnic minority children (primarily African American) attending the schools was 36% (ranging from 1% in rural PA to 55% in Nashville). The mean reading percentile across the sites was 45th percentile (ranging from the 32nd percentile in Nashville to the 57th percentile in rural PA). A series of analyses of variance indicated no significant differences between intervention and control schools on the percentage of children who received free and reduced lunch, percentage of ethnic minority children, or academic achievement scores.

School disadvantage was indicated by the percentage of students who qualified for free/reduced lunch at each school and was reflective of the poverty of the school population and surrounding area. As the percentage of children below the poverty cutoff was highly stable (>.90%) each year, a single index was used as the average school disadvantage across the study years.

The Intervention

The Fast Track PATHS curriculum was implemented in Grades 1–3. Grade 1 contained 57 lessons and Grade 2 contained 46 lessons, approximately 80% of which were drawn from the published version of the curriculum (Kusche & Greenberg, 1995). Grade 3 contained 48 lessons, with approximately 65% drawn from the published version. Previously designed for special need populations, this multiyear (first through fifth grade) classroom prevention program was adapted to fit the needs of regular education students in high-risk schools for the Fast Track program. At each grade level, some new lessons were created in order to provide synchronization with the parent training and social skill training components of the Fast Track program.

Across all three grades, approximately 40% of the lessons focused on skills related to understanding and communicating emotions. PATHS teaches young children to recognize the internal and external cues of affect and to label them with appropriate terms, as a basic step toward self-control. In a series of lessons, feeling words are identified and descriptions of the sorts of situations that may elicit the feeling, the external cues to recognize that feeling in others, and the internal cues to identify that feeling in oneself are provided. Additional lessons help children understand the difference between feelings and behaviors. Appropriate and inappropriate behavioral responses are discussed. The teaching of feelings involves a generalization technique (“Feeling Faces”) that is used to promote the student’s use of new knowledge and skills throughout the classroom day. After each emotion concept is introduced, the children personalize their own Feeling Face for that affect; these faces are small cards with idealized line drawings of the affect that are kept on the student’s desk. The faces allow the children to communicate their feelings with minimal difficulty throughout the day, and they facilitate the children’s understanding about how feelings change. Teachers have their own set of Feeling Faces and use the cards as models for their students. Teachers are encouraged to promote generalization at the beginning and the end of the day, after recesses, and after lunchtime by suggesting that the children evaluate how they feel and display the appropriate faces. In Grade 3, feeling posters and a dictionary were substituted for the feeling faces.

Another 30% of the lessons focus on skills related to the increase of positive social behavior (e.g., social participation, prosocial behavior, communication skills). Lessons address

making and sustaining friendships, using good manners, taking turns and sharing in games, making up with friends after difficulties, expressing your viewpoint, and listening to others. In addition, positive behaviors are elicited and reinforced during each lesson. For example, during each lesson, one child serves as the teacher's helper (the "PATHS Kid of the Day"); teacher's helpers receive compliments from classmates, the teacher, and themselves. In third grade, cooperative learning skills were introduced and parts of lessons were conducted in small, student-led groups.

Finally, about 30% of the lessons focus on self-control and other steps in social problem solving. The development of self-control, affective awareness and communication, and beginning problem-solving skills is integrated with the introduction of the Control Signals Poster (CSP). The CSP resembles a traffic signal and is a modified version of the "stoplight" used in the Yale–New Haven Middle School Social Problem-Solving Program (Weissberg, Caplan, & Bennetto, 1988). The CSP has a red light to signal "Stop—Calm Down," a yellow light for "Go Slow—Think," a green light to signal "Go—Try My Plan," and, at the bottom, the words "Evaluate—How Did My Plan Work?" Children are taught that when they are in a situation that they find upsetting or frustrating (such as a playground conflict or difficult work situations), the first step toward effective problem solving is to "go to the red light" in order to stop and think before they act. Before they take an action, they should "take a long, deep breath," calm down, and "say the problem and how they feel." Once the problem is identified, they can move to the yellow light to "Make a Plan," first considering the possible solutions and then selecting the best option. The next step is to "Try the Plan" at the green light and evaluate the effectiveness of that plan, recycling through the problem-solving steps if the plan proves ineffective. Children master these steps to problem solving in scripted lessons, and teachers are taught how to hold classroom problem-solving meetings to help children use the problem-solving steps to address current classroom problems. Grade 3 contained the greatest focus on identifying problems, generating effective solutions, setting positive goals, and making good decisions.

Skill concepts are typically presented via direct instruction, discussion, modeling stories, or video presentations. Discussion and role-playing activities follow, giving children a chance to practice the skill and teachers a chance to monitor the level of understanding and skill attained by each class. Although a standard script describes each lesson, teachers are encouraged to adjust the level of presentation and amount of practice as dictated by the responsivity and developmental level of each class.

Although the lessons form an important part of the PATHS program, teachers are strongly encouraged to generalize their use of PATHS concepts across the school day and to other school settings outside the classroom. In particular, teachers are encouraged to help children identify their feelings; communicate clearly with others; use self-control strategies; and apply the three steps of problem solving as frustrations, challenges, and interpersonal problems occur at school. Each classroom has a mailbox in which students can submit problems or concerns, which are then discussed in problem-solving meetings. PATHS coordinators consulted with principals and teachers on how to broaden the use of the PATHS program across the entire school (e.g., CSPs used on the playground, assemblies that modeled skills for the entire school, displays at open houses).

The curriculum generalizes concepts to the home situation by including frequent parent updates on curriculum content and suggestions for ways parents can promote their children's growing competence. Regular homework activities are designed to help children engage their parents in cooperative activities, such as completing drawings or sharing stories related to curriculum components.

Teacher Training

The intervention teachers in each grade attended a 2-day training workshop and received weekly consultation and observation from project staff. Over 90% of teachers attended these training workshops; if they could not attend, small group or individual training was provided. The PATHS lessons were taught approximately two or three times per week, with each lesson lasting 20–30 min, from mid-September until May. Teachers were paid for their extra preparation and consultation time (at rates of pay negotiated with each school district, according to its standards), or they received continuing education credit for their participation. Fast Track educational consultants (ECs) provided weekly consultations from October until April that were intended to enhance the quality of implementation through modeling, coaching, and provision of ongoing feedback regarding program delivery. ECs also provided general feedback on classroom and behavior management. The ECs were experienced teachers hired by the project. They spent an average of 1 to 1.5 hr per week in each classroom observing, demonstrating, or team teaching the PATHS lessons. Although some teachers were initially reluctant to have a coach–observer in the classroom, over 90% of teachers accepted this support. They also met individually or in groups with teachers on a regular basis. (For further information on both the curriculum and the consultation process, see Greenberg & Kusche, 2002, and Bierman et al., 1996.)

Measures of Intervention Dosage and Quality of Implementation

Teachers reported weekly to their assigned ECs on the lessons they had presented so the amount of dosage could be assessed. The mean number of lessons taught was 48.2 in first grade (range = 13–57, $SD = 9.7$), 39.6 in second grade (range = 22–49, $SD = 10.2$), and 38.4 in third grade (range = 17–48, $SD = 9.6$). Fidelity was assessed through monthly ratings of quality of implementation the ECs made based on their direct observation of teacher instruction. For all three cohorts, ECs used 4-point Likert scales (from *low skilled* to *highly skilled performance*) to rate four aspects of PATHS implementation: (a) quality of teaching of PATHS concepts, (b) modeling of PATHS concepts throughout the day, (c) quality of classroom management (during PATHS lessons), and (d) openness to consultation from the EC. Data aggregation across the year indicated that these ratings were highly consistent over time ($\alpha = .88$); thus, a mean score for each rating was computed for each teacher. Mean scores for fidelity were relatively constant across grades, with no significant changes in implementation quality across grades. The mean score across grades was 3.2 for quality of teaching concepts, 3.0 for modeling of PATHS concepts, 3.1 for classroom management, and 3.0 for openness to consultation. It was not feasible to conduct adequate interrater reliability due both to the size of the sample and to the intensity of data collection. It should be clarified that these ratings are much broader than traditional measures of fidelity that count whether teachers taught each component of a particular lesson; these ratings not only required knowledge of the curriculum delivery but also observations, both during and outside of the lesson time, to rate generalization as well as teachers' comments and observations during consultation meetings.

Measures of Outcome

Outcome measures were derived from two independent sources: teacher ratings and peer sociometric nominations. The measures presented here are the only measures available on the entire classroom population. Measures that focused on the targeted population were more extensive and are presented in companion articles (CPPRG, 1999b, 2002). First, in the fall and spring of first grade and the spring of second and third grade, teachers were individually interviewed regarding the behavior of each child in their class using the Teacher Observation of Classroom Adaptation— Revised (TOCA–R; Werthamer-Larsson, Kellam, & Wheeler, 1991) and the SHP (CPPRG, 1998). Second, in the spring of first, second, and third grade, sociometric nominations were collected to assess peer aggression, hyperactive–

disruptive behavior, and prosocial behavior. The sociometric measure was not used as a pretest assessment, as it would have required a month of school adaptation and 2 months to collect. This would have delayed the program, which was designed to begin as early in the school year as possible.

Teacher ratings—Teachers completed the TOCA–R and SHP in a structured interview. On the TOCA–R, teachers rated the behavior of each child in the class on items using 6-point Likert scales (from *Almost Never* to *Almost Always*). During a single interview, teachers completed these ratings on all of the students in the class, which required about 90 min, and teachers were reimbursed for their time. Two internally consistent factors from the TOCA–R were used in the analyses. The Authority Acceptance subscale (10 items, $\alpha = .93$) assessed oppositional and conduct problem behaviors (e.g., takes property, breaks rules, teases, disobedient). The Cognitive Concentration subscale (12 items, $\alpha = .97$) assessed concentration, attention, and work completion. The SHP included nine items describing prosocial behaviors and emotion regulation. Items were rated on a 6-point scale and were summed to create a total score for social competence ($\alpha = .87$). For all teacher-rated scales, scores represented average item ratings, and high scores represented higher levels of problematic adjustment.

Peer nominations—During individual interviews, children with consent nominated classroom peers who fit descriptions of aggressive, hyperactive–disruptive, and prosocial behaviors. A trained research assistant provided each child with a class roster and read the names aloud in order to ensure that the child was familiar with his or her classmates. The assistant then read each behavioral description and asked the child to name classmates whose behavior fit that description (unlimited nominations were accepted). The descriptions were (a) aggressive (“Some kids like to start fights, say mean things, and hit other kids”); (b) prosocial (“Some kids are really good to have in your class because they cooperate, help others, and share. They let other kids have a turn”); and (c) hyperactive (“Some kids get out of their seats and bother people”). Scores were standardized by classroom. High aggressive and hyperactive scores reflected problematic adjustment, whereas high prosocial scores reflected positive social adjustment. On average, 75% ($SD = 13.5\%$) of the students in each classroom received informed consent and participated in the sociometric interviews. Only a few classrooms (3%) failed to reach the minimal 50% participation rate set by the project.

Results

Analyses of Attrition

Preliminary analyses compared the first-grade scores of students who remained in their original school for 3 years (the sample for this study) with those of other students in the original sample who left the school between Grades 1 and 3. Rates of attrition ranged from 25% to 61%, reflecting the differential mobility across the three sites, so attrition analyses were conducted by site. In Nashville, longitudinal students were less likely to be African American (59% vs. 55%, $p < .05$) and had better pretest scores on cognitive concentration ($p < .05$) than did students who moved to other schools. In Seattle, longitudinal students were less likely to be African American (39% vs. 23%, $p < .001$) and had better pretest scores on social competence ($p < .05$) than did students who moved to other schools. In PA, longitudinal students had better pretest scores on cognitive concentration ($p < .001$) than did students who moved. There were no differences on pretest authority acceptance or gender at any site, nor did any interactions emerge between intervention and other variables. This indicated there was no differential attrition between students in the intervention and control groups. In order to make sure that findings related to intervention moderation by student risk and that school disadvantage were not confounded by the uneven representation of PA

students in the combined sample, we performed all analyses on the combined sample and then again on the PA sample alone. The combined sample results are fully presented here. The PA-only results are footnoted and available upon request in full form from Mark T. Greenberg.

Analytic model—The choice of statistical models was based on the need to accommodate both the nested nature of the data (time period nested within child nested within school) and the nonnormally distributed outcome variables. All outcomes evaluated were characterized by higher frequencies at lower values and moderate positive skew. For instance, as expected in this "universal intervention" sample, there was a sizable number of children who were rated by their teachers on the SHP as "never having any problems." All three SHP outcomes had highly nonnormal distributions and were not appropriate for regressions that assume normality in the dependent variable. Thus, we rescaled these variables to represent levels of disorder, which would be appropriate for ordinal regressions. Values were first truncated at 3.5 (which affected less than 1% of the sample) to remove the influence of extreme cases. These values were then rounded to the nearest .5, creating a 7-point ordinal scale for each SHP outcome (higher values indicating worse conditions). The sociometric outcomes were left in their original scale, although values were truncated at 12 nomination counts to lessen the impact of extreme cases. For both sets of outcomes, analyses were carried out with multilevel (three-level) ordered-logistic regressions in Stata's GLLAMM (Rabe-Hesketh, Skrondal, & Pickles, 2004), with random intercepts specified to represent clustering at the school and individual levels. All model results indicated significant variation in the random intercepts. These results demonstrated the necessity of this analytic structure for representing variance in average levels across schools and individuals (those significance tests are not presented in tables, given our focus on fixed effects).

We specified regression models that would allow us to focus on the effect of the intervention by third grade as well as any intervention group differences in change of the outcome. Time (grade) was centered so that intervention effects could be assessed at the end of measurement. Also, an apparent curvature in the SHP and sociometric outcomes across the three grades indicated a need to include a test for curvilinear effects. Therefore, a squared time value was included in regressions, with time coefficients in the random effects model being treated as fixed—nonvarying across participants—in order to allow random effects models to identify curvilinearity coefficients. All models included several key covariates in addition to time: baseline problem levels, site (represented by two dummy codes), poverty (the percentage of free lunch), and gender. For the models assessing the SHP outcomes, baseline problem levels were the corresponding SHP outcomes measured at kindergarten; for the models assessing the sociometric outcomes, baseline problem levels were represented by the baseline measure from the Authority Acceptance subscale. For all models, baseline problem level for each participant was centered within school, and mean school baseline problem was added as a control variable. After examining variation of change (and curvilinear change) by intervention status, we examined additional moderation of intervention across levels of baseline problems, poverty, and gender. We retained any significant interactions ($p < .05$), and results of such moderation assessment are reported below. Moderation by site was not assessed, as preliminary analyses examining site differences indicated no significant variation of intervention effects across sites. Effect sizes were estimated from model-generated adjusted means of the ordinal outcomes (with separate multilevel linear models).

Teacher Ratings of Children's Behavioral Problems (TOCA and SHP)

Significant intervention main effects and significant moderation of intervention were found for all three teacher-rated TOCA-SHP outcomes. Model results are presented in Table 2. On

the outcomes of authority acceptance ($p < .001$, effect size = .24), cognitive concentration ($p < .001$, effect size = .12), and social competence ($p < .0001$, effect size = .34), children in the intervention schools had significantly lower problem levels at Grade 3 and less of an increase in problems than did children in the control schools ($p < .001$). Tests of interactions with the key moderators indicated that effects varied across school and child characteristics, however. An important moderation between poverty and change related to intervention status emerged in models of all three SHP outcomes, as represented by the three-way interactions listed in Table 2. These findings indicate that intervention effects are weaker in low-income schools for authority acceptance ($p < .005$, effect size = .37), for cognitive concentration ($p < .005$, effect size = .24), and for social competence ($p < .001$, effect size = .70). Another focus for testing moderation was whether baseline status might impact the intervention effect. For authority acceptance, a two-way interaction between baseline status and intervention status shows that the intervention effect was stronger for children whose aggression problems were worse initially ($p < .001$, effect size = .24). Finally, a difference in curvilinear change across intervention groups was detected for the cognitive concentration outcome, and this two-way interaction was retained in the final model. No interactions with gender were found for the TOCA-SHP outcomes. We note that likelihood-ratio tests for the overall effect of the two-way interactions were significant (at least $p < .0005$) in all three SHP regression models.

To illustrate the significant interactions in Table 2, we plotted subgroup differences in predicted probabilities generated through the random-effects regressions. Such probabilities can be output for any level (cutpoint) in terms of the ordered logit model. We chose a cutoff distinguishing the probability of being in the top 20% of behavioral problems. Subgroups for continuous variables were defined as those participants above one standard deviation on that measure (e.g., participants in the “high poverty” group are those who attended schools with rates of free or reduced lunch above one standard deviation in this sample of schools). The plots that show change in outcomes as a function of poverty grouping and intervention status are quite similar for the three SHP outcomes. In lower poverty schools, children in intervention and control groups have similar rates of problems in Grade 1. By Grade 3, however, control group participants have noticeably higher rates of problems. Among higher poverty schools, plots show similar results across the three outcomes: An intervention effect exists by the end of Grade 1 (with a higher probability for worse problems for children in control vs. intervention schools), and this difference is maintained at Grade 2 for all three outcomes. By Grade 3, however, the gap between intervention and control groups has lessened for both cognitive concentration and social competence outcomes. In contrast, significant group differences reflecting positive intervention effects are maintained for the rates of aggression (authority acceptance) through Grade 3 (see Figures 1, 2, and 3).

As noted, baseline status was found to be a significant moderator of intervention effect for authority acceptance. In particular, stronger effects on this measure were detected among children with higher baseline aggression problems (this effect was not further moderated by poverty or across time). Figure 4 shows that the predicted probability for higher aggression problems differs across intervention and control groups for children with higher baseline scores; the difference is nonsignificant for children with lower baseline scores.[2]

[2]When analyses were repeated on the more complete data from rural Pennsylvania only, the main effect model indicated significant intervention effects for all three teacher ratings ($p < .0001$). Baseline aggression level moderated intervention effects only for authority acceptance and social competence. For authority acceptance, the largest gain in intervention effects was shown by intervention children with higher baseline aggression. For both cognitive concentration and social competence, intervention effects of similar magnitude were found for all children.

Peer Sociometric Nominations

As we did with the models for the TOCA-SHP outcomes, we assessed potential intervention effects for the three sociometric outcomes as well as potential moderation of intervention effects by time and by key background variables. For sociometric outcomes, in contrast to the SHP models, effects were moderated by gender. For aggressive nominations, a significant Gender × Intervention interaction indicated that boys in the control group were more likely than those in the intervention group to be peer nominated as aggressive ($p < .001$, effect size = 20). Similarly, for hyperactive nominations a significant Gender × Intervention interaction indicated that boys in the control group were more likely than those in the intervention group to be peer nominated as hyperactive ($p < .05$, effect size = .12). The same interaction emerged as a marginally significant interaction for prosocial nominations ($p = .086$), although it is not retained in the final model presented in Table 3. Interaction terms representing potential moderation by poverty level or baseline status indicated no significant intervention group moderation.[3]

Discussion

The results of this universal-intervention model at the end of third grade provide evidence of the model's effectiveness both for promoting social competence and for reducing aggressive behavior problems. Significant main effects for intervention were found with mild-to-moderate effect sizes (Cohen's $d = 0.1–0.4$) for all three teacher-rated outcomes (authority acceptance, cognitive concentration, and social competence) and for the two of the three peer-rated outcomes for boys (aggressive and hyperactive–disruptive nominations). Hence, evidence for effectiveness emerged from the viewpoints of two independent sources of information: teachers and peers. These findings reflect consistent but modest effects of the universal-level prevention activities on behavior for children who remain in the same school for 3 years of sustained exposure. These findings are in line with expectations that universal intervention will have mild-to-moderate effects across an entire population (Cuijpers, 2003; Hahn et al., 2007). These findings demonstrate, along with effects on social behavior, improved classroom behavior and teacher perceptions of more effective academic engagement, including increased self-control and on-task behavior. As such, these findings are consistent with a recent meta-analysis showing significant effects of social–emotional learning programs on both behavioral and academic outcomes (Durlak, Weissberg, Dymnicki, Taylor, & Schellinger, in press). In addition, as hypothesized, factors at the level of the individual child and school environment moderated the impact of the universal intervention.

Moderation by Child Factors: Baseline Problems and Gender

In terms of child factors, individual baseline levels of behavior problems served as a moderator of intervention effects on teacher ratings of aggressive–disruptive behaviors (e.g., authority acceptance). Children who exhibited higher levels of baseline aggression in the fall of first grade (by teacher report) and received the intervention showed larger reductions in aggression by the end of third grade (by teacher report) than did children who started school with low levels of aggressive behavior problems. The effect was somewhat different for peer nominations, as significant intervention effects on aggressive peer nominations effects emerged for all boys and did not vary by level of baseline aggression. However, boys had higher mean levels of peer-nominated aggression than did girls.

[3]When analysis were repeated on the more complete data in rural Pennsylvania, positive intervention effects were found for aggression, hyperactivity, and prosocial for boys and for prosocial for girls at the end of Grade 3 (ps < .001). For aggression, larger intervention effects were found among both boys and girls with lower baseline aggression in less disadvantaged schools. For prosocial, larger intervention effects were found for boys with higher baseline aggression.

The distribution of aggressive behaviors and its normative developmental trends may account for these somewhat different patterns of intervention moderation across teacher versus peer reports (Kellam & Rebok, 1992). Elevated levels of aggressive behavior problems are relatively rare by either teacher or peer report, and hence many children had low scores at school entry. Classroom rates of aggressive–disruptive behavior show normative declines between first and third grade, as children become socialized into the rules of school. Hence, relatively few children show trajectories of increasing aggression during these years, making it most likely that an intervention affects aggression by decreasing it in children with high initial levels. Peer nominations, in contrast, tend to show relatively stable levels across the early school years. Hence, intervention may affect peer nominations either by reducing nominations among initially aggressive classmates or by suppressing the initiation of peer aggression during the early school years. Boys are more likely than girls to exhibit overt aggression in peer contexts across the elementary school years. Thus, the overall benefits of universal social–emotional learning programs on aggressive outcomes do not appear to be limited to children who show high initial rates (although they benefit more, according to teacher ratings) but appear also to promote sustained nonaggressive orientations among boys, in particular (according to peer nominations). In general, the lack of significant intervention effects on peer sociometric nominations for aggression or hyperactivity among girls may reflect the very low base rate of such nominations for girls during the early elementary years (Bierman et al., 2004).

Moderation by School Disadvantage and Site

Moderation by school disadvantage emerged for teacher ratings of authority acceptance, cognitive concentration, and social competence, as intervention effects were largest in schools that had less socioeconomic disadvantage (e.g., lower rates of student reduced or free lunch). It should be remembered that the mean level of poverty in the high-disadvantaged schools was approximately 80% of children qualifying for free or reduced lunch. In contrast, the other schools in this study averaged approximately 45% free or reduced lunch eligibility. For comparison purposes, nationwide figures indicate that the percentage of children eligible for free and reduced lunch is 39.6% nationwide and is 47.3% for the 500 largest American school districts (U.S. Department of Education, National Center for Education Statistics, 2001). Thus, the effects of this universal model appear to be robust for most schools but not for those at the extreme levels of student poverty.

In theory, two types of mechanisms may contribute to the greater effectiveness of this universal social–emotional learning program in schools that served student populations comprising fewer socioeconomically disadvantaged children. One is that it may have been much easier for teachers at less disadvantaged schools to implement the intervention with sustained, high fidelity over the 3 years studied. Supplementary analyses indicated, however, that there were not wide differences in implementation quality that resulted from school disadvantage. This may have been due to the ongoing, proactive technical assistance provided to teachers. However, a substantial weakness of this study is there were no unbiased ratings of teacher’s fidelity in delivering the lessons, and the coordinators who rated the overall implementation quality may have been unreliable.Hughes et al. (2005) have argued that social–emotional learning programs that require organized lesson planning, generalized support in nonclass settings, and coordination with parents may overwhelm teachers who are working in highly stressed contexts and responding to daily student crises. Even when teachers support these efforts, the capacity to sustain the programs in a broad, school-based manner, consistently over multiple years, might be jeopardized by high rates of student and teacher turnover, which disrupts continuity in skill acquisition and generalization. In spite of these processes operating in more disadvantaged schools, our findings show that effects on both teacher ratings of aggression and peer nominations of

aggression show that the PATHS curriculum reduced aggression both high- and low-poverty schools, especially for boys.

Due to the design of the study, students who did not remain in their original schools from Grade 1 through Grade 3 were not tracked longitudinally. The substantial rate of child turnover in the high-risk urban schools (69% in Nashville and 58% in Seattle) raises an important policy issue for the implementation of effective prevention programming. Given such high mobility, it is unlikely that prevention programs will have substantial impact unless they are conducted across whole school districts or at least larger subunits of very large urban districts. At present, no studies have been reported that have assessed whole urban districts or at least large clusters of elementary schools. Such rates of student and teacher turnover mean that establishing the full impact of prevention programming will require large-scale designs.

Given the high rate of attrition in the urban districts, one might question the external validity of the findings. As a result, analyses were also conducted separately for PA, in which 75% of the beginning students were assessed across time. Findings indicated substantially stronger effects in this rural sample, with main effect findings at the $p < .0001$ level for all three teacher ratings and findings at the $p < .001$ level for all three sociometric nominations for boys and for two of the three nominations for girls. Thus, in the more stable and low-risk schools, effects were stronger and more pervasive.

Caveats

It should be recognized that the Fast Track universal intervention included intensive intervention with high-risk children as an integral part of the overall universal intervention. Although the present analyses did not include the high-risk children who received additional intervention, it is quite possible that effects of the intervention on the non-high-risk children depend on a simultaneous intervention with the high-risk children. Project staff commitment to work with high-risk children may have reduced teacher stress and increased teacher interest in implementing a universal intervention. Likewise, the improvements in high-risk children that were due to the selected intervention may have improved classroom peer relations among other children. The current study was not designed to evaluate the effects of a universal intervention that excludes simultaneous intensive intervention with a selected group of high-risk children; thus, it does not assess the use of the universal intervention alone. Instead, this study clearly supports that an integrated approach that combines universal and selected intervention can have powerful effects at the universal level of analysis.

Another concern regards the necessary exclusion of the high-risk sample from the evaluation of the effects of the universal intervention. It is recognized that the exclusion of the worst behaving children may place limits on the generalizability of these findings. However, as these were high-risk neighborhood schools, the number of children who were showing significant behavior problems was considerable. Using data from a normative subsample that is part of the larger Fast Track intensive study (Lochman & CPPRG, 1995) and having accounted for the removal of the high-risk children, we estimated that 14% of children still scored in the clinical range (greater than 64) on the Teacher Report Form of the Child Behavior Checklist (Achenbach, 1991).

In addition, there are a number of measurement limitations in this study that should be noted. First, due to the size of the study, it was not feasible to gather observational data after first grade (CPPRG, 1999b). Second, although the sociometric measurement allowed for unlimited nominations (e.g., children could identify as many students as they wished who fit the descriptions of an aggressive or prosocial child), children tend to list the few classmates

who are the most prominent examples within the classroom. Sociometric nominations are therefore not an absolute measure of social behavior within a classroom but also reflect social comparison processes, as children nominate those who "stand out" relative to classroom norms. However, such processes should operate to make sociometric measures less sensitive to universal intervention effects that are designed to change classroom behavioral norms. Hence, the significant impact of sustained universal intervention on sociometric nominations found here is notable. Third, differences across classrooms in teacher ratings of behavior may be less than accurate estimates, as teachers are likely to use the same scaling across widely varying classroom environments (this despite the fact that a rating of "2" or "sometimes" in one classroom may be quite different than the same score in another classroom). It would be useful in future studies to assess this with scoring of frequency per unit time rather than Likert scaling of *Almost Always* to A*lmost Never*. Finally, the teachers and peer raters were not blind to the intervention condition. If they liked the intervention and wanted it to continue, their responses might be biased.

Future Directions

These results indicate the effectiveness a universal intervention implemented with fidelity can have in altering child social competence and problem behaviors during the first 3 years of school. It is the largest study of its kind indicating the efficacy of school-based, universal interventions during the elementary school years both for the promotion of competence (Elias, 1995) and for the prevention of maladjustment (Caplan et al., 1992; Dolan et al., 1993; Grossman et al., 1997; O'Donnell, Hawkins, Catalano, Abbott, & Day, 1995). However, because of the nature of the experimental design, the current findings cannot adequately answer two important questions. First, because the number of years of intervention exposure was not systematically varied, longitudinal analyses cannot differentiate the impact of having 1 year versus more than 1 year of intervention. Second, the design permits us to understand the effects for multiple years of intervention only for those children who remained in their schools for all 3 years. In addition, the absence of more refined measurement of school-systems-level processes (e.g., teacher and principal attitudes and behaviors) provides no information on the processes by which school disadvantage influences child outcomes. Future studies that examine the number of years of exposure and fully characterize the implementation environment at multiple levels will be necessary to provide further answers to these central questions regarding school-based processes of change in prevention research.

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Appendix

Members of the Conduct Problems Prevention Research Group, in alphabetical order, include Karen L. Bierman, Department of Psychology, Pennsylvania State University; John D. Coie, Department of Psychology, Duke University; Kenneth A. Dodge, Center for Child and Family Policy, Duke University; Mark T. Greenberg, Department of Human Development and Family Studies, Pennsylvania State University; John E. Lochman, Department of Psychology, University of Alabama; Robert J. McMahon, Department of Psychology, University of Washington; and Ellen Pinderhughes, Department of Child Development, Tufts University.

Drs. Bierman, Coie, Dodge, Greenberg, Lochman, and McMahon are the developers of the Fast Track curriculum and have a publishing agreement with Oxford University Press. Dr. Greenberg is an author on the PATHS curriculum and has a royalty agreement with Channing-Bete, Inc. Dr. Greenberg is a principal in PATHS Training, LLC. Dr. McMahon is a coauthor of *Helping the Noncompliant Child* and has a royalty agreement with Guilford Publications, Inc.; he is also a member of the Treatments That Work Scientific Advisory Board with Oxford University Press.

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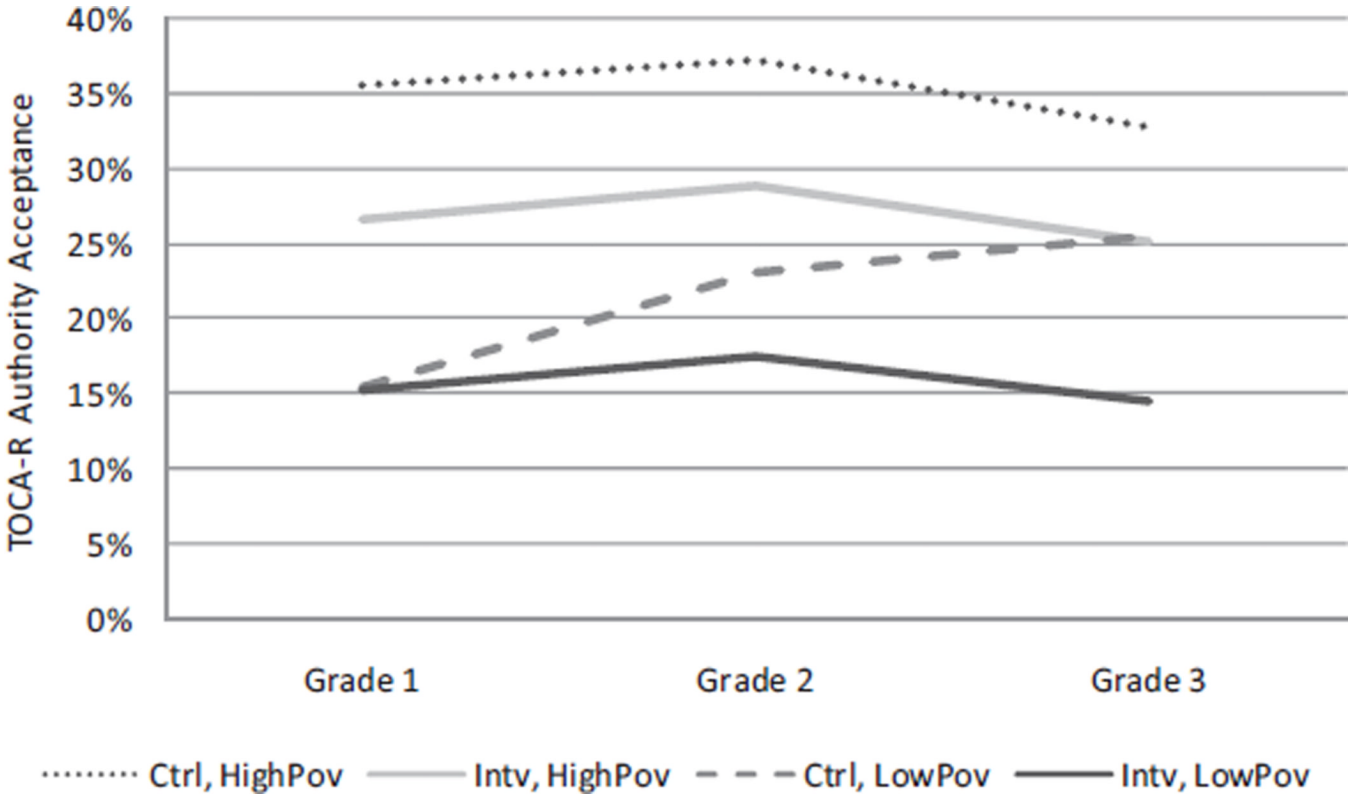

Figure 1.
Predicted probability for a high level (top 20th percentile) of authority acceptance problems: Intervention Group × Poverty × Grade (high/low poverty = above/below 1 *SD* from the mean). TOCA–R = Teacher Observation of Classroom Adaptation—Revised; Ctrl = control; Pov. = poverty; Intv = intervention.

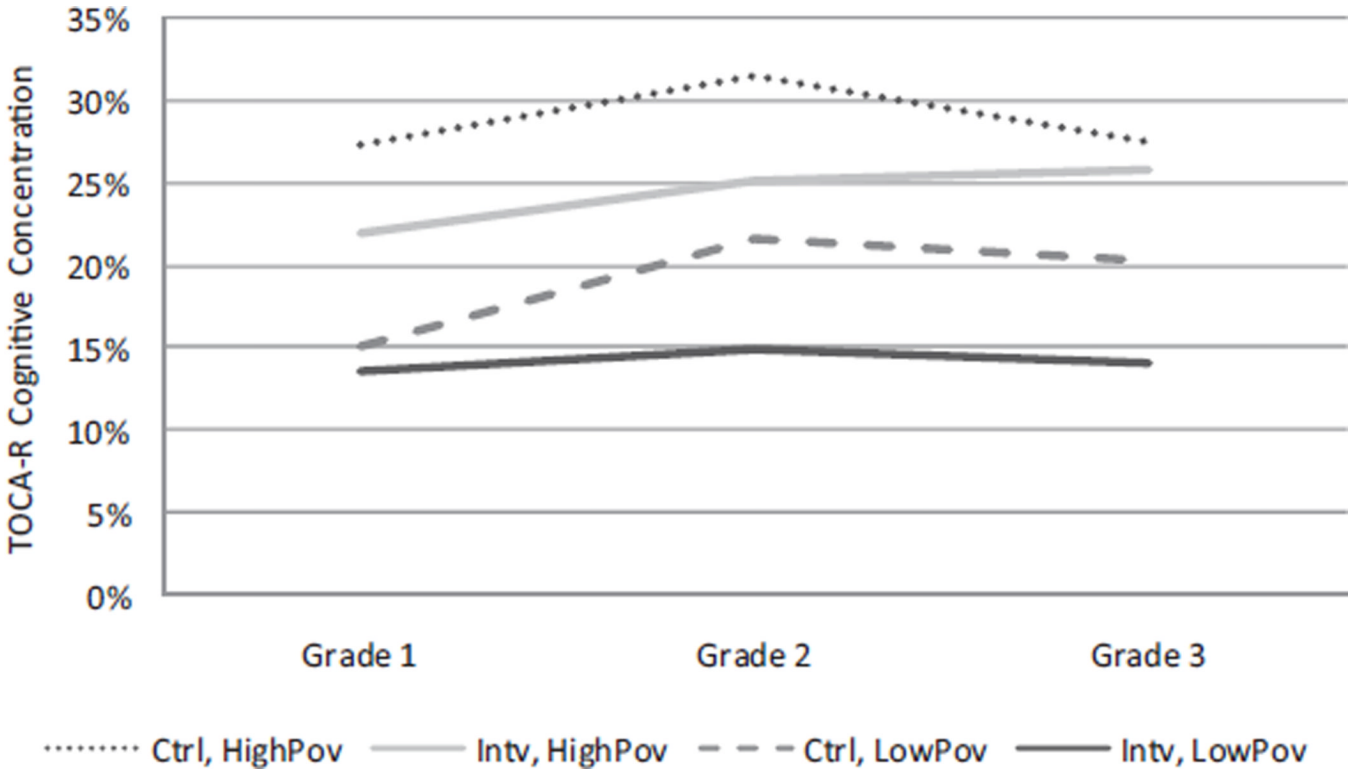

Figure 2.
Predicted probability for a high level (top 20th percentile) of cognitive concentration problems: Intervention Group × Poverty × Grade (high/low poverty = above/below 1 *SD* from the mean). TOCA–R = Teacher Observation of Classroom Adaptation—Revised; Ctrl = control; Pov. = poverty; Intv = intervention.

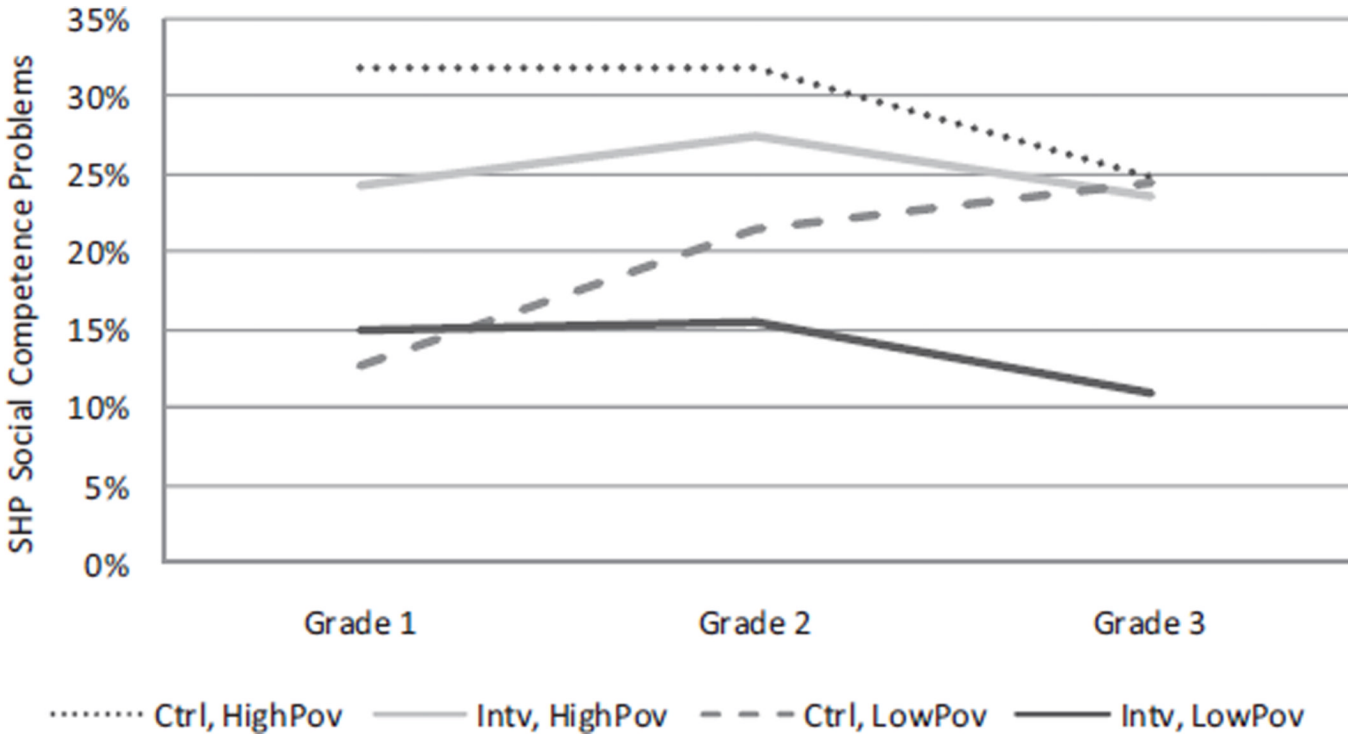

Figure 3.
Predicted probability for a high level (top 20th percentile) of social competence problems: Intervention Group × Poverty × Grade (high/low poverty = above/below 1 *SD* from the mean). SHP = Social Health Profile; Ctrl = control; Pov. = poverty; Intv = intervention.

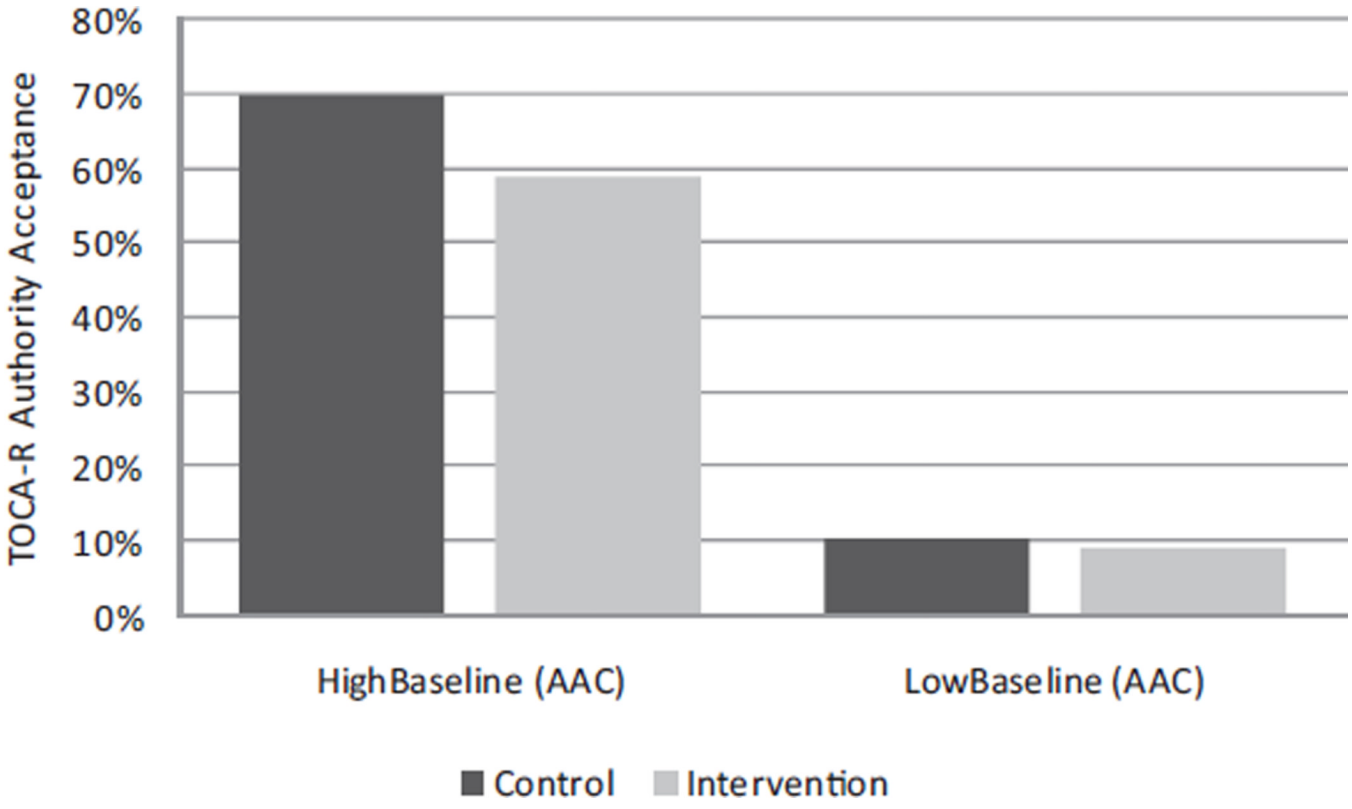

Figure 4.
Predicted probability for a high level (top 20th percentile) of authority acceptance (AAC) problems at Grade 3: Intervention Group × Baseline Status at Grade 3 (high/low baseline = above/below 1 *SD* from the mean). TOCA–R = Teacher Observation of Classroom Adaptation— Revised.

Table 1

Means by Site and by Condition of School Level Variables Indicating Poverty, Ethnicity, and Achievement

	% children receiving free and reduced lunch		% minority children		Reading percentile score		Math percentile score	
Site and condition	***M***	***SD***	***M***	***SD***	***M***	***SD***	***M***	***SD***
Nashville								
Intervention	78.5	12.4	61.0	22.2	30.0	9.5	32.0	10.6
Control	77.0	10.9	47.3	23.8	36.4	9.2	37.5	13.2
Pennsylvania								
Intervention	39.6	16.4	1.0	0.6	63.1	16.5	60.8	13.6
Control	39.1	13.4	1.0	0.9	52.3	14.0	56.8	15.8
Seattle								
Intervention	45.4	7.0	50.1	17.3	47.0	5.7	49.2	5.8
Control	46.6	14.2	53.9	22.3	44.9	5.4	48.7	5.7

Note. North Carolina schools have initiated their own achievement testing system that presently has no percentile scores. Thus scores from the Durham, North Carolina, site cannot be compared with those from the other sites.

Table 2

Parameter Estimates in Models for Social Health Profile Data From All Three Sites

	Authority acceptance			Cognitive concentration			Social competence		
Parameter	**Estimate**	***SE***	***p***	**Estimate**	***SE***	***p***	**Estimate**	***SE***	***p***
Time	0.811	0.096	.000	0.928	0.123	.000	0.818	0.089	.000
Time^2	−0.275	0.044	.000	−0.369	0.059	.000	−0.294	0.041	.000
Baseline[a]	1.934	0.068	.000	1.570	0.036	.000	1.278	0.033	.000
Baseline (school mean)	1.863	0.278	.000	0.920	0.161	.000	0.975	0.186	.000
Male	0.493	0.065	.000	0.491	0.062	.000	0.449	0.053	.000
Site: Nashville[b]	0.120	0.247	.627	0.333	0.178	.060	0.360	0.224	.107
Site: Central Pennsylvania	−0.380	0.146	.009	−0.618	0.125	.000	−0.453	0.164	.006
Poverty	−0.017	0.006	.002	−0.014	0.005	.003	−0.031	0.005	.000
Intervention	−0.595	0.139	.000	−1.130	0.326	.001	−0.769	0.132	.000
Time × Intervention	−0.324	0.052	.000	−0.575	0.174	.001	−0.399	0.047	.000
Time^2 × Intervention	ns	ns	ns	0.230	0.084	.006	ns	ns	ns
Baseline × Intervention	−0.236	0.087	.007	ns	ns	ns	ns	ns	ns
Poverty × Intervention	0.023	0.007	.001	0.021	0.005	.000	0.042	0.006	.000
Poverty × Time × Intervention	0.012	0.003	.000	0.008	0.003	.002	0.020	0.003	.000

Note. Interactions not involving the intervention (i.e., Poverty × Time) were included in analyses but are not presented in the table. ns = nonsignificant (removed from model).

[a]Baseline covariate is value of outcome measured at study baseline (kindergarten) and group-centered within school.

[b]Site main effect represented by two dummy indicators (Washington is reference site).

Table 3

Parameter Estimates in Models for Sociometrics Data From All Three Sites

	Aggressive			Prosocial			Hyperactive		
Parameter	**Estimate**	***SE***	***p***	**Estimate**	***SE***	***p***	**Estimate**	***SE***	***p***
Time	0.304	0.104	.003	0.459	5.160	.000	0.391	0.103	.000
Time^2	−0.153	0.050	.002	−0.160	−3.730	.000	−0.172	0.049	.000
Baseline authority acceptance[a]	1.403	0.056	.000	−0.866	−17.470	.000	1.453	0.055	.000
Baseline authority acceptance (school)	−0.146	0.267	.583	−0.454	−1.690	.090	0.313	0.242	.196
Male	2.272	0.116	.000	−1.089	−15.040	.000	1.853	0.111	.000
Site: Nashville[b]	0.970	0.232	.000	0.490	2.080	.038	0.862	0.221	.000
Site: Central Pennsylvania	0.123	0.166	.457	0.638	4.080	.000	0.435	0.145	.003
Poverty	0.002	0.004	.546	0.006	1.530	.127	0.000	0.004	.921
Intervention	0.126	0.147	.392	0.160	1.270	.206	0.006	0.139	.965
Male × Intervention[c]	−0.556	0.160	.001	ns	ns	ns	−0.324	0.155	.036

Note. ns = nonsignificant (removed from model).

[a]Baseline covariate is value of outcome measured at study baseline (kindergarten) and group-centered within school.

[b]Site main effect represented by two dummy indicators (Washington is reference site).

[c]Intervention and male are dummy-coded, whereby a negative coefficient indicates that the control problem level is higher than that for the intervention.