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THE DISTAL IMPACT OF TWO FIRST-GRADE PREVENTIVE INTERVENTIONS ON CONDUCT PROBLEMS AND DISORDER IN EARLY ADOLESCENCE

In this article, we examine the impact of two universal, first-grade preventive interventions on the prevalence of conduct problems and disorder and mental health service need and use in early adolescence. The classroom-centered (CC) intervention was designed to reduce the risk for later conduct problems and disorder by enhancing teachers' behavior management in first grade, whereas the Family-School Partnership (FSP) intervention targeted improvement in parent-teacher communication and parents' child behavior management strategies. At Grade 6, or age 12, CC and FSP intervention children received significantly lower ratings from their teachers for conduct problems than control children. CC and FSP children were also significantly less likely than control children to meet diagnostic criteria for Conduct Disorder and to have been suspended from school in the last year. In addition, the CC intervention was associated with significantly lower rates of child mental health service need and utilization. Overall, the CC intervention appeared to be the more effective of the two in reducing the prevalence of conduct problems and disorder at age 12 and in reducing mental health service need and utilization. Nevertheless, future studies may show that the combination of CC and FSP interventions

produces additive or even synergistic effects.

Substance abuse, depression, and antisocial behavior are among the most common and serious mental health problems in the United States (Kessler et al., 1994). Their impact and cost extend well beyond the affected individuals to their families, friends, neighbors, coworkers, and the community at large. Although advances continue to be made in the behavioral and psychopharmacological treatment of these disorders, particularly depression (Clarkin, Pilkonis, & Magruder, 1996; Thase & Kupfer, 1996) and substance abuse (Crits-Cristoph & Siqueland, 1996; O'Brien, 1996; Schuckit, 1996), the general consensus among mental health professionals, and likely the lay population as well, is that effective preventive interventions would be highly preferable (Mrazek & Haggerty, 1994).

Yet, despite substantial evidence that the antecedents of these disorders may be apparent as early as first grade, there have been relatively few randomized controlled studies of universal preventive interventions aimed at these early antecedents (Conduct Problems Prevention Research Group, 1999; Hawkins et al., 1992; Kellam, Rebok, Ialongo, & Mayer, 1994a; Reid, Eddy, & Fetrow, 1999), and only two of these studies have reported outcomes beyond first grade (Hawkins et al., 1982; Kellam et al., 1994a). Both studies reported beneficial--albeit modest--impact into the middle school years. The dearth of randomized controls studies such as these is somewhat surprising given that the Woodlawn study (Kellam, Brown, Rubin, & Ensminger, 1983), as well as others, showed that learning problems predict psychiatric distress, particularly depressed mood and depressive disorder (Kellam et al., 1983; Shaffer et al., 1979), whereas aggressive behavior, as early as first grade, predicts later antisocial behavior, criminality, and heavy substance use (Ensminger, Kellam, & Rubin, 1983; Kellam et al., 1983; Farrington & Gunn, 1985; Robins, 1978). Furthermore, in the Woodlawn studies, aggressive behavior interacted with shy behavior and attention concentration problems to increase the risk of later delinquency and substance use (Block, Block, & Keyes, 1988; Ensminger et al., 1983; Farrington, Gallagher, Morley, St. Ledger, & West, 1988; Farrington & Gunn, 1985; Kellam et al., 1983; McCord, 1988; Schwartzman, Ledingham, & Serbin, 1985).

In response to the lack of well-controlled, longitudinal evaluations of preventive interventions targeting the early antecedents of substance abuse, depression, and antisocial behavior, the Johns Hopkins University Prevention Intervention Research Center (JHU PIRC) has mounted two first-grade, universal, preventive intervention trials in collaboration with the Baltimore City Department of Education. By universal preventive intervention, we mean that we intervened with an entire population of first-grade schoolchildren (Mrazek & Haggerty, 1994). In this article we report on the distal impact of this second set of JHU universal preventive intervention trials on conduct problems and disorder and on mental health service need and utilization in early adolescence.

This second generation of preventive trials builds on the foundation laid by the JHU PIRC's initial classroom-based, universal preventive intervention trials, which were fielded in 19 Baltimore city schools with two consecutive cohorts of first graders in the 1985-1986 and 1986-1987 school years. In these initial JHU PIRC intervention trials, two theory-based preventive interventions were evaluated, but both were based exclusively in the classroom and did not directly involve families. One intervention (the Good Behavior Game; Barrish, Saunders, & Wolfe, 1969) was aimed at aggressive and shy behavior, whereas the other (Mastery Learning; Block & Burns, 1976) targeted poor school achievement. The results of this initial set of JHU PIRC trials yielded evidence that the proximal targets of poor achievement and aggressive and shy behavior were malleable (Dolan et al., 1993) and that change in the proximal targets was associated with change in the distal outcomes in middle school (Kellam et al., 1994; Kellam, Rebok, Mayer, Ialongo, & Kalodner, 1994). Although the evidence was promising, we were not satisfied with either the magnitude or the duration of the effects of the initial JHU PIRC universal interventions on their proximal or distal targets. Consequently, we fielded our second, and latest, set of universal, first-grade preventive interventions. In the second-generation field trials, the two classroom-based interventions used in the initial JHU PIRC trials were revised to enhance their effectiveness, which included combining the two protocols into one. Thus, this revised intervention protocol focused on both poor achievement and aggressive and shy behavior. The decision to focus on both achievement and behavior was driven by the evidence from the 1985 to 1986 trial that whereas Mastery Learning had a beneficial impact on early achievement, it had only a modest to moderate crossover, or indirect, effect on aggression. Similarly, the Good Behavior Game had a beneficial impact on aggressive and shy behavior, but not on achievement. Each intervention, thus, appeared to be specific to its proximal target. Consequently, to reduce the later risk for substance abuse, depression, and antisocial behavior, we would need to target both early aggression and achievement.

In addition to combining the two classroom interventions, a universal, family-school partnership intervention was developed to contrast with the combined classroom intervention. Like the classroom-centered intervention, the proximal targets of the family-school partnership intervention were poor achievement and aggressive and shy behaviors. The family-school partnership intervention sought to reduce these early risk behaviors by enhancing family-school communication and parenting practices associated with learning and behavior. The decision to develop a family-based intervention component was consistent with existing theory and the considerable empirical evidence of the important influences that families exert on their children's academic success (Gallagher, 1987; Rutter, 1985; Scott-Jones, 1991; Sines, 1987) and social development (Kazdin, 1985; Patterson, Reid, & Dishion, 1992) and the benefits of strong parent-teacher partnerships and parent involvement (Henderson, 1987; Sattes, 1985) on children's behavior and achievement.

The final design of the latest JHU PIRC trials thus involved the evaluation of two theory-based, universal, first-grade preventive interventions. One sought to reduce the early risk behaviors of poor achievement and aggressive and shy behaviors through the enhancement of classroom curricula and teacher instructional and behavior management practices. The second sought to reduce these early risk behaviors by improving parent-teacher collaboration and by enhancing parents' teaching and behavior management skills. In the following section, we briefly describe the conceptual basis for the interventions and discuss the proximal impacts of the interventions through second grade.

THE CONCEPTUAL BASIS FOR THE INTERVENTIONS

As described in detail in Jalongo, Werthamer, Brown, Kellman, & Wang (1999), the conceptual basis for the interventions was derived from the life course/social fields framework (Kellam & Rebok, 1992) and its integration with Patterson et al.'s (1992) model of the development of antisocial behavior. Briefly, the classroom-centered (CC) and Family-School Partnership (FSP) interventions were hypothesized to reduce the early antecedent risk behaviors of aggressive and shy behaviors and their distal correlates by improving teachers' and parents' disciplinary practices and by enhancing parent-teacher communication in the case of the FSP intervention (see Henderson, 1987; Sattes, 1985). The reductions in the early antecedent risk behaviors were hypothesized, in turn, to lower the risk for more serious forms of antisocial behavior in adolescence and young adulthood. Finally, the corresponding need for and use of child mental health services would then be reduced.

PROXIMAL IMPACT OF THE INTERVENTIONS

With regard to the immediate, or proximal, impact of the second-generation JHU PIRC trials, the CC intervention had significant impact on the early risk behaviors for later antisocial behavior through the second-grade follow-up (Jalongo et al., 1999). By the end of second grade, the CC intervention also resulted in a significant reduction in the likelihood of boys (a) being placed in a self-contained classroom for emotional or behavioral problems, (b) having received school-based mental health services for behavioral or emotional problems, (c) being evaluated for special education services, (d) having received school-based services for learning or attention problems, (e) being judged in need of medication for behavioral or emotional problems; and (f) having been removed from school for disciplinary reasons. The breadth and magnitude of the FSP intervention effects on the early risk behaviors were more modest than for the CC intervention at the end of second-grade follow-up, with the primary impact being on second-grade teacher ratings of the early risk behaviors of attention or concentration problems and aggressive and shy behavior.

THE PRESENT STUDY

In this study we report on the distal impact of the latest JHU PIRC preventive interventions with respect to conduct problems and disorder and mental health service need and utilization in Grade 6 or age 12. Consistent with the immediate impact of the interventions in Grades 1 and 2 and the theoretical mechanisms elaborated above, we hypothesized that children in the CC and FSP interventions would exhibit lower rates of conduct problems and disorder relative to controls. We also hypothesized that the CC and FSP participants would have significantly less service need and utilization than the children in the standard setting condition.

METHOD

Participants

A total of 678 children and their families, representative of the entering first graders in nine Baltimore city public elementary schools, was available for participation. Fifty-three percent were boys, 86.8% were African American, and 13.2% were of European American heritage. At entrance into first grade, the children ranged in age from 5.3 years to 7.7 years with a mean age of 6.2 years (SD + 0.34). Nearly two thirds (62.3%) of the children received free or reduced-cost lunch. Of the 678 children available for assessment in the fall of first grade, written parental consent was obtained for 97%. Three percent of the parents or guardians refused to allow their children to participate in the assessments or failed to respond to the consent request. Chi-square analyses and t tests failed to reveal any significant differences in terms of sociodemographic characteristics (ethnicity, age, gender, and free lunch status) between the children for whom parental consent was obtained and those for whom it was not.

Design

A randomized block design was used, with schools serving as the blocking factor. Three first-grade classrooms in each of nine urban elementary schools were randomly assigned to one of the two intervention conditions or a control condition. Teachers and children were randomly assigned to intervention conditions with balancing for gender. The interventions were provided over the first-grade year, following a pretest assessment in the early fall. As reported in Jalongo et al. (1999), immediate intervention impact was assessed in the spring of first and second grades. In the present article we examine the impact of the intervention on the distal targets of the intervention--5 years later in the spring of sixth grade.

THE INTERVENTIONS

The CC Intervention

The CC intervention consisted of three components: (a) curriculum enhancements, (b) enhanced behavior management practices, and (c) backup strategies for children not performing adequately. Each CC class was divided into three heterogeneous groups, which provided the underlying structure for the curricular and behavioral components of the classroom intervention. The existing curriculum in language arts and mathematics was enhanced through the addition of new and supplementary curricular materials designed to increase critical thinking, composition, and listening and comprehension skills. The existing math curriculum was replaced with the Mimosa mathematics program (Irons & Trafron, 1993), which implemented the most recent National Council on Teaching of Mathematics standards at the time. Current behavior management practices were enhanced by a weekly classroom meeting that was used to promote child social problem solving within a group context (Johnson & Johnson, 1987; Kellam, Branch, Agrawal, and Ensminger, 1975) and the Good Behavior Game (Dolan et al., 1993). Regarding social problem solving, a class meeting was held once each week by the CC intervention teacher. The principle objectives of the class meeting were to foster the children's skills in social problem solving through the integration of their thinking, language, listening, and reasoning skills. As part of the class meeting, the teacher instructed the children in a six-step problem-solving model consistent with extant social cognitive models of social competence and aggression (e.g., Crick & Dodge, 1994). The Good Behavior Game, developed and found efficacious by Barrish et al. (1969), is a whole-class strategy to decrease aggressive or disruptive behavior and increase time on task. In the Good Behavioral Game, children are assigned to one of three heterogeneous groups in each classroom, and points are given to the team for precisely defined good behavior by its members and taken away for off-task and shy or aggressive behavior. The points are then exchanged for a variety of tangible rewards in the form of classroom activities, stickers, erasers, and so on. Material reinforcers were accompanied by social reinforcers, with the material rewards gradually phased out over the school year and replaced with social reinforcers.

The FSP Intervention

The FSP intervention was designed to improve achievement and reduce early aggression, shy behavior, and concentration problems by enhancing parent-teacher communication and providing parents with effective teaching and child behavior management strategies. The major mechanisms for achieving those aims were (a) training for teachers and other relevant school staff in parent-teacher communication and partnership building, (b) weekly home-school learning and communication activities, and (c) a series of nine workshops for parents

led by the first-grade teacher and the school psychologist or social worker. The Parents on Your Side program (Canter & Canter, 1991) formed the basis for training teachers in partnership building and parent-teacher communication. The program included a 3-day seminar with follow-up supervisory visits and an explicit training manual that is accompanied by videotape training aides.

The parent workshop series began immediately after the pretest assessments in the fall of first grade and ran for 7 consecutive weeks--one workshop per week--through early December. A follow-up or booster workshop was held in the winter and spring of first grade. The first two parent workshops aimed at establishing an effective and enduring partnership between parents and school staff and set the stage for parent-school collaboration in facilitating the children's learning and behavior. The next five workshops focused on effective disciplinary strategies. The Parents and Children series, a videotape modeling group discussion program developed by Webster-Stratton (1984), formed the basis for this component of the intervention. These workshops were led by the schools' psychologist or social worker, and the topics included effective praise, play, limit setting, time-out versus spanking, and problem solving. In addition to the workshops, a voice mail system, or "Warm Line," was put in place in each school to maintain parent involvement and to facilitate parent--school communication and collaboration around children's learning or behavior management difficulties.

Intervention Fidelity

First grade teachers administered the CC intervention after completing 60 hours of training and receiving certification. Similarly, first-grade teachers in conjunction with the school social worker or psychologist administered the FSP intervention after completing 60 hours of training and receiving certification. During the intervention period, teachers and the school psychologist or social worker met with intervention experts individually as often as needed to effectively implement the intervention in their classrooms. In addition, all intervention teachers attended monthly meetings to discuss common intervention issues and to receive ongoing support.

To monitor and sustain the integrity of both the CC and FSP interventions, we precisely delineated and codified the training and intervention manuals, thus standardizing the content of each training and intervention contact. In addition, intervenors had a number of materials available designed to foster correct execution of the interventions, including detailed outlines and checklists that prescribe the necessary materials for each intervention contact, the specific themes or tasks that need to be covered, and related information.

In terms of implementation or participation checks specific to each intervention, the monitoring of fidelity of implementation for the CC intervention involved three parts: (a) measures of setting up the classroom, (b) classroom observation sessions, and (c) reviews of classroom visit records. With respect to the FSP intervention, intervenors were required to provide documentation of each contact with parents, including, where appropriate, summaries of what transpired, any unique features, duration of the contacts, parent or child attendance, and level of participation and compliance with "homework assignments." Parents involved in the FSP intervention anonymously reported on their implementation and the usefulness of the techniques taught and were also asked to report on the family intervenors' interpersonal and teaching skills. Live and audiotaped observations of parent workshops were made to determine the extent to which the intervention protocols were being adhered to and how well they were administered.

MEASURES

Fall of First Grade

Teacher Observation of Classroom Adaptation-Revised (TOCA-R). The TOCA-R (Werthamer-Larsson, Kellam, & Wheeler, 1991) is designed to assess each child's adequacy of performance on the core tasks in the classroom as rated by the teacher. It involves a structured interview administered by a trained member of the assessment staff. The interviewer follows a script precisely and responds in a standardized way to issues the teacher initiates. The interviewer records the teacher's ratings of the adequacy of each child's performance on three basic tasks: accepting authority (the maladaptive form being aggressive behavior); social participation (the maladaptive form being shy behavior); and concentration and being ready for work (the maladaptive form being concentration problems). Teachers rate the child's adaptation on a frequency scale from 1 to 6 (1 = not at all, 6 = always). The authority acceptance, or aggressive behavior, scale includes items such as "breaks rules," "harms

property," and "fights." The social participation, or shy behavior, scale includes items such as "plays with classmates" and "initiates interactions." The concentration scale includes items such as "pays attention," "is easily distracted," and "stays on task." Werthamer-Larsson et al. (1991) reported that the scale has sound psychometric characteristics. The TOCA-R score used in the analyses described in the following sections was the mean of the items making up the aggression, shy behavior, and attention/concentration problems subscales. The total score ranges from 1 to 6, with the higher the score, the greater the frequency of problem behaviors. Cronbach's coefficient alpha for this total scale was .96, suggesting considerable internal consistency. Our decision to use the total score as opposed to the individual subscales reflected the fact that these problem behaviors typically cooccur, as the total score alpha of .96 would suggest. Moreover, the composite score afforded us greater protection against Type 1 error.

The Comprehensive Test of Basic Skills--Version IV (CTBS). The CTBS (1990) is a group-administered, standardized achievement test. The CTBS subtests cover both verbal (word analysis, visual recognition, vocabulary, comprehension, spelling, and language mechanics and expression) and quantitative (computation, concepts, and applications) topics. The CTBS was standardized on a nationally representative sample of 323,000 children from kindergarten through Grade 12.

Structured Interview of Parent Management Skills and Practices--Parent Version (SIPMSP). The SIPMSP (Capaldi & Patterson, 1989) was designed to assess the major constructs included in Patterson et al.'s (1992) model of the development of antisocial behavior in children, that is, the parent disciplinary practices and processes associated with the development of antisocial behavior. These same practices were targeted by the FSP intervention; therefore, parent responses to the SIPMSP also provided information with respect to implementation of FSP intervention principles and practices by FSP parents. The subscales utilized in the present study include (a) parental monitoring and supervision (e.g., "How often is the child out after dark without an adult present?"); (b) inconsistent discipline (e.g., "How often can the child talk you out of punishing him/her?"); (c) reinforcement or involvement in reinforcing activities (e.g., "How often do you spend time with the child in a fun activity?"); and (d) rejection of the child ("How difficult is it to be patient with the child?"). Parents are asked to respond to questions regarding their disciplinary practices on a 1 (almost always) to 5 (never) frequency scale for the monitoring, discipline, and reinforcement items. A 1 to 5 response format is also used with the rejection scale. However, the response anchors reflect a severity rather than a frequency scale, with 1 representing the lowest level and 5 the highest level of rejection. Capaldi and Patterson (1989) reported adequate internal consistency and test-retest reliability for each of the preceding subscales. Cronbach's coefficient alphas for these subscales in our study were .67 for monitoring, .77 for inconsistent discipline, .50 for reinforcement, and .69 for rejection.

Spring of Sixth Grade

Teacher Report of Classroom Behavior--Checklist Form (TRCB CF). The TRCB-CF is designed to obtain teacher reports of child conduct problems in the school setting. It was based on the standardized teacher interview (TOCA-R) developed by Werthamer-Larsson et al. (1991) and described previously. Teachers respond to seven items corresponding to Diagnostic and Statistical Manual of Mental Disorders-IV (DSM-IV; American Psychiatric Association, 1994) criteria for Conduct Disorder (e.g., starts physical fights with classmates, lies, hurts others physically, steals, damages other people's property on purpose, skips school, and bullies classmates into getting his or her own way). Only those DSM-IV Conduct Disorder symptoms and behaviors that were thought to be observable in the school setting were included in the TRCB-CF. Teachers rate the frequency of child conduct problems on a scale from 1 to 6 (1 = not at all, 6 = always). The teacher also reports on whether a child has been suspended from school in the last year and whether the child is in need of mental health services. Coefficient alpha for the TRCB-CF Conduct Problems scale in sixth grade was .88, whereas the intraclass coefficient for 1-year test-retest reliability was .55. In terms of concurrent validity, the total Conduct Problems score on the TRCB-CF was significantly related to suspension from school and receipt of school-based mental health services for emotional and behavior problems: the higher the score, the greater the likelihood of the event.

The TRCB-F was completed by the children's English/language arts, reading, and math teachers in sixth grade. The choice of these subjects was in keeping with the original academic targets of the intervention and the fact that these three subjects were required of all children in the Maryland public schools. For analytic purposes, we took the mean of the three ratings on the Conduct Problems scale. Regarding the suspension and mental health service need questions, the variable used in the data analyses was coded "yes" if any of the three teachers

reported a "yes."

Diagnostic Interview Schedule for Children (DISC-IV). The Conduct Disorder module of the DISC IV (Shaffer, Fisher, Lucas, Dulcan, & Schwab-Stone, 2000) was used in sixth grade to determine whether the youth met DSM-IV criteria for a lifetime diagnosis of Conduct Disorder based on youth and parent reports. The DISC-IV is a fully structured interview that generates DSM-IV diagnoses as well as the number of diagnostic criteria met and symptom counts for discrete diagnostic entities. The interview specifies the exact wording and sequence of questions and provides a complete set of categories for classifying respondents' replies. It is designed to be administered by lay interviewers. A computer algorithm developed by Shaffer et al. (2000) was used to derive the lifetime diagnosis of Conduct Disorder. A Conduct Disorder symptom was counted as present if either the parent or the child reported it. This is in accord with Piacentini, Cohen, & Cohen (1992) and Bird et al. (1992), who concluded that complex algorithms for combining discrepant diagnostic information offer no clear-cut advantage over a simple combinational rule that identifies symptomatic criteria as positive when they are acknowledged as positive by either parent or child informants. Although the complete results of the psychometric studies of the DISC-IV have yet to be published, the data on the earlier versions of the DISC (DISC 2.1, DISC 2.3) suggest adequate test-retest reliability (Jensen et al., 1995) and validity (Schwab-Stone et al., 1996).

Service Assessment for Children and Adolescents Parent Report (SACA-P). The SACA-P (Horwitz, et al., in press) is a structured interview designed to accompany the DISC-IV and obtain information on child mental health service utilization. We used the SACA-P to obtain lifetime use of child mental health services--including inpatient as well as outpatient services--provided by mental health professionals, including clinical and counseling psychologists, psychiatrists, and social workers.

School Mental Health Professional Report (SMHPR). The SMHPR is a checklist we administered to school mental health professionals to determine whether they had provided mental health services to a study participant in the last year (yes or no) and the nature of the services provided (individual or group counseling, psychological assessment, or consultation).

Structured Interview of Parent Management Skills and Practices-Parent Version (SIPMSP). The SIPMSP, which was administered in the fall of first grade, was readministered in the spring of sixth grade.

RESULTS

Analytic Plan

Mixed (i.e., random effects regression; Gibbons, Hedeker, Watemaux, & Davis, 1988) model analysis of variance was used in the case of interval-level variables, whereas logistic regression was used with the nominal outcomes. Within these analyses, planned contrasts were performed between the CC intervention and control condition and the FSP intervention and control condition. Effect sizes for interval-level variables are reported in terms of the between-group difference in standard deviation units at the sixth-grade follow-up in keeping with what Cohen (1988) describes as *d*. All of these analyses examine the impact of the interventions after adjustment for the baseline (the fall of first grade) level of the early risk behaviors of attention/concentration problems and aggressive and shy behavior as rated by teachers. The intervention x pretest-level interaction was included in the outcome analyses, along with the intervention main effect. The former allowed us to test whether intervention impact varied by the baseline level of the early risk behaviors. We also tested for an intervention x gender interaction in each analysis. In the event an intervention x gender effect was found, the analysis was rerun separately by gender.

Preliminary Analyses

Equivalence of the Intervention Conditions at Baseline. Table 1 summarizes the characteristics of the study population at baseline in the fall of first grade. Chi-square and analyses of variance revealed that the intervention conditions were equivalent with respect to child age, gender, ethnicity, free lunch status, achievement levels, and parenting practices at pretest, or baseline, in the fall of first grade. Significant differences (*p* less than or equal to .05) were found between the CC intervention and controls in terms of teacher ratings of the early risk behaviors of attention/concentration problems and aggressive and shy behavior (see Table 1). Accordingly, the

baseline level of teacher ratings of the early risk behaviors was included as a covariant in all analyses.

Attrition Analyses. Of the 653 children with consent to participate in the evaluation in the fall of first grade, 597 or 91.3% completed the fall and spring of first-grade assessments and remained in their assigned intervention condition over the first-grade year. Five hundred nine, or 77.9%, completed spring of sixth-grade assessments. At the sixth-grade followup, there were no significant differences between the intervention conditions in terms of rates of attrition. Nor were there any between-condition differences in terms of sociodemographic characteristics (ethnicity, gender, age, or free lunch status) in sixth grade. Finally, there were no differences in terms of sociodemographic characteristics or baseline levels of the early risk behaviors between the children with complete data at first and sixth grade and those with baseline data in first grade but missing data in the spring of sixth grade.

Level of Participation/Implementation in the CC and FSP Interventions. Each of the nine CC intervention classrooms was assigned a score from 0 to 100 representing the percentage of the teacher's implementation of the intervention as designed. Scores were based on the three sources of implementation data identified previously: (a) measures of setting up the classroom, (b) classroom observation sessions, and (c) reviews of classroom visit records. CC implementation scores ranged from 30% to 78%, with a median of 64.37% and a mean of 59.9% (SD = 17.03%). All but two of the nine CC intervention teachers implemented more than 50% of the intervention protocol. In terms of the FSP intervention, parents or caregivers attended on average 4.02 (SD = 2.38, median = 5.0, range 0-7) of the seven core parenting sessions offered in the fall of first grade, or 57.4% of the available sessions. Just less than 13% (12.7 %) of the parents or caregivers failed to attend any of the core workshops, whereas just more than a third (35.3%) of the parents attended at least six of the seven sessions. In terms of the rate of parent or caregiver completion of weekly take-home Read Aloud and Fun Math activities, parents on average completed 39.15 (SD = 16.54) of the 64 activities, or 60.9%. Once again, about one third (35.7%) completed 75% or more of the activities, whereas only 2.3% failed to complete any of the activities.

Outcome Analyses

Teacher Report of Conduct Problems in Sixth Grade. The mixed model analyses of covariance yielded significant main effects for both the CC and FSP interventions with respect to teacher ratings of conduct problems in sixth grade. No gender x intervention interactions were found. Teachers rated children in the CC, $t(314) = 3.27$, p less than or equal to .001, CC Adjusted M = 1.47, SD = 0.66 vs. Control Adjusted M = 1.72, SD = 0.69, ES = .39, and FSP interventions $t(319) = 2.98$, $p < .05$, FSP Adjusted M = 1.49, SD = 0.67 vs. Control Adjusted M = 1.68, SD = 0.67, ES = .29, as having significantly lower levels of conduct problems than children in the standard setting or control condition.

Lifetime Diagnosis of Conduct Disorder by Grade 6. Logistic regression analyses yielded a significant CC intervention effect in terms of the rate of a lifetime diagnosis of Conduct Disorder by Grade 6 (see Table 2). The FSP intervention effect was in the expected direction but was not significant at p less than or equal to .05. Children in the CC condition had a lower probability of a lifetime Conduct Disorder diagnosis than children in the control condition. This was also true for the FSP intervention. However, as pointed out above, the odds ratio failed to reach significance (i.e., $p > .05$). Note that in these analyses, the control group was coded as 0 and the respective intervention condition as 1, whereas the outcomes were coded 0 for no and 1 for yes. Consequently, a statistically significant odds ratio below 1 would signify that the intervention was associated with a reduced risk of the outcome of interest.

School Suspension/Disciplinary Removals in Sixth Grade. Logistic regression analyses yielded a significant intervention effect for the CC intervention in terms of school suspensions in sixth grade (see Table 2). Children in the CC intervention were significantly less likely to have been suspended in the sixth grade than children in the control condition. In light of a significant FSP x gender interaction, the school suspension data were analyzed separately by gender for the FSP versus control comparison. A significant intervention effect was found for girls, with girls in the FSP intervention significantly less likely to have been suspended during the sixth-grade year than girls in the control condition.

Receipt and Need for Mental Health Services in Sixth Grade. Logistic regression analyses yielded significant CC intervention effects for teacher report of the child's need for mental health services in sixth grade, school mental health professional report of the child's receipt of school-based mental health services, and parent report of lifetime use of child mental health services (see Table 2). Relative to controls, CC intervention children were

significantly less likely to be judged by teachers to be in need of mental health services. Parent and teacher reports indicated that CC children were also less likely to have received mental health services than controls. Whereas the effects of the FSP intervention were in the expected direction on each of these outcomes, none of the effects proved significant (i.e., $p > .05$).

Mediational Analyses

Earlier we offered a number of hypotheses as to the mechanisms for intervention effects. The first hypothesis we tested was that the impact of the interventions on the distal outcomes would be mediated--at least in part--by improvement in the early risk behaviors of attention/concentration problems and shy and aggressive behavior. To that end, we computed a change score representing the improvement in the early risk behaviors from the fall of first grade to the spring of second grade (see Note). In accord with Baron and Kenny (1986), we then established that each of the interventions had a significant impact on the change score in the expected direction, FSP, $t(235) = 2.62$, $p < .01$; CC, $t(227) = 4.35$, $p < .001$, and that the change score was significantly related to each of our distal outcomes. Subsequently, we added the change score into each of the foregoing impact analyses, where a significant intervention effect was found. We then examined whether the coefficient for the intervention effect remained significant after introducing the change score into the equation. As can be seen in Table 3, we found that the size of the intervention coefficients and test statistics decreased in all instances when the change score was introduced into the model. Moreover, the p -levels for the effect of the CC and FSP interventions on teacher-rated conduct problems at Grade 6 became nonsignificant.

Consistent with Patterson et al. (1992), we also tested the hypothesis that the statistically significant Grade 6 CC and FSP intervention effects on antisocial behavior might be mediated through improved parenting practices via improvement in the early risk behaviors. More specifically, we first tested the hypothesis that, relative to controls, CC and FSP intervention parents would be more likely to engage in reinforcing activities with their children and be less likely to "reject" them. We also tested whether CC and FSP intervention parents would be more likely to monitor their children and less likely to engage in inconsistent discipline. We did not find significant intervention effects on parent monitoring and inconsistent discipline (i.e., $p > .05$). We did, however, find significant FSP and CC intervention effects on rejection, CC, $t(227) = 2.10$, $p < .04$; FSP, $t(235) = 2.02 < .05$, and reinforcement, CC, $t(227) = 1.97$, $p < .05$; FSP, $t(235) = 2.13 < .04$, in the expected direction. That is, relative to controls, FSP and CC intervention parents reported less rejection and greater involvement in reinforcing activities with the target child. Once we established the impact of the interventions on parent rejection and reinforcement, we examined the relationship between the sixth-grade rejection and reinforcement constructs and the change score representing the improvement in the early risk behaviors (Table 4). We found the expected significant relationship between the change score and parent rejection, but not reinforcement. We then tested whether the intervention effects on parent rejection were mediated through the change in the early risk behaviors, which proved to be the case for both the CC, without mediator, $t(227) = 2.10$, $p < .04$, $\beta = 0.19$; with mediator, $t(225) = 2.00$, p less than or equal to $.08$, $\beta = .16$, and FSP without mediator, $t(235) = 2.02$, $p < .05$, $\beta = 0.16$; with mediator $t(233) = 1.67$, p less than or equal to $.10$, $\beta = .13$, interventions. Subsequently, we examined whether the rejection construct was significantly associated with the sixth-grade outcome variables that the CC and FSP interventions had a significant impact upon (see Table 4). Finally, where we found a significant relationship between the rejection construct and the outcome variable, we then tested whether the intervention effects were reduced in significance and magnitude when both the early risk behavior change score and the rejection construct were included in the model. As can be seen in Table 5, the significance level and the size of the intervention coefficient decreased in all cases.

DISCUSSION

In this study, we examined the impact of two universal, school-based preventive interventions on their distal targets of conduct problems and disorder. Relative to controls, by the spring of sixth grade, children assigned to the CC intervention were significantly less likely to have a lifetime diagnosis of conduct disorder, to have been suspended from school, and to have received, or been judged in need of, mental health services. Moreover, both CC and FSP children were rated by teachers as exhibiting lower levels of conduct problems in sixth grade than standard setting, or control, children. Finally, FSP intervention girls were significantly less likely to have been suspended in sixth grade than control girls.

Consistent with the tenets of life course social field theory and the organizational theory of development, we

found evidence to suggest that the impact of the interventions on their distal targets was in part mediated by improvement in the early risk behaviors of attention/concentration problems and shy and aggressive behavior. That is, it appears that success in meeting the early demands for authority acceptance, attention to task, and social participation presages social adaptational success at a later stage in development. Nevertheless, the effects of the interventions on the distal outcomes were at best only partially mediated by the reduction in the early risk behaviors. This finding may in part be due to measurement error in the measures of the immediate and distal impacts. However, it also may be the case that intervention children and parents were not called upon to employ the skills acquired via the interventions until middle school. Relatedly, Patterson et al. (1992) posited a second pathway to antisocial behavior and conduct disorder that begins in the pre- to early adolescent years. A disruption in parental supervision and discipline brought on by an event such as a divorce or parental conflict might result in the late onset of antisocial behavior on the part of the child. It may be the case for some children that the problem-solving skills taught in the CC intervention are not called upon until the transition to middle school, when they may be placed in a classroom that is poorly managed by the teacher or has a significantly greater preponderance of antisocial children than the child experienced in earlier grades. The poor management skills of the teachers or the greater preponderance of antisocial children may require the child to call upon problem-solving skills to self-regulate his or her own behavior as well as to resolve conflicts with classmates.

In line with Patterson et al. (1992), we had also hypothesized that as a result of the beneficial impact of the CC and FSP interventions on the early risk behaviors, we would see reduced parental rejection and greater reinforcement of child behavior in early adolescence. Moreover, intervention parents would be more consistent in their discipline of their children and would monitor their children's behavior more closely. Although we did not find an intervention effect on sixth-grade parent monitoring and consistent discipline, we did find an effect on positive reinforcement and rejection for both interventions, with CC and FSP intervention parents reporting less rejection and greater involvement in reinforcing activities with their children at age 12. In turn, we found evidence to suggest that the impact of CC intervention on teacher-rated conduct problems, conduct disorder, and school mental health service use was mediated at least in part by parent rejection. This also proved to be the case for the FSP intervention, at least in the case of teacher-rated conduct problems.

These findings raise the question of why we would see these more positive outcomes for the CC and FSP intervention children relative to controls, given there were no differences between CC and FSP intervention and control parents in terms of monitoring and discipline. It may be that asking parents to report on their monitoring and discipline practices elicited socially desirable responses, more so than for the rejection and reinforcement questions. Consequently, parents might have reported inflated levels of monitoring and supervision. Alternatively, assuming that the parent reports of monitoring and discipline were reasonably accurate, part of the answer may lie in the fact that children whose relationship with their parents is characterized by rejection may not receive consistent reinforcement from parents for prosocial behaviors (e.g., obeying parents and teachers, getting along with siblings and classmates, and paying attention at school). Rather, the predominant form of managing the child's behavior is through punishment, which in itself will not lead to the learning of new behaviors. As a result, such children may fail to develop the "social survival skills" that Patterson et al. (1992) have argued are necessary for successful adaptation to the demands of parents, teachers, and mainstream peers during the adolescent years.

These social survival skills, which include the ability to monitor and manage one's own behavior in the absence of direct adult supervision, may be critically important during the adolescent years because children spend increasingly more time unsupervised by adults (Capaldi & Patterson, 1996). Even in the school setting, the larger class sizes seen in middle and high school may make it difficult for teachers to provide close supervision of any one child's behavior. In addition, the physical movement from class to class in middle and high school may not only make it harder to adequately monitor child behavior but also provide adolescents with increased opportunities for engaging in antisocial behavior in concert with deviant peers or classmates. Thus, the adolescent with limited social survival skills may be more likely to engage in antisocial behavior outside of the close and direct supervision of adults.

As did Ialongo et al. (1999), we found that the impact of the FSP intervention on its distal targets was less broad than the CC intervention. One possible explanation is that the CC teachers received 60 hours of training and direct supervision in the use of the CC intervention, whereas parents were offered a total of nine workshop sessions of approximately 90 minutes in length. Parents did have access to their child's teacher and school mental health worker outside of the workshops through the "Warm Line," but this probably was no substitute for the one-on-one contact the teachers were provided. Moreover, the CC intervention trainers only had to deal with nine teachers, as opposed to the FSP teachers and school mental health professionals, who were dealing with

more than 180 parents, each varying in terms of their competencies, skills, life stresses, and motivation to participate. To provide the entire population of first-grade parents with as much training as the CC teachers received is not feasible from a logistical or cost standpoint. Indeed, asking parents, the majority of whom have well-behaving children, to attend 60 hours of workshops on parenting and FSPs is likely to lead to little or no participation and overwhelm the resources available to schools for parent involvement.

As also indicated by Jalongo et al. (1999), we believe the optimal design for school-based universal preventive interventions would include a combined focus on the classroom and the FSP, along with the nesting of selective and indicated interventions within the universal intervention. The universal preventive intervention could act as the docking mechanism for the selective and indicated interventions; that is, the universal intervention could serve as the means to identify children in need of the latter interventions, via the assessment tools built into the universals to assess intervention response.

In this article we reported only on the results of the intention to treat analyses. Currently, we are unaware of a statistically acceptable way of taking into account intervention compliance in analyzing data from an intervention trial similar to ours. What is sometimes done in the literature is to divide the intervention participants into compliers and noncompliers and then compare them to each other and to the control group. But a major disadvantage of this approach is that one negates the benefits of randomization of participants to condition (Little & Yau, 1998); that is, the assumption of randomization underlying the standard analytic techniques used in intervention trials, such as analysis of variance, is violated (Little & Yau, 1998). Little & Yau offered a statistically appropriate way of analyzing data from prevention trials in the presence of noncompliance. However, in their example compliance is measured in categorical terms--whether an unemployed adult attended a workshop on finding a job. Moreover, the data set used by Little and Yau did not involve nested or clustered data. In the present study, the measures of compliance used are continuous, and the children, teachers, and parents are clustered within schools. In addition, implementation in the CC intervention was measured at the level of the teacher and not the student. Consequently, the sample size for a compliance analysis is quite small ($n = 9$). Finally, in the present study there were no teachers who did not implement at least some of the classroom-intervention and only a very few parents who did not attend at least one FSP intervention workshop. Consequently, the cell size for the noncompliers is extremely small and the distribution of compliance scores is relatively narrow. Each of these issues will need to be addressed before a methodologically sound analysis of the relationship between intervention compliance and outcome can be provided.

In terms of the study's limitations, although the sixth-grade teachers were not aware of children's first-grade intervention status, parents and children were. As such, in contrast to their counterparts in the standard setting condition, parents and children in the FSP and CC intervention conditions might have been biased toward reporting few conduct problems in sixth grade. Nevertheless, we did find significant intervention effects on sixth-grade outcomes derived from teacher and school mental health professional reports. Direct observations of child behavior by independent observers would have overcome the bias associated with parent and child self-report. Moreover, direct observation of parent-child and teacher-child interactions might have also allowed for a more precise delineation of the potential mechanisms for the intervention effects found. However, with a study population as large as this, the costs of such an assessment would have been prohibitively expensive--particularly in light of the fact that the children had dispersed to more than 100 schools and 18 states since the end of first grade.

To summarize, both the CC and FSP interventions proved effective in reducing antisocial behavior at Grade 6. The CC intervention appeared to be the more effective of the two interventions in terms of the magnitude and breadth of intervention effects. Nevertheless, it may be the case that the combination of the CC intervention produces additive or even synergistic effects. Consequently, these results should not be used to argue against universal, school-based FSP interventions such as described here. Moreover, it may be the case that the effects of the FSP intervention will be more apparent during the late adolescent years, when the rates of conduct disorder and antisocial behavior tend to increase dramatically.

Note

Due to missing parent report data at Grades 1 and/or 6 and/or missing teacher report data at Grade 2, the sample sizes for the mediational analyses were smaller (CC vs. Controls, $n = 246$; FSP vs. Controls, $n = 254$) than that for the initial analyses of the sixth-grade outcomes (CC vs. Controls, $n = 333$; FSP vs. Controls, $n = 338$). An examination of the differences between those with complete versus missing data in terms of teacher

ratings of the early risk behaviors and math and reading achievement at baseline revealed no significant differences within intervention condition. The trend, however, was for those with complete data to have slightly lower levels of the teacher-rated early risk behaviors at baseline than those with missing data. The largest difference was about a 1/4 standard deviation. We also tested whether there were significant differences in terms of parenting practices at baseline. The only significant difference found was among the controls, with those with complete data having a higher level of parent-reported positive reinforcement at baseline than those with missing data.

In general the p-levels for the significance tests of intervention impact reported in Table 5 increased in size from those reported in Table 3. This is particularly true for a lifetime diagnosis of conduct disorder and school-based mental health service use, where the p-levels increased from .044 to .055 and .037 to .053, respectively. In general, however, the size of the intervention coefficients did not change substantially in terms of magnitude, suggesting the smaller number of subjects available for the analyses might have led to the increase in significance levels.

TABLE 1

Baseline Characteristics of the Study Population by Design and Gender

Legend for Chart:

- A - Characteristics
- B - Classroom-centered: Overall
- C - Classroom-centered: Boys
- D - Classroom-centered: Girls
- E - Family-school partnership: Overall
- F - Family-school partnership: Boys
- G - Family-school partnership: Girls
- H - Standard setting: Overall
- I - Standard setting: Boys
- J - Standard setting: Girls

A	B	C	D
	E	F	G
	H	I	J
Reading achievement			
M	38.97	37.88	41.04
	40.97	40.45	40.91
	39.37	38.03	40.62
SD	17.71	17.50	16.51
	20.62	20.78	21.17
	18.71	18.43	18.60
Math achievement			
M	37.13	35.51	39.35
	39.03	37.03	40.35
	39.43	36.90	42.45
SD	19.99	21.31	21.31
	24.57	23.84	24.66
	21.94	20.85	23.22
Teacher total problems:			
Early risk behaviors			

M	2.53	2.65	2.37
	2.24	2.36	2.12
	2.08	2.25	1.91
SD	0.91	0.90	0.88
	0.82	0.85	0.78
	0.91	0.96	0.84
Monitoring			
M	1.14	1.13	1.16
	1.14	1.12	1.16
	1.16	1.18	1.14
SD	0.36	0.30	0.35
	0.38	0.35	0.42
	0.32	0.40	0.34
Discipline			
M	2.02	1.93	2.15
	2.05	2.02	2.14
	2.08	2.01	2.07
SD	0.75	0.68	0.76
	0.74	0.77	0.72
	0.72	0.69	0.81
Rejection			
M	1.94	1.99	1.87
	1.87	1.94	1.80
	1.90	1.89	1.92
SD	0.49	0.53	0.42
	0.50	0.47	0.51
	0.52	0.46	0.59
Reinforcement			
M	2.15	2.15	2.14
	2.10	2.09	2.10
	2.02	2.07	1.98
SD	0.51	0.50	0.52
	0.50	0.48	0.53
	0.51	0.50	0.52
Age			
M	6.20	6.21	6.18
	6.25	6.29	6.20
	6.25	6.26	6.24
SD	0.34	0.33	0.35
	0.37	0.43	0.29
	0.36	0.38	0.33

% Receiving free lunch	68.4	75.2	60.2
	67.4	62.3	67.3
	71.0	73.6	75.2
% African American	87.2	88.3	85.8
	83.8	82.6	85.3
	83.5	80.3	86.8

TABLE 2

Odds Ratios and 95% Confidence Intervals for Outcome Analyses

Legend for Chart:

- A - Outcome variable
- B - Classroom-centered vs. control: Overall or interaction, O.R. (C.I.)
- C - Classroom-centered vs. control: Boys, O.R. (C.I.)
- D - Classroom-centered vs. control: Girls, O.R. (C.I.)
- E - Family-school partnership vs. control: Overall or interaction, O.R. (C.I.)
- F - Family-school partnership vs. control: Boys, O.R. (C.I.)
- G - Family-school partnership vs. control: Girls, O.R. (C.I.)

A		B		C
		D		E
		F		G
Lifetime diagnosis conduct disorder	0.42 (0.18-0.98)	--	0.69 (0.32-1.49)	--
		--		--
Parent report				
Lifetime receive mental health services	0.53 (0.38-0.76)	--	0.66 (0.32-1.32)	--
		--		--
Teacher report				
Suspension Grade 6	0.73 (0.56-0.95)	--	0.59 (0.35-0.97)	--
	1.13 (0.61-2.09)	--	0.38 (0.17-0.86)	--
Need mental health services Grade 6	0.37 (0.20-0.70)	--	0.72 (0.47-1.11)	--
		--		--
School mental health professional report		--		--
		--		--
Receive mental health services Grade 6	0.56 (0.32-0.99)	--	0.66 (0.32-1.33)	--
		--		--

Note. O.R. = odds ratio; C.I. = confidence interval.

TABLE 3

Test Statistics, p levels, and Coefficients With and Without the Change in the Early Risk Behaviors as a Mediator

Legend for Chart:

A - Outcome variable
 B - CC w/o mediator: Test statistic
 C - CC w/o mediator: p
 D - CC w/o mediator: Coefficient
 E - CC w/mediator: Test statistic
 F - CC w/mediator: p
 G - CC w/mediator: Coefficient
 H - FSP w/o mediator: Test statistic
 I - FSP w/o mediator: p
 J - FSP w/o mediator: Coefficient
 K - FSP w/mediator: Test statistic
 L - FSP w/mediator: p
 M - FSP w/mediator: Coefficient

A	B	C	D	E	F	G
	H	I	J	K	L	M
Teacher-rated conduct problems	3.04 2.63	< .02 < /= .03	0.27 0.21	1.87 2.04	< .10 < .08	0.15 0.19
Lifetime conduct disorder diagnosis	1.92 --	< .06[a] --	1.08 --	1.52 --	< .09 --	0.86 --
School suspension	3.38 --	< .01 --	1.02 --	2.27 --	< .02 --	0.87 --
School mental health services use	1.93 --	< .06[b] --	0.53 --	1.42 --	< .16 --	0.36 --
Parent report of lifetime mental health service use	3.49 --	< .01 --	1.10 --	2.93 --	< .01 --	0.87 --
Parent report of Teacher report of the need for mental health service use	3.49 2.93	< .01 < .01	1.10 1.02	2.93 2.05	< .01 < /= .04	0.87 0.72

Note. CC = classroom-centered intervention; FSP = Family-School Partnership intervention.

a p = .055. b p = .053.

TABLE 4

Test Statistics and p levels for Parenting Constructs at Grade 6 by Grade 6 Outcome Variables

Legend for Chart:

A - Outcome variables
 B - Rejection: Z/t statistic
 C - Rejection: p
 D - Positive reinforcement: Z/t statistic
 E - Positive reinforcement: p

A	B	C	D	E
Change in early risk behaviors	3.14	< .01	0.94	.35
Teacher-rated conduct problems	6.21	< .001	2.83	< .01
Lifetime diagnosis of conduct disorder	5.58	< .001	2.01	< .05
School suspension	3.61	< .001	1.77	< .08
School mental health service receipt	2.53	< .02	1.26	.10
Parent report of child lifetime mental health service use	4.32	< .001	2.35	< .02
Teacher report of the need for child mental health services	4.32	< .001	2.47	< .02

TABLE 5

Test Statistics, p levels, and Coefficients With and Without the Change in the Early Risk Behaviors and Parent Rejection as Mediators

Legend for Chart:

A - Outcome variable
 B - CC w/o mediator: Test statistic
 C - CC w/o mediator: p
 D - CC w/o mediator: Coefficient
 E - CC w/mediator: Test statistic
 F - CC w/mediator: p
 G - CC w/mediator: Coefficient
 H - FSP w/o mediator: Test statistic
 I - FSP w/o mediator: p
 J - FSP w/o mediator: Coefficient
 K - FSP w/mediator: Test statistic
 L - FSP w/mediator: p
 M - FSP w/mediator: Coefficient

A	B	C	D	E	F	G
	H	I	J	K	L	M
Teacher-rated conduct problems	3.04	< .04	0.27	1.32	< .27	0.11
	2.84	< .03	0.23	2.14	< .07	0.14
Lifetime conduct disorder diagnosis	1.92	< .06[a]	1.08	1.35	< .18	0.78
	--	--	--	--	--	--
School suspension	3.39	< .01	1.02	1.93	< .06	0.60
	--	--	--	--	--	--
School mental health services use	1.93	< .06[b]	0.53	1.08	< .28	0.37
	--	--	--	--	--	--

Parent report of lifetime mental health service use	3.48 --	</= .01 --	1.10 --	1.82 --	< .07 --	0.71 --
Teacher report of the need for mental health service use	2.93 --	< .01 --	1.02 --	1.73 --	< .09 --	0.62 --

Note. CC = classroom-centered intervention; FSP = Family-School Partnership.

a $p = .055$. b $p = .053$.

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