Prevention Science, Vol. 3, No. 2, June 2002 (© 2002)

Early Elementary School Intervention to Reduce Conduct Problems: A Randomized Trial With Hispanic and Non-Hispanic Children

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Children's aggressive behavior and reading difficulties during early elementary school years are risk factors for adolescent problem behaviors such as delinquency, academic failure, and substance use. This study determined if a comprehensive intervention that was designed to address both of these risk factors could affect teacher, parent, and observer measures of internalizing and externalizing problems. European American ($n = 116$) and Hispanic ($n = 168$) children from 3 communities who were selected for aggressiveness or reading difficulties were randomly assigned to an intervention or no-intervention control condition. Intervention families received parent training, and their children received social behavior interventions and supplementary reading instruction over a 2-year period. At the end of intervention, playground observations showed that treated children displayed less negative social behavior than controls. At the end of a 1-year follow-up, treated children showed less teacher-rated internalizing and less parent-rated coercive and antisocial behavior than controls. The study's limitations and implications for prevention are discussed.

KEY WORDS: children; conduct problems; Hispanics; intervention; randomized trial.

INTRODUCTION

Aggressive and uncooperative social behavior that begins in early childhood has serious long-term social and psychological consequences. Young children with conduct problems such as disobedience, tantrums, arguing, and aggression are at risk for rejection by peers, poor school performance, and escalating aggressive behavior (Patterson *et al.*, 1992). Over time, they also face increased risk for association with deviant peers, failure in school, high-risk sexual behavior, and excessive alcohol and drug use (e.g., Fergusson *et al.*, 1994; Patterson *et al.*, 1992). As adults, antisocial individuals frequently have poor occupational adjustment, low educational attainment, marital disruption, poor physical health, increased risk of psychiatric impairment (McMahon & Wells, 1989), elevated rates of violence against women (Fagot *et al.*, 1988), and a high suicide rate (Puig-Antich, 1982). Thus, the development and evaluation of strategies for reducing aggressive behavior are high priorities for prevention research.

This paper describes the Schools and Homes in Partnership (SHIP) program, a comprehensive intervention to reduce conduct problems among early elementary school children. Drawing from research on social behavior interventions (Taylor *et al.*, 1999), parent training (McNeil *et al.*, 1991; Taylor & Biglan, 1998), and academic instruction (Francis *et al.*, 1996; Kellam *et al.*, 1998), the SHIP program focused on three promising strategies for preventing conduct problems among young children. This section highlights the research base for the strategies and provides a rationale for their inclusion in SHIP.

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Parent Training

Behavioral parenting interventions have been shown to ameliorate early conduct problems (Taylor & Biglan, 1998). A meta-analysis of 26 studies, (Serketich and Dumas, 1996) reported an effect size of .86 for the effects of such interventions on children's aggressive or disruptive behavior. Although parent training interventions have achieved larger improvements on children's behavior at home than at school, modest improvements have also been found for children's school behavior (McNeil *et al.*, 1991; Webster-Stratton *et al.*, 1988).

Social Behavior Interventions

A second strategy is to modify the social and cognitive behaviors that are associated with aggressive behavior. These interventions generally focus on helping children deal with social situations that may prompt aggressive behavior by teaching them an alternative problem-solving sequence, providing models of appropriate cognitive and social behavior with opportunities to practice, and reinforcing their use of appropriate behavior. The social behavior interventions that appear to produce the strongest results are those that make extensive use of modeling and role-playing techniques. In reviewing evaluations of social behavior programs, Taylor *et al.* (1999) concluded that there is weak support for the value of such interventions. They suggest that such interventions might not be sufficient by themselves, but might be valuable components of more comprehensive interventions.

Supplemental Reading Instruction

A third strategy for preventing the development of behavior problems is to ensure the academic success of children through effective instructional techniques. Comprehensive interventions to prevent aggressive behavior that include an instructional component have had a beneficial impact on social behavior (Conduct Problems Prevention Research Group, 1999a,b; Hawkins *et al.*, 1991; Ialongo *et al.*, 1999; Kellam *et al.*, 1998). For example, Kellam *et al.* (1998) found that Mastery Learning techniques improved achievement for early elementary school boys and girls and that, among boys, improvements in achievement were also associated with a reduction in teacher-rated aggression.

It might be particularly important to target reading skills among early elementary school students. Reading is fundamental to academic success, and children who fail to attain an adequate level of basic reading skills by Grade 3 have only a minimal probability of catching up to their average-achieving peers (Francis *et al.*, 1996; Slavin *et al.*, 1994). Although there is insufficient evidence to conclude that reading disability causes aggressive or delinquent behavior, some findings suggest that reading difficulty may be associated with problem behavior as well as academic failure (e.g., Maughan *et al.*, 1996). For example, Smart *et al.* (1996) found that second graders who had both reading and behavior difficulties were more likely to continue to have behavior problems than children with behavior problems only.

Learning From Variations in Ethnicity and Gender

Kellam and Van Horn (1997) commented that "an important focus for the next generation of prevention studies will be to identify which participants benefit from a particular intervention and which ones are less affected" (p. 183). They noted that their experience with the Baltimore Prevention Trials showed that intervention effects were conditioned by subject and contextual factors such as gender, baseline levels of aggressive behavior, and classroom characteristics. Ethnicity is another factor that should be evaluated to determine the external validity of preventive interventions that are developed with predominantly European American samples (Sue, 1999). To date, there have been several studies that evaluated the effectiveness of preventive interventions when they were applied to ethnic minority participants (Botvin *et al.*, 1995, 1997; Kumpfer *et al.*, 1996; Tolan & McKay, 1996). Some studies (such as the present one) evaluated the efficacy of intervention methods with ethnic minority participants after the intervention methods had shown efficacy with majority participants (e.g., Botvin *et al.*, 1997; Kumpfer *et al.*, 1996). In essence, those studies evaluated the external validity of the initial intervention trials. Other studies evaluate "culturally specific" or "culturally focused" interventions that are designed to incorporate specialized content or intervention methods that are particularly relevant for a cultural group. For example, Botvin *et al.* (1995) developed a culturally focused preventive intervention for urban African-American and Hispanic junior high school students that used storytelling, video, and peer leaders. These media and the contents of

stories that were used to teach skills were thought to be particularly relevant to the life experiences of those ethnic minority youth. Results of that research supported the efficacy of the culturally focused intervention.

A unique aspect of SHIP was the inclusion of Hispanic boys and girls, most of whom were Mexican American. Three communities were invited to participate because they contained sizeable numbers of Hispanic families, many of whom spoke Spanish as their dominant language. Pragmatically, it is important to create and validate the tools of prevention research (such as Spanish-language intervention materials and assessment measures) that can be used with large segments of communities that would otherwise be unserved with existing prevention methods. For theory development, it is valuable to use diverse groups to establish the external validity of models that show how interventions are related to putative mediators and to outcome variables (Barrera *et al.*, 1999). After making the intervention materials and personnel appropriate for work with Hispanic families and students, we predicted that the comprehensive intervention would be as effective for Hispanics as it was for European Americans in reducing internalizing and externalizing behaviors of students.

METHOD

Overview of the Design

Hispanic and European American students in kindergarten through third grade in three communities were screened for aggressive behavior and reading difficulties. Those who met criteria in at least one of these areas were randomly assigned to receive or not receive an intervention that included parent training, social behavior interventions, and reading instruction. These intervention activities were provided over 2 years. In addition to the screening, there were four assessment periods: prior to the beginning of intervention (T1), at the end of the first academic year (T2), at the end of the second academic year when intervention activities stopped (T3), and 1-year following the end of intervention (T4). Assessments included measures of students' internalizing and externalizing problems that were evaluated through teacher ratings, parent ratings, and behavioral observations at school. The T2 assessment was not used in the present analyses because not all participants completed parenting and social behavior interventions until T3.

Communities

Three communities in the northwest (A, B, & C) participated in SHIP. Based on 1990 census data, their populations were 4,632 in A, 13,559 in B, and 13,404 in C. The representation of Hispanics in the communities were 10.5% in A, 9.2% in B, and 31.5% in C. The communities were selected because they had significant numbers of Hispanic residents. All of the public elementary schools within each of the three communities were approached and invited to participate. One of five schools in community A, six of seven schools in community B, and four of four schools in community C participated in this research.

Screening Procedures

All students in kindergarten, first, second, and third grade in participating schools were screened for aggressive behavior and reading difficulties. Of the 3,284 students who were eligible to be screened, 2,988 were actually screened. The parents of 296 children declined screening. A two-stage screening procedure was used to insure that students would show at least one of the risk factors (aggressiveness or reading difficulties) that were hypothesized as antecedents to adolescent problem behavior (Barrera *et al.*, 1999). First, children were eligible for SHIP if they were above the 95th percentile (t score of 67) on the Teacher's Rating Form of the Child Behavior Checklist's Aggression Scale (CBCL; Achenbach, 1991). Second, if students did not meet criteria on aggressive behavior, they were eligible if they showed evidence of marked reading difficulties on a composite of screening measures. After removing the children who met criteria on aggressiveness, children were eligible if they scored in the lowest 5% of the reading score distribution in their grade level in their school. Of the students meeting criteria, 43.4% met criteria for aggressiveness at the first stage of screening while 56.6% met criteria for reading difficulties in the second phase.

Participants

A total of 364 students met screening criteria across the four grades. To protect confidentiality, the schools contacted the 364 eligible families to obtain their permission for the research project staff to call or visit them. The schools' recruiters could not locate 19 students, 9 students were excluded because they had a sibling in the study, and 4 declined participation.

A total of 332 families agreed to have their names released to the research staff. When these families were contacted by research staff recruiters, 306 agreed to participate, 5 had relocated, and 21 declined participation. Prior to randomization, an additional 21 families declined participation.

A total of 285 families agreed to participate in SHIP and were randomized into either the intervention or control condition, but one family assigned to the intervention condition declined before the start of intervention. Thus, there were 141 families in the intervention and 143 in the control condition; 77% of eligible families actually participated in the study. There were 168 Hispanic children and 116 European American children; 45% of the sample were girls.

Hispanic parents provided information about their ethnic identity, nativity, and language use. These data indicated that 94% of the Hispanic parents were of Mexican heritage, 5% from Central America, and the remainder from some other Latin American country. About 9% were born in the United States, 85% were born in Mexico, and the remainder in some other Latin American country; 84% of Hispanic parents spoke only or mostly Spanish.

Intervention Procedures

There were three intervention components: parent training, social behavior interventions, and supplemental reading instruction. The screening measures were used to ensure that participants met the eligibility criteria on at least one of the risk factors; they were not used to channel students into specific intervention components. All families and students assigned to the intervention condition were offered parent training and social behavior interventions; 72 and 74% of participants received these components, respectively. All students who were reading below grade level (97% of the sample) were offered and received supplemental reading instruction. Ultimately, 86% received reading instruction and at least one of the components designed to decrease conduct problems (i.e., parent and social behavior interventions). Participants received intervention components between T1 and T3.

Parent Training

The Incredible Years parenting program was provided in 12–16 sessions (Webster-Stratton, 1992b). Groups of 5–14 parents met weekly for 2.25 hr with two (or occasionally three) facilitators. Incredible Years included 10 videotape programs that contained nearly 250 unrehearsed vignettes, each lasting 1–2 min. Tapes illustrated topics such as how to play with your child, effective praise, tangible rewards, effective limit setting, ignoring, time-out, logical consequences, and preventive strategies. Groups watched videotaped vignettes of parent–child interactions, discussed effective parenting methods, and role-played preferred strategies. Assignments to practice new skills were given each week. Childcare, dinner, and (in some cases) transportation were provided for families to make their attendance at group sessions more convenient. Groups were conducted in Spanish or English, depending on the parents' language preferences. Participants completed an average of 5.88 parent training sessions ($SD = 6.18$).

Social Behavior Interventions

Two programs were used to teach students how to manage their behavior in classrooms and in interactions with peers outside of classes. Contingencies for learning academic and social skills (CLASS; Hops & Walker, 1988) is a program designed to reduce acting-out behaviors of young children. It teaches and reinforces appropriate classroom behaviors (Walker, 1995). CLASS was implemented in three phases. During the first phase (days 1–5), a trained consultant worked individually with the target child by awarding points and praise for appropriate classroom behavior, and delivering awards that included free-time activities for the entire class when the child reached criterion. If daily CLASS sessions at school were successful, the child also earned a prearranged home privilege.

Over time, the consultant's involvement was reduced and rewards were administered over longer intervals. The teacher assumed control of CLASS in the second phase (days 6–20). The third phase of CLASS ran from days 21–30. During that phase, the child received intermittent praise and recognition from the teacher and parents for socially competent performance. CLASS required direct teacher involvement for successful maintenance of the skills introduced by the consultant. As a result, we could only deliver this component to students of teachers who consented to be actively involved. Twenty students across seven schools received this component.[3]

[3]Fifteen of the 20 students also participated in Dinosaur School.

Table 1. Internal Consistency Reliabilities of Measures for the Total Sample and for the Non-Hispanic and Hispanic Subsamples

Measure	Number of items	Total sample	Non-Hispanic	Hispanic
Teachers' ratings				
Externalizing (TRF)	34	.95	.94	.94
Internalizing (TRF)	35	.88	.88	.88
Parents' ratings of child's behavior				
Externalizing (CBCL)	33	.87	.86	.86
Internalizing (CBCL)	31	.83	.81	.84
Child's coercive behavior	10	.93	.92	.92
Child's antisocial behavior (daily reports)	10	.80	.80	.71

We also provided the Dina Dinosaur Social Skills Program for young children (Dinosaur School). Dinosaur School is a social skill intervention that uses puppets and video taped modeling to teach appropriate classroom and social behavior to children aged 4–8 years (Webster-Stratton, 1992a). In a randomized experiment, the program led to significant reductions in conduct problems and improved children's problem solving skills in directly observed behavior with friends more than did parent training alone (Webster-Stratton & Hammond, 1997). Dinosaur School met during after-school hours for approximately 20 sessions. Some groups met once a week for 2 hr, whereas other groups met twice a week for 2 hr. Group sizes varied from 4–10 children. Each group had at least two adult leaders; however, the largest group of 10 children had three leaders.

Supplemental Reading Instruction

Reading Mastery and Corrective Reading were used for the supplemental reading instruction because the programs have been extensively validated in small-group and whole class settings, and are effective for teaching reading to low as well as higher performing students (Adams & Engelmann, 1996). Reading Mastery and Corrective Reading teach basic reading skills using a direct instruction approach that addresses the critical skills identified by research as necessary for successful reading development (e.g., Adams, 1990; National Reading Panel Report, 2000).

Students were placed in *Reading Mastery* if they were beginning readers in first or second grade. *Reading Mastery* provides explicit instruction in phonemic awareness, sound-letter correspondence, and blending. Third-grade and fourth-grade students who had received beginning reading instruction but who were still nonreaders or who were reading below grade level were placed in *Corrective Reading*. These students also received explicit instruction in phonemic awareness, sound-letter correspondence, and blending. However, skills were taught at a faster rate and the stories were geared to the interests of older children. In both programs, most students received instruction in groups of two or three. Treatment students received 30 min of supplemental instruction daily for 4–5 months in Year 1 and 9 months in Year 2. Reading instruction was provided to all children who were screened into the study on the basis of low reading skill, and to those who were screened into the study on the basis of aggressive social behavior but who were also below grade level in reading skill on the baseline reading achievement measure. Detailed information about the reading instruction is provided in Gunn *et al.* (2000).

Measures

Table 1 lists the teacher-report and parent-report measures, and their internal consistency reliabilities. Separate reliability coefficients are presented for the European American and Hispanic subsamples.

Measures administered to parents were translated into Spanish unless a suitable Spanish translation was available. Following procedures described by Marin and Marin (1991), initial translations were backtranslated into English and compared to the original version of the measure. Discrepancies between the English and Spanish versions were identified and resulted in changes to the Spanish and, at times, the English versions of the measures to increase their similarity.

Screening Measures

Teachers' Ratings of Aggressive Behavior

The aggression scale of the Teacher Rating Form (TRF; Achenbach, 1991) was used to screen for aggressive behavior. Each child's classroom teacher

rated 25 items on 3-point scales to indicate how characteristic a behavior (e.g., "destroys property belonging to others," "gets in many fights," "physically attacks people") was of the student during the past 2 months. Extensive psychometric data are available for this and the other TRF scales (Achenbach, 1991).

Reading Skills

Students were screened for deficits in early literacy skills using subtests from the dynamic indicators of basic early literacy skills (DIBELS; Good *et al.*, 1992). The tests assessed students' abilities to identify letter names, segment words into phonemes, and identify the initial sound of the target words. Good and Kaminski (1996) provided reliability and validity data for all of the DIBELS measures. Oral reading fluency, the speed at which students read connected text, was also assessed for students in grades one and two. Students read grade-level passages that were timed to determine how many words they could read correctly in 1 min. Marston (1989) reported reliability and validity data for the reading fluency assessment.

Outcome Measures

Observations of Social Behavior Toward Peers

Social behavior during recess periods was measured with the peer social behavior (PSB) observation system (Walker *et al.*, 1994). The PSB uses a 10-s partial interval-based measurement system to record one of four types of social behaviors: (a) positive or negative social engagement, (b) positive or negative participation (i.e., structured games and activities), (c) parallel play, and (d) alone. For the present analyses, only total amount of negative social engagement and negative participation was used. Observations were conducted at T1 and T3 only.

All schools had two daily 10–20 min recess periods on a playground. Supervision was provided by one or two teachers or instructional assistants. Each participant was observed for 5–15 min segments during three separate recess periods. Scores for each behavior category were calculated by totaling the number of intervals for each category across three observations, dividing the total by the total number of observation intervals, and multiplying by 100. Interobserver reliability checks were conducted at T1 and T3. Approximately 33% of total PSB observations during T1 and T3 assessment periods were checked for reliability (minimum standard of 80% agreement). Walker *et al.* (1994) reported the reliability and validity of the observation measure.

Teachers' Ratings of Children's Behavior Problems

Teachers completed the 118-item CBCL Teacher's Report Form (TRF; Achenbach, 1991). Teachers rated each of the items on the same 3-point scales that appeared in the parent's version of the CBCL: "not true," "somewhat or sometimes true," and "true or often true." Teachers were instructed to consider students' behavior over the previous 2 months. For analyses, two scores were used: internalizing and externalizing.

Parent Self-Report Measures

Parents' Ratings of Children's Behavior Problems

The Child Behavior Checklist (CBCL; Achenbach, 1991) is a widely used measure of parents' ratings of their children's behavior. Parents rate 118 items on three-point scales to indicate if a behavior (e.g., "lies or cheats") was "not true," "somewhat or sometimes true," or "very true or often true" of their child during the past 6 months. The reliability and validity of this measure have been well established in previous research (Achenbach, 1991). Statistical analyses used the two prominent summary scores: internalizing and externalizing.

Children's coercive behavior was assessed in relation to two situations: "when your child doesn't get what she/he wants" and "when your child doesn't want to do something she/he is asked to do." For each situation, parents were asked to rate how likely (on a 7-point scale) each of the following child behaviors would occur: talking back or arguing, getting angry, whining or crying, throwing a temper tantrum, hitting and kicking. The 7-point response scale varied from *not at all likely* to *extremely likely*. These items were written specifically for this project.

Parent Daily Report (PDR) assessments consisted of three telephone calls to one parent (usually a mother) that were separated by 2-day intervals. The PDR included 10 items that assessed the frequency of antisocial behaviors such as talking back to adults, fighting, and stealing. Parents indicated how often those behaviors occurred within the past 2 days on

a 7-point scale (0–6 or more). The PDR was adapted from the telephone interviews conducted by Capaldi and Patterson (1989).

RESULTS

Attrition

Of the 284 families who began the study, we obtained data from 259 (91.2%) at T2, 248 (87.3%) at T3, and 245 (86.3%) at T4. Attrition analyses were conducted to compare participants in the intervention and control conditions who discontinued and those who sustained participation in the study. There were no differences in attrition by gender, ethnicity or grade of child, marital status of parents, or selection criterion (aggressiveness and reading).

Overview of Analysis

Data at T3 and T4 were analyzed using analysis of covariance, with the T1 measure used as the covariate. The independent variables were intervention condition, gender, ethnicity, and the reason for children's selection (reading or aggression problems). We tested main effects of all independent variables and interactions of ethnicity, selection, and gender with intervention condition. When significant interactions were detected, they were followed by simple main effects analyses comparing conditions within subgroups (defined by ethnicity, selection, or gender). Table 2 presents the results of the analyses of covariance for all outcome measures.[4]

Direct Observation Measures

At T3, there was a significant intervention effect on children's directly observed negative social behavior toward peers. Compared with their matched controls, children who received the intervention showed less negative behavior. There was also a significant interaction between intervention condition and the reason for the child's selection. Those participants who were selected because of aggressiveness showed a significant intervention effect, $F(1, 90) = 8.808$, $p < .004$, $f = .31$, while those selected for reading difficulties did not. As noted above, direct observation assessments were not conducted at T4.

Teacher Ratings

There were no significant effects for teacher ratings of externalizing on the TRF at either T3 or T4. For teacher-rated internalizing symptoms on the TRF, there was a significant interaction between the intervention and ethnicity at T4. Simple main effects analysis showed that there were no intervention effects for Hispanic children. However, for non-Hispanic children, those in the intervention condition had lower internalizing symptoms than those in the control condition, $F(1, 85) = 5.086$, $p < .027$, $f = .24$.

Parent Ratings of Children's Behavior

At T3 there was a significant interaction between condition and ethnicity on the CBCL externalizing scale. However, simple main effects were not statistically significant. Similarly, there was a significant interaction between gender and intervention condition on CBCL internalizing scale at T3. The simple main effect for girls approached significance, $F(1, 82) = 2.804$, $p < .098$, $f = .18$, with girls in the intervention condition having lower levels of internalizing problems. There were no significant intervention effects on the CBCL at T4.

For parent reports of children's coercive behavior there were significant intervention effects at both T3 and T4. At T3 there was a significant interaction of condition and ethnicity on parent reports of children's coercive behavior. However, neither of the simple effects were significant. At T4, children who received the intervention were rated as lower in coercive behavior than were children in the control condition, $F(1, 190) = 5.603$, $p < .05$, $f = .18$.

Finally, for the parent daily report of antisocial behavior, there was no effect at T3, but a significant effect at T4, with intervention children having lower levels of antisocial behavior than children in the control group, $F(1, 194) = 11.078$, $p < .001$, $f = .24$.

[4]In addition to the effects shown in Table 2, we tested for grade and Grade × Intervention interactions. Results showed that there were no main effects for grade and one (of 13) significant interaction effects for Grade × Intervention interactions. This isolated interaction appeared when T4 parent-rated externalizing was the dependent variable. Tests of simple effects showed that there was a trend for intervention participants in grades K, 1, and 3 to show lower parent-rated externalizing than controls at T4. However, intervention participants in grade 2 showed significantly higher parent-rated externalizing than controls at T4.

Table 2. Analysis of Covariance Results for all Independent and Dependent Variables at T3 and T4

	T3		T4	
	F	Size, f^a	*F*	Size, f^a
Peer social behavior percent SE(−)+	$df = (1, 193)$			
Condition	7.049**	.19		
Ethnicity	0.059	.02		
Selection	4.385*	.15		
Gender	6.155*	.18		
Ethnicity interaction	3.252	.18		
Selection interaction	8.303**	.21		
Gender interaction	2.479	.11		
Teacher report of child behavior				
TRF externalizing			$df = (1, 206)$	
Condition	0.954	.07	0.273	.04
Ethnicity	0.102	.02	4.672*	.15
Selection	8.878**	.21	2.110	.10
Gender	3.608	.13	4.568*	.15
Ethnicity interaction	0.083	.02	0.995	.07
Selection interaction	1.437	.08	0.057	.02
Gender interaction	0.011	.01	0.145	.03
TRF internalizing	$df = (1, 200)$		$df = (1, 206)$	
Condition	0.110	.02	3.240	.13
Ethnicity	1.600	.09	29.751**	.38
Selection	8.349**	.20	0.001	.00
Gender	0.044	.01	0.681	.06
Ethnicity interaction	1.861	.10	4.029*	.14
Selection interaction	0.528	.05	0.366	.04
Gender interaction	0.040	.01	1.494	.09
Parent report of child behavior				
CBCL externalizing	$df = (1, 188)$		$df = (1, 184)$	
Condition	0.658	.06	0.122	.03
Ethnicity	5.209*	.17	8.503*	.21
Selection	0.312	.04	0.893	.07
Gender	0.292	.04	0.513	.05
Ethnicity interaction	4.169*	.15	0.697	.06
Selection interaction	0.630	.06	0.383	.05
Gender interaction	3.691*	.14	1.605	.09
CBCL internalizing	$df = (1, 188)$		$df = (1, 184)$	
Condition	0.042	.02	0.941	.07
Ethnicity	5.330*	.17	0.602	.06
Selection	1.183	.08	0.614	.06
Gender	0.115	.02	0.229	.04
Ethnicity interaction	1.031	.07	0.281	.04
Selection interaction	0.044	.02	0.439	.05
Gender interaction	5.040*	.16	1.195	.08
Child coercive behavior	$df = (1, 190)$		$df = (1, 181)$	
Condition	0.077	.02	5.603*	.18
Ethnicity	6.265*	.18	11.259**	.25
Selection	0.074	.02	0.026	.01
Gender	0.562	.05	0.657	.06
Ethnicity interaction	4.134*	.15	0.824	.07
Selection interaction	2.721	.12	2.615	.12
Gender interaction	0.046	.02	0.148	.03
Parent daily report of child antisocial	$df = (1, 208)$		$df = (1, 194)$	
Condition	0.428	.05	11.078**	.24
Ethnicity	0.948	.07	2.893	.12
Selection	1.082	.07	1.145	.08
Gender	4.268*	.14	0.539	.05
Ethnicity interaction	3.161	.12	0.018	.01
Selection interaction	0.011	.01	0.687	.06
Gender interaction	0.538	.05	0.652	.06

Note. All interactions shown are interactions with the intervention condition. All models contained 11 between-subjects effects, omitting Ethnicity × Selection, Ethnicity × Gender, Selection × Gender, and the covariate from this table.

[a]Effect size statistic f computed from ANCOVA tables according to formulas included in Rosenthal and Rosnow (1991).

*$p < .05$. **$p < .01$.

DISCUSSION

The results of this study provide some support for the efficacy of a comprehensive intervention to reduce and prevent the further development of conduct problems among children in early elementary school. An intervention combining several previously validated interventions to reduce behavior problems (Hops & Walker, 1988; Webster-Stratton, 1984; Webster-Stratton & Hammond, 1997) and improve reading (Adams & Engelmann, 1996; Stahl & Miller, 1989) was able to achieve significant gains in several key areas. At the end of the intervention phase (T3), the intervention had beneficial effects on directly observed negative social behavior toward peers for children who had been selected for high levels of aggressive behavior at the start of the study. By the 1-year follow-up (T4), the intervention resulted in lower teacher ratings of internalizing behavior among non-Hispanic children, and lower parent ratings of children's coercive and antisocial behavior. It is noteworthy that intervention effects were found for both externalizing and internalizing symptoms, and for data derived from parents, teachers, and observers.

The most important effect of the intervention might have been its reduction in the rate of directly observed negative behavior toward peers. Negative social behavior toward peers has been shown to lead to social rejection by prosocial peers and to a greater likelihood of association with deviant peers in later life (Patterson *et al.*, 1992). Patterson and Forgatch (1995) found that the best predictor of future arrests among conduct-problem children was the level of directly observed aversive behavior at the end of treatment. These researchers noted that teacher and parent ratings of the child's behavior on questionnaires did not predict later arrests. Thus, the improvements on directly observed behavior found in this study might be more predictive of later benefits of the intervention in preventing antisocial behavior than teacher and parent reports.

It is also important to note that effects were observed at the 1-year follow-up for parents' ratings of children's coercive behavior and parents' daily reports of children's antisocial behavior, despite the absence of effects on these measures immediately after the intervention. Those results exemplify "sleeper effects" reported in other prevention trials (Kellam *et al.*, 1994; Tremblay *et al.*, 1995). For example, Kellam *et al.* (e.g., Kellam *et al.*, 1994) found small initial differences in disruptive behavior at the end of first grade as a result of a classroom behavior-management intervention, but these differences grew through the sixth grade. In sum, sleeper effects in preventive interventions focused on elementary school children with disruptive behavior problems are fairly common. They suggest the possibility that intervention effects observed in this study might increase over future assessments.

One of the unique aspects of this study was the inclusion of Hispanic families. This was a subsample of primarily foreign-born parents whose primary language was Spanish. Providing the intervention to these families and conducting the assessments required the creation of Spanish-language intervention materials, the training of bilingual–bicultural staff, and the translation of measures. There were deliberate efforts to make the previously evaluated interventions culturally sensitive, but they were not culturally specific (cf., Botvin *et al.*, 1995). In the end, there was only one clear interaction between the intervention condition and ethnicity in which the intervention appeared to show beneficial effects on teacher-rated internalizing symptoms for European American children, but not for Hispanics. The intervention effects for conduct problems on playground observations and two parent-report measures (coercion and antisocial behaviors) were not qualified by interactions between intervention and ethnicity. These results suggested that the intervention was as successful in decreasing conduct problems for Hispanic children as it was for European American children. In this respect the study is similar to others that have found beneficial effects for validated programs that have been adapted to be effective with ethnic minority children and families (Botvin *et al.*, 1997; Brondino *et al.*, 1997; Kumpfer *et al.*, 1996).

Not all of the hypothesized effects of the intervention were observed. Intervention effects were not found for parent or teacher reports of externalizing behavior. Intervention effects might have been constrained by less-than-optimal participation in parent training and child social behavior interventions. Another limitation was the lack of teachers' participation in the CLASS intervention that reached only 20 students (and was subsequently replaced by Dinosaur school). Furthermore, differences between the intervention and control groups might have been reduced if those teachers who used CLASS also applied those procedures to students in the control condition who were in their classrooms. In general, the participation of some students in CLASS and others in Dinosaur school did not compromise the internal validity of the

study, but it did compromise the uniformity of the comprehensive intervention.[5]

Parent and teacher ratings of children's internalizing and externalizing symptoms might not be highly sensitive to intervention effects. For example, the initial evaluation of the PATHS curriculum reported no significant effects on any measures of child conduct problems (Greenberg *et al.*, 1995). The evaluation of the Second Steps curriculum reported significant effects on only a quarter of the observation measures, and no effects on teacher reports (Grossman *et al.*, 1997). Webster-Stratton (1998) found intervention effects on five of six observation measures conducted in the home, but on none of the parent or teacher reports of externalizing behavior on the CBCL-based scales. Numerous other prevention programs have similar mixed findings, especially with parent and teacher reports (Eddy *et al.*, 2000; Hundert *et al.*, 1999).

We highlight these findings not to diminish the significance of the genuinely positive effects these programs have achieved. Rather, we believe they reflect the difficulty in detecting significant prevention effects with some parent and teacher rating measures when compared to direct observation measures of parent and child behavior. Parent and teacher questionnaire ratings are often insensitive to intervention effects, yet existing observation systems are complicated and expensive, making them difficult to implement even in controlled evaluations of interventions.

Finally, it should be noted that our intervention had clear effects on the development of children's reading skill. We reported elsewhere that children in SHIP who received supplemental reading instruction performed significantly better on measures of decoding skill than students who did not receive instruction (Gunn *et al.*, 2000). Moreover, they had higher rates of oral reading fluency and greater comprehension of what they read. Given Kellam *et al.*'s evidence that improved achievement can prevent the development of aggressive behavior among boys and higher functioning girls (Kellam *et al.*, 1998), these effects may yet translate into further effects on social behavior.

The findings of this study suggest a number of important directions for future research. The "sleeper" effects detected in this study and others highlight the importance of measuring long-term effects of preventive interventions. Long-term follow-up will assist in identifying preventive interventions that achieve long-term benefits. This knowledge also provides tests of developmental theory such as the relations of academic achievement and aggression during childhood to adolescent problem behavior. Also, our findings, like those of several other recent prevention studies, point to the value of targeted interventions. We found several significant interactions that suggest that the children and families who were experiencing the most difficulties also benefited the most from intervention. This is consistent with the findings of others (e.g. Kellam *et al.*, 1998; Stoolmiller *et al.*, 2000), and suggests that targeted interventions may be the most appropriate and cost-effective strategy for substantially reducing the problems that put children at risk for later delinquency and drug abuse.

[5]We conducted supplemental analyses similar to those that appear in Table 2 to determine the effects of the comprehensive intervention for those students who received CLASS and those who received Dinosaur School. However, the results cannot be interpreted unambiguously because students were not randomly assigned to CLASS or Dinosaur School; 15 of the 20 students who received CLASS also received Dinosaur School, and the analyses were conducted with subsamples that were smaller than the original sample. In the analyses of those who received Dinosaur School (including 15 who also received CLASS) and their matched controls, intervention effects were found for three of the four outcome variables that showed intervention effects for the total sample: children's directly observed negative social behavior toward peers (T3), child coercive behavior (T4), and parent daily report of antisocial behavior (T4). When the analyses were constrained to just those who had participated in Dinosaur School (and not CLASS) and their matched controls, significant intervention effects were found on child coercive behavior and parent daily report of antisocial behavior. For students who participated in CLASS (including the 15 who also received Dinosaur School) and their matched controls, there was a large and significant intervention effect for children's directly observed negative social behavior toward peers, $F(1, 26) = 13.59$, $p < .01$, $f = .72$. There were no significant effects on any of the other dependent variables that were analyzed for this paper.

ACKNOWLEDGMENTS

This project was supported by Grant # DA09678 from the National Institute on Drug Abuse. The authors acknowledge the valuable contributions of Blair Irvine, Hill Walker, Claudia Montaño, Jason Blair, Wanda Ballentine, and Helen Kuo. We also thank Carolyn Webster-Stratton who provided extensive staff training and who commented on an earlier version of this paper. Finally, we express our gratitude to the children, parents, teachers, and other school personnel who participated in this research.

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