

EVALUATION OF A SCHOOL-BASED, UNIVERSAL VIOLENCE PREVENTION PROGRAM:

Low-, Medium-, and High-Risk Children

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*The current investigation examined the differential effectiveness of **PeaceBuilders**, a large-scale, universal violence prevention program, on male and female youth identified as low, medium, or high risk for future violence. It included eight urban schools randomly assigned to intensive intervention and wait-list control conditions. The current sample included N = 2,380 predominantly minority children in kindergarten through fifth grade. Results indicated differential effectiveness of the intervention, by level of risk; high-risk children reported more decreases in aggression and more increases in social competence in comparison to children at medium and low levels of risk. Findings add to a growing number of promising science-based prevention efforts that seek to reduce aggression and increase social competence; they provide encouraging evidence that relatively low-cost, schoolwide efforts have the potential to save society millions in victim, adjudication, and incarceration costs.*

Keywords: *aggression; social competence; violence prevention; ethnicity*

Young people are the primary perpetrators, victims, and often witnesses of interpersonal violence in our society (Snyder & Sickmund, 1999). Children who live in a climate of violence learn to suppress empathy and learn that violence is an acceptable means to achieving their goals (Beland, 1996). This growing problem is evident in national crime statistics.

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Even though recent publications of the National Crime and Victimization Survey (NCVS) and Uniform Crime Reports (UCR) note continued decreases in violence over the past several years (U.S. Department of Justice [USDOJ], 2001a, 2001b), juvenile violence remains high. Although firearm-related homicides have decreased, the youth homicide rate has remained fairly stable; moreover, the overall youth violence index, assault with injury, and robbery with a weapon have increased (U.S. Department of Health and Human Services [USDHHS], 2001). In addition, a cross-national comparison shows that the rate of adolescent homicides involving a firearm is over 15 times higher in the United States than in 12 European countries combined (Centers for Disease Control and Prevention [CDC], 1997).

Prevention and intervention efforts designed to ameliorate violence have identified a number of individual, family, school, peer, and community risk factors that contribute to delinquency and future violence (Andrews & Trawick-Smith, 1996; Consortium on the School-Based Promotion of Social Competence, 1994). Although many of these factors can help identify individuals at risk for problem behaviors, good prevention efforts need to target risk factors most amenable to change, such as skills training, behavior monitoring and reinforcement, behavioral techniques for classroom management, and building school capacity (USDHHS, 2001). A number of individual-level risk factors can be targeted by violence prevention programs. Such factors include general offenses, substance use, aggression, problem behaviors, and antisocial attitudes (Gottfredson, 2001; USDHHS, 2001). Several of these risk factors are highly confounded with rates of deviance; however, the most salient behavioral predictor of later violence and delinquency is early aggression between ages 8 and 10 years (Farrington, 1987; Gottfredson, 2001; Hawkins et al., 1998; Lipsey & Derzon, 1998; Loeber & Dishion, 1983; O'Donnell, Hawkins, & Abbott, 1995; Viemerö, 1996; USDHHS, 2001). Furthermore, aggression in the school context is highly problematic during grade school as it violates peer group and social norms (Bierman & Montminy, 1993; Coie & Dodge, 1998). Cross-sectional research has demonstrated that childhood aggression can foretell official delinquency status (Vazsonyi, Vesterdal, Flannery, & Belliston, 1999). Longitudinal investigations have also demonstrated that aggressive behavior is relatively stable over time and part of a general pattern of antisocial behavior that is associated with later self-reported violence, arrests, and convictions for violent offenses (Farrington, 1987; Lipsey & Derzon, 1998; Loeber, Farrington, Stouthamer-Loeber, Moffitt, & Caspi, 1998; Viemerö, 1996).

Most violence and delinquency prevention research has focused on reducing aggression; however, researchers have also emphasized protective factors that may interact with risk factors to buffer or reduce risk of future violence (Bierman, Miller, & Stabb, 1987; Coie & Koeppl, 1990; USDHHS, 2001). Individual-level factors that protect against delinquency include a positive social orientation and an intolerant attitude toward interpersonal violence and deviance (USDHHS, 2001). Recent prevention efforts have targeted behavioral measures of social competence and prosocial skills (e.g., Blechman, 1996; O'Donnell et al., 1995). Children who lack these skills are more likely to rely on their negative patterns of interaction and demonstrate more negative behavioral outcomes (Ollendick, Weist, Borden, & Greene, 1992; Quinn, Mathur, & Rutherford, 1995; Walker & McConnell, 1988). However, few rigorous evaluation studies have been completed examining risk and protective factors of juvenile violence and deviance.

A next important step for researchers is to identify how risk and protective factors work together to influence problem behaviors. Kupersmidt, Coie, and Dodge (1990) found that aggressiveness and social competence predicted delinquency in elementary school. Similarly, Hämäläinen and Pulkkinen (1995) found that rates of recidivism were greater for

criminals who had been more aggressive and less prosocial when they were young. Conversely, in a review of intervention programs, Coie and Koepl (1990) observed that a number of programs targeting aggressive, disruptive, and rejected children focused their prevention efforts on increasing prosocial behaviors and paid insufficient attention to reducing aggressive behaviors (e.g., Frey, Hirschstein, & Guzzo, 2000; Gottfredson, Gottfredson, & Skroban, 1998; Prinz, Blechman, & Dumas, 1994). Both behaviors must be changed to achieve intervention effectiveness (Blechman, 1996; Coie & Koepl, 1990; Gresham & Elliott, 1987; USDHHS, 2001; Wasserman & Miller, 1998). Therefore, rigorous evaluation studies of programmatic efforts should focus on risk and protective factors, and they should evaluate how both of these behaviors change following an intervention.

School-Based Violence Prevention

Recent violence prevention efforts have shifted to large-scale, universal programmatic efforts (Powell et al., 1996). Although prevention efforts have occurred in multiple contexts, school-based interventions have several advantages (Catalano, Arthur, Hawkins, Berglund, & Olson, 1998; Gottfredson, 2001; USDHHS, 2001). For example, schools are an optimal setting for preventions and interventions; children spend a great deal of time at school with teachers and peers, and large groups of at-risk children can be easily targeted (Beland, 1996; Blechman, 1996). Effective strategies for universal school implementation include behavioral monitoring and reinforcement, classroom management, and skills training; students receive direction from their primary teacher and support from other school staff members. This approach recognizes that behavior change takes time; it also recognizes that the total school atmosphere needs to change as reinforcements are implemented across school experiences (e.g., Farrell, Meyer, Kung, & Sullivan, 2001; Gottfredson, 2001; USDHHS, 2001).

Several large-scale, school-based violence prevention programs targeting elementary school students have documented promising findings of program effectiveness (cf. the Students for Peace Project, Kelder et al., 1996; Orpinas et al., 2000). For example, the Resolving Conflicts Creatively Program (RCCP) (Aber, Jones, Brown, Chaudry, & Samples, 1998) found that the program did not reverse negative or positive behavior patterns but significantly slowed the trajectories for increasing aggressiveness and decreasing social competence, particularly for students who were exposed to most of the programmatic components. Similarly, findings from the Fast Track prevention trial by the Conduct Problems Prevention Research Group (CPPRG) indicated that the program has decreased rates of conduct problems in children identified as being at high risk for behavior problems in kindergarten (baseline; 27% children with conduct problems in the intervention group vs. 37% in the control group; CPPRG, 2002). In another effort evaluating the effects of Peacemakers, Shapiro, Burgoon, Welker, and Clough (2002) found decreases in self-reported and teacher-reported aggressive behaviors as well as decreases in the number of disciplinary incidents and suspensions following program implementation. The study also indicated stronger program effects for boys than for girls and for younger children than older ones. Finally, teacher-reported data showed more consistent and stronger program effects than student data, although self-reported student data corroborated findings based on teacher reports.

Additional programs require some discussion. Again focusing on a high-risk sample of children, the Metropolitan Area Child Study (MACS) (Eron, Huesmann, Spindler,

Guerra, & Henry, 2002; Guerra, Eron, Huesmann, Tolan, & Van Acker, 1997) provided evidence of program effectiveness. Findings indicated that the program was most beneficial when it was administered during the early school years and where it was supported by a 2-year follow-up intervention. They also indicated that the intervention was equally effective for boys and girls; in fact, although median levels of aggression increased over time in intervention and control conditions, a significant number of children moved from clinical to nonclinical status for externalizing behavior problems following the intervention.

The Responding in Peaceful and Positive Ways (RIPP) (Farrell & Meyer, 1997; Farrell, Meyer, & White, 2001) program and evaluation study provided evidence of a reduction in violent behaviors and less in-school suspensions following the intervention. The reduction in violent behaviors was most evident in students who had high levels of violent behaviors at pretest, which indicated a differential programmatic effect.

Finally, two studies evaluating Linking the Interests of Families and Teachers (LIFT) (Reid, Eddy, Fetrow, & Stoolmiller, 1999; Stoolmiller, Eddy, & Reid, 2000) found support for reducing young children's physical playground aggression and increasing teacher ratings of peer-preferred behaviors. Differential effectiveness for reducing children's aggression were found over time, namely, that children with the highest levels of aggression at pretest showed more changes than children with lower pretest scores. To assess this differential effectiveness, Stoolmiller et al. (2000) measured the effect sizes at four levels of aggression and found medium to high effect sizes for children with the highest levels of aggression at pretest.

These findings are encouraging and are consistent with Durlak and Wells' (1997) meta-analysis that showed that programs targeting reducing negative behaviors and promoting social competency show promise. These programs addressed a specific recommendation by Durlak and Wells (1997) and Weissberg and Bell (1997) to evaluate program success for at-risk populations. In particular, these studies started to address the differential effectiveness of programs, how well the programs work for children at risk for future violence, rather than addressing main effects between intervention and control groups. Indeed, Stoolmiller et al. (2000) identified differential effectiveness as a key issue for universal programs. However, researchers disagree on how to best determine risk for future delinquency. Because of low base rates, only a small number of children become classified as officially delinquent, approximately 5% to 6% of boys (Vazsonyi et al., 1999). RIPP, LIFT, and **PeaceBuilders** have addressed differential effectiveness utilizing regression methodology (Farrell, Meyer, & White, 2001; Flannery et al., 2003; Stoolmiller et al., 2000). In particular, previous research on **PeaceBuilders** found differential effectiveness for teacher-reported aggression, self-reported aggression, and prosocial behavior.

Based on these studies, the purpose of this article is to test the differential effectiveness hypothesis, namely, that programs have greater effects on children with high rates of problem behaviors as opposed to children with very low rates. Rather than utilizing a regression procedure, an alternative method for assessing differential effectiveness is to assign children to risk levels. In addition, instead of classifying children at risk by official delinquency status, risk determination should include more children by identifying variables that predict delinquency that are not confounded with measures of delinquency (Loeber & Dishion, 1983). LeBlanc (1998) advocated using a "multiple-gating" procedure developed first by Loeber and Dishion (1983) that uses several assessments or predictors as screening gates. The first step is to apply the first predictor to the full sample, temporarily classifying children into risk and nonrisk samples by the primary factor. Subsequently, in the second step, children are maintained or dropped from the risk sample based on the sec-

ond predictor. The result is that a larger number of children are classified at risk for a particular outcome, which may be beneficial for determining how effective programs are for children most at risk for future problems.

Thus, the current investigation examined the differential effectiveness of **PeaceBuilders** on children identified as low, medium, or high risk for future problems. Children were classified by the multiple-gating procedure into three risk groups (low, medium, and high risk) based on teachers' assessments of aggression and social competence.

PeaceBuilders Violence Prevention Program

PeaceBuilders is a schoolwide, universal violence prevention program that is theoretically based (Embry, Flannery, Vazsonyi, Powell, & Atha, 1996). The program attempts to change antecedents that trigger aggressive behavior, reward prosocial behavior, and provide strategies to avoid reinforcing negative behavior. **PeaceBuilders** is organized around five main principles: (a) **PeaceBuilders** praise people, (b) **PeaceBuilders** avoid put-downs, (c) **PeaceBuilders** seek wise people, (d) **PeaceBuilders** notice hurts they have caused, and (e) **PeaceBuilders** right wrongs. The intervention structure uses several behavior techniques to promote change: symbolic and live models, role-plays and rehearsals, and group and individual rewards.

The **PeaceBuilders** program was implemented in the school setting by teachers, principals, and other support staff. members Teachers use a variety of materials to help teach and encourage students to be **PeaceBuilders**: "I Help Build Peace" story/workbooks, mediation essays, Praise Boards (written records of positive events), games (The Peace Scout Game where anonymous scouts send secret notes), home notes, posters made by children, PeaceCards and secret notes. Teachers received an hour-long preintervention orientation, 3 to 4 hr of training workshops, and 2 hr of site coaching per week that occurred during the first 8 to 12 weeks of program implementation. Additional help sessions were offered when schools had specific questions regarding **PeaceBuilders** (Embry et al., 1996).

The study design included nine project schools with children in kindergarten through fifth grades. One Grade K-2 school and one Grade 3-5 school were combined to form a single K-5 unit. These eight school units were then grouped into four matched pairs. Within the pairs, schools were randomly assigned as intervention (Wave 1) or wait-list control (Wave 2) schools. Baseline data (Time 1) for all schools were conducted in the fall of 1994. Wave 1 schools received the intervention following baseline, in the fall of 1994, and Wave 2 schools received the intervention in the fall of 1995. Data collection occurred every fall and spring for 2 years; Time 2 data collection occurred spring 1995, Time 3 data collection occurred fall 1995, and Time 4 data collection occurred spring 1996.

A preliminary analysis of the effectiveness of **PeaceBuilders** compared children in an initial treatment versus delayed treatment condition. Children in both conditions had similar baseline levels of aggression and social competence. Hierarchical linear modeling determined that children who received the intervention in the initial treatment condition showed significant increases in teacher-rated social competence and child self-reports of peace building as compared to the delayed treatment condition, over a 2-year period. Similarly, after 12 months, children in the delayed treatment condition showed significantly higher rates of aggression than children in the continuous treatment condition (Flannery et al., 2003). Whereas preliminary longitudinal analyses show some changes in children's behav-

iors because of **PeaceBuilders** interventions, these results need to be more carefully examined, especially for children who vary in degree of risk for future violence at baseline.

Risk status established through a multiple-gating procedure has been used to examine how level of risk subsequently predicts delinquency or externalizing behaviors in previous studies (Lipsey & Derzon, 1998; Lochman & The Conduct Problems Prevention Research Group, 1995; Loeber & Dishion, 1983; Patterson, Capaldi, & Bank, 1991); however, it has not been utilized in evaluation research. One exception is the MACS project, where Guerra et al. (1997) reported splitting children into two risk categories. The most recent reports of MACS program effects (Eron et al., 2002) focused on program effects in the high-risk group of children. Across violence prevention programs, program effectiveness has not been evaluated at multiple levels of risk. Therefore, the current investigation cannot make specific predictions about program effectiveness by level of risk based on previous work; at the same time, we did expect the greatest amount of change in high-risk youth and the smallest amount of change in low-risk youth.

More specifically, we expected differential program effects on behavioral outcome measures by levels of risk. For example, we expected that children identified as high risk would show the greatest program effects in teacher-reported aggression and social competence, and self-reported aggression and prosocial behavior. We also expected more modest program effects for children identified at medium risk for future violence and delinquency, and we expected very few program effects for children identified at low risk for future violence and delinquency. Finally, we expected that we would find similar programmatic effects by levels of risk for boys and girls.

Method

Sample

The sample for the current study is based on the **PeaceBuilders** violence prevention evaluation project conducted in the Tucson metropolitan area (Embry et al., 1996; Flannery et al., 2003; Vazsonyi et al., 1999). The targeted region had experienced an increase in violent offenses from 1990 to 1993—increases in juvenile arrests for violent crimes and homicides, vandalism, and weapons violations. Juvenile arrests for total, property, and violent crimes continued to increase and peaked in 1995. Since 1995, juvenile arrests have been decreasing. However, property crimes have decreased at a higher rate than violent crimes, which are still high at similar levels as reported in 1990-1991 (Geospatial and Statistical Data Center [Geostat], 2003). In addition to community-wide efforts to increase social and cognitive competencies related to preventing violence, a comprehensive program, **PeaceBuilders**, was implemented within two city school districts.

Two school districts were chosen based on police crime maps; these maps identified areas with high levels of violent crimes and high neighborhood stress (e.g., domestic violence, transition and mobility, poverty levels). Nine schools (one K-2 and 3-5 were combined to form one school unit) were invited for participation based on these data (Embry et al., 1996). Schools were matched into four pairs based on geographic proximity, student ethnicity, percentage of students eligible for free or reduced lunch, and percentage of students with English as their second language (Embry et al., 1996; see Table 1). It is important to note that some of the matched school pairs differed on key variables (e.g., student ethnic-

TABLE 1
 School Level Demographic Characteristics:
 Percentage of Ethnicity and Socioeconomic Variables

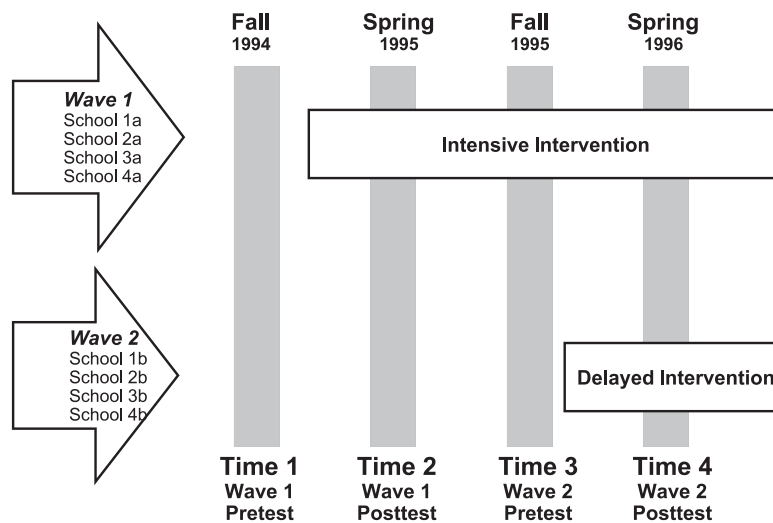
	<i>School 1A (n = 704)</i>	<i>School 1B (n = 551)</i>	<i>School 2A (n = 817)</i>	<i>School 2B (n = 377)</i>	<i>School 3A (n = 550)</i>	<i>School 3B (n = 573)</i>	<i>School 4A (n = 327)</i>	<i>School 4B (n = 780)</i>
African American	9.7	14.6	0.2	5.2	2.8	0.8	2.8	3.5
Asian/Pacific Islander	3.7	2.5	0.3	1.4	0.6	0.3	1.3	1.0
Hispanic	22.7	18.5	33.5	62.2	74.4	91.8	65.9	58.5
Native American	0.6	1.9	54.6	1.7	13.4	2.5	2.1	1.0
White	63.3	62.5	11.3	29.4	8.8	4.8	28.0	36.0
Free lunch	55	55	94	60	60	94	89	73
English as Second Language	5	8	6	29	29	68	28	21

NOTE: Schools were matched in pairs based on geographic proximity, student ethnicity, percentage of students eligible for free or reduced lunch, and percentage of students with English as their second language. Schools were randomly assigned to the initial intervention condition (A schools) or the wait-list control condition (B schools).

ity). Schools were then randomly assigned to the initial intervention condition or the wait-list control condition.

The sample included approximately 4,600 children from kindergarten through fifth grade. Of the total sample, 50% were Hispanic, 29% White, 15% Native American, 5% African American, and 1% Asian/Pacific Islander. Children were roughly evenly divided by sex between the intervention and wait-list control conditions. Figure 1 graphically presents program intervention and data collection periods. One half of the schools received the **PeaceBuilders** intervention in the fall of the first year (Wave 1), while the other one half received the intervention during the following fall (Wave 2). For the current investigation, we focused on children in third through fifth grades who had teacher ratings of aggression and social competence and self-reports of aggression and prosocial behaviors at the baseline (Time 1). Data from children in both treatment conditions (Wave 1 and 2) were aggregated to permit a comparison of children’s pretest scores and posttest scores. Data at pretest were Time 1 data for Wave 1 children and Time 3 data for Wave 2 children. Data at posttest were Time 2 data for Wave 1 children and Time 4 data for Wave 2 children. ANOVAs comparing pretest scores by Wave showed only one significant difference for female prosocial behavior; Wave 2 girls reported slightly higher prosocial behaviors at pretest than Wave 1 girls ($F = 5.96, p < .05, d = .19$).

The total number of students enrolled in project schools in kindergarten through Grade 5 at initial data collection was $N = 4,679$. Some students were excluded from the sample because of incomplete data. Teacher data were available on children in kindergarten through Grade 5. Complete teacher data (K-5) were collected from $n = 2,380$ children (M age = 8.5 years), a response rate of 50.8% (see Table 2). Because of cognitive and language ability, child self-report data were only available for Grades 3 through 5. Complete child self-report data (3-5) were obtained for $n = 1,170$ children (M age = 9.8 years), a response rate of 52.2% (see Table 2). The low response rates (as compared to Flannery et al., 2003) are due largely to the construction of this sample. First, to classify the students into risk categories by teacher reports, the sample was limited to students with baseline teacher-reported data. Second, to compare pretest and posttest data, Wave 1 children had to have



Note. Vertical Bars are Data Collection Periods

Figure 1. Overview of Project Design, Data Collection, and Intervention Schedule

Time 1 and Time 2 data, whereas Wave 2 children had to have Time 3 and Time 4 data. Thus, students without child and/or teacher data at Time 1 and Time 3, for example, were dropped from the sample. This selection process did not appear to vary by sex or race. Approximately 50% of boys and girls were dropped, and race percentages ranged from 20% to 25% for all groups except Native Americans (41%). In addition to sample construction issues, subject attrition rates were related to relatively high residential mobility within school districts.

Procedures

Data were collected by trained project staff members from teachers in Grades K through 5, and children in Grades 3 through 5. During regular school hours, children completed in-class surveys administered by project staff members who read all questions aloud. The survey took approximately 1 hr to complete, and students received small incentives for their participation, such as stickers or pencils. Teachers completed surveys for each child in their classroom. They received data collection packets at the time of the student survey data collection. Each teacher received \$20 for participation. In addition, the schools were eligible for schoolwide incentives based on the number of teacher surveys returned (\$300 to \$500). During the initial phase of the project, data were collected at four points in time (two fall and two spring, in consecutive school years) for schools assigned to two intervention conditions. Schools in Wave 1 started the intervention immediately following baseline data collection. Schools in Wave 2 began the intervention about 1 year later following Time 3 data collection.

TABLE 2
Sample Description and Response Rates

	<i>Not Classified</i>	<i>Low Risk n</i>	<i>Medium Risk n</i>	<i>High Risk n</i>	<i>Total n</i>	<i>N</i>	<i>%</i>
Teacher report (K-5) with baseline data ^a	(1,132)	1,147	1,099	1,301	3,547	4,679	75.8
Teacher report (K-5) with pretest/posttest scores ^b		840	746	794	2,380	4,679	50.8
Males		455	341	376	1,172	2,380	49.2
Females		385	405	418	1,208	2,380	50.8
Child self-report (3-5) with pretest/posttest scores ^b		443	332	395	1,170	2,243	52.2
Males		221	146	197	564	1,170	48.2
Females		222	186	198	606	1,170	51.8
	<i>Not Classified</i>	<i>Low Risk %</i>	<i>Medium Risk %</i>	<i>High Risk %</i>	<i>n</i>	<i>N^d</i>	<i>%</i>
Ethnicity ^c							
African American	20.1	21.8	18.4	39.7	174	3,086	5.6
Asian/Pacific Islander	20.4	40.8	22.4	16.3	49	3,086	1.6
Hispanic	25.6	25.8	24.7	23.8	1,540	3,086	49.9
Native American	40.8	18.7	18.1	22.3	497	3,086	16.1
White	24.0	28.2	21.7	26.2	826	3,086	26.8

NOTE: a. Baseline data for all children were collected at Time 1.

b. Data at pretest were Time 1 data for Wave 1 children and Time 3 data for Wave 2 children. Data at posttest were Time 2 data for Wave 1 children and Time 4 data for Wave 2 children.

c. Ethnicity statistics reported here were obtained from archival school records and are reported for students with baseline data.

d. Ethnicity was available for 3,086 children out of the 4,679 children eligible with baseline data, 34.0% of the sample was missing data on ethnicity.

Measures

Social competence (teacher report). The 19-item short-form version of the Walker-McConnell Scale of Social Competence (Walker & McConnell, 1995) measured social skills and school adjustment as rated by teachers. The instrument has been used in long-term follow-up studies and has predictive value, particularly for children with serious behavior problems (Fifeld, 1987; Hops, 1987). The scale includes three subscales: School Adjustment (e.g., “student attends to assigned tasks” and “produces work of acceptable quality given his or her skills”); Peer Preferred Behavior (e.g., “invites peers to play” and “shares laughter with peers”); and Teacher Preferred Behavior (e.g., “can accept not getting his or her way” and “compromises with peers when a situation calls for it”). Teachers rated each item on a 5-point scale from 1 = *never* to 5 = *frequently* ($\alpha = .95$). The three subscales were summed to produce an overall Social Competence score (Flannery et al., 2003; Vazsonyi et al., 1999).

Aggressive behavior (TRF). Physical and nonphysical aggressive behavior was measured by the 25-item Achenbach's Child Behavior Checklist Teacher Report Form (Achenbach, 1991; Flannery et al., 2003; Vazsonyi et al., 1999). Teachers were asked to recall children's behavior over the past 2 months; examples include "The child argues a lot," "The child gets in many fights," and "The child threatens people." Responses were given on a 3-point Likert-type scale, 0 = *not true*, 1 = *somewhat true*, or 2 = *very true* ($\alpha = .95$).

Prosocial behavior (child report). This 16-item scale was developed by the research team to measure how much children engaged in prosocial acts over the past 2 weeks (Flannery et al., 2003; Vazsonyi et al., 1999). Children responded to questions such as "I did things to help other kids," "I smiled at others," and "I apologized to a grown-up at school." Responses were given on a 3-point scale, 1 = *no*, 2 = *a little*, and 3 = *a lot* ($\alpha = .92$).

Aggressive behavior (YSR). This scale consisted of nine items from the Delinquency and Aggression subscales of the Child Behavior Checklist-Youth Self Report (Achenbach, 1991; Flannery et al., 2003; Vazsonyi et al., 1999). Questions asked about physical and nonphysical aggression over the past 2 weeks, for example, "I teased other kids at school," "I hit someone," and "I tried to get other students to fight." Responses were given on a 3-point Likert-type scale, 0 = *no*, 1 = *a little*, to 2 = *a lot* ($\alpha = .95$).

Plan of Analysis

Initial descriptive statistics on teacher reports and child self-reports were computed for all children with baseline (Time 1) data. These data were used to classify children into three risk groups: low, medium, and high risk.

Analyses for the current study were computed using general linear modeling (GLM). GLM covers a variety of linear models of analyses of variance and covariance, regression, and repeated measures models (Howell, 1992); it also adjusts for unequal cell sizes and provides estimated marginal means (predicted estimates of the population marginal mean based on regression; Searle, Speed, & Milliken, 1980). GLM repeated-measures procedures account for variation in the pretest and posttest scores by computing a pooled value for multivariate tests and subsequently determines change over time using estimated marginal means (SPSS, 1999).

To maximize sample size, GLM analyses were conducted separately by sex and by teacher and self-report data. Risk status was entered in the model as a between-subjects variable with three levels of risk. Age and race were also included in the model as covariates. Age was a continuous covariate, and race was a categorical covariate, namely, White versus non-White. Because of the inclusion of covariates in the model, GLM analyses were conducted in two steps (Winer, 1971). The first step ran the model with the covariates and reported the between-subjects portion of the model. The second step ran the model without the covariates and reported the within-subjects portion of the model. Subsequently, pairwise comparisons were conducted based on the estimated marginal means. Because differences over time were hypothesized a priori, significant pairwise comparisons were reported regardless of the significance of the omnibus *F* statistic (Girden, 1992; Tabachnick & Fidell, 1989).

One assumption of ANCOVA is that the regression coefficients are equal (Howell, 1992). A significant covariate would violate that assumption, usually invalidating the use of

TABLE 3
Descriptive Statistics of Teacher Reports by Sex (N = 3,554)

	<i>Males</i> (n = 1,765)			<i>Females</i> (n = 1,779)		
	M	SD	Median	M	SD	Median
Social competence	3.49	.82	3.53	3.86	.76	3.89
Aggression (TRF)	1.45	.52	1.24	1.23	.38	1.04

NOTE: Social competence and aggression (TRF) are teacher-reports. TRF = Teacher Report Form of the Achenbach Child Behavior Checklist (Achenbach, 1991).

ANCOVA for modeling data (Howell, 1992; G. Hudson, personal communication, March 8, 2002; SPSS, 2002). However, in the current study, the covariates included in the model were not treatment effects but naturally occurring variations in the population. Therefore, we were interested in the percentage of variance in the model explained by each of the covariates (Howell, 1992). For GLM repeated measures, this was done in two procedures: first by analyzing the slope and variance of the covariates for the pooled dependent variable (consistent with GLM multivariate tests) and subsequently by examining whether the covariate influenced change in the dependent variables over the course of the program by using change scores (Howell, 1992; G. Hudson, personal communication, March 8, 2002; SPSS, 2002; Tabachnick & Fidell, 1989). The second step of the analyses determined the effect of the program over time for each of the three risk groups after controlling for the effects of covariates. Pairwise comparisons of the estimated marginal means determined programmatic effects on children’s behaviors at different levels of risk.

Results

At-Risk Status

Children’s at-risk status was determined by teacher-reported aggression and social competence scores collected at baseline. Low, medium, and high risk was defined by a multiple-gating procedure that utilized a median split of the two risk variables separately by sex (see Table 3).

Boys and girls were classified as high risk if they had scores above the median in aggression and below the median for social competence; in other words, they exhibited high negative behaviors and few positive ones. Individuals were classified as low risk if they had scores below the median score for aggression; these children also reported high social competence scores. The medium-risk group was characterized by scores above the median in aggression and social competence or by scores below the median in aggression and social competence. In other words, these children exhibited a mixture of positive and negative behaviors (see Figure 2 for the multiple-gating procedure; see Table 3 for the number of children in each of the risk groups by sex; there were at least 125 children in each risk category for boys and girls).

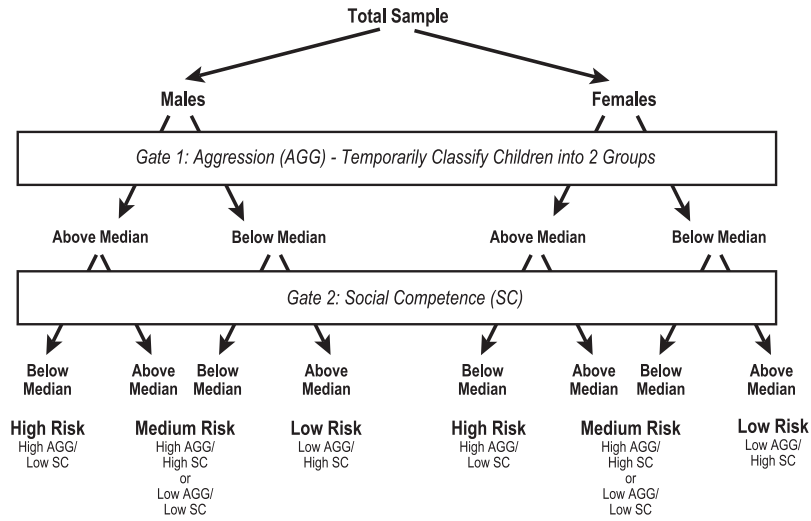


Figure 2. Multiple-Gating Procedure

Winer Model Step 1:

Inclusion of Covariates and Between-Subjects Variable

The first step of the Winer model includes both covariates, age and race, and the independent variable, risk status. The results of the analyses are presented in Table 4. The first three columns report the multivariate *F* statistics for each dependent variable. The next four columns report the slope and percentage of variance explained by each of the covariates in the pooled dependent variable. The last four columns report the slope and percentage of variance explained by the covariates on the amount of change over time in each dependent variable.

Significant effects for age were found for female social competence, male teacher-rated aggression, male and female prosocial behaviors, and male self-reported aggression. Significant effects for race were found only for female prosocial behavior as well as male and female self-reported aggression. Significant effects for risk as a covariate were found for male and female social competence, teacher-reported aggression, and self-reported aggression. No significant effects for risk were found for prosocial behavior.

When analyzing the effects of the covariates on the pooled dependent variables, age accounted for a large percentage of the variance in prosocial behavior (8.9% girls, 12.8% boys). For both of these variables the slopes were negative; as age increased, prosocial behavior decreased. Age also accounted for 4.4% of the variance in male teacher-rated aggression and 3.2% of the variance in female social competence. Race accounted for very little variance in the dependent variables; the highest percentage of variance attributed to race was for male self-reported aggression (1.4%). Even though age and race accounted for some proportion of the variance in the pooled dependent variables, additional analyses needed to determine the percentage of variance these covariates explained in pre/post change scores. In these scores, age accounted for a small proportion of the variance in male (2.5%) and female (1.5%) changes of social competence and male self-reported aggression (1.5%). Race accounted for very little variability in change scores, namely, 1.7% of the

TABLE 4
 Winer Model (Step 1): Between-Subjects *F* Values, and Covariate Analyses Slope, and *R*² Values for General Linear Modeling (GLM) model

				<i>Pooled DV</i>				<i>Change Scores</i>			
	<i>Age</i> <i>F</i> ^d	<i>Race</i> <i>F</i> ^d	<i>Risk</i> <i>F</i> ^d	<i>Slope</i> <i>of Age</i> <i>β</i>	<i>%</i> <i>Variance</i> <i>Age</i>	<i>Slope</i> <i>of Race</i> <i>β</i>	<i>%</i> <i>Variance</i> <i>Race</i>	<i>Slope</i> <i>of Age</i> <i>β</i>	<i>%</i> <i>Variance</i> <i>Age</i>	<i>Slope</i> <i>of Race</i> <i>β</i>	<i>%</i> <i>Variance</i> <i>Race</i>
Males											
Social competence ^a	2.45	1.35	381.40*	-.001	1.82	-.004	0.07	-.063	2.54	.014	0.00
Aggression (TRF) ^{a,c}	6.21*	1.09	342.29*	-.001	4.43	-.002	0.04	.001	0.11	.003	1.69
Prosocial behavior ^b	108.11*	0.24	1.33	-.19	12.78	-.002	0.04	-.023	0.19	.037	0.11
Aggression (YSR) ^{b,c}	6.95*	7.64*	18.72*	-.005	1.36	-.106	1.42	.056	1.53	.047	0.24
Females											
Social competence ^a	6.39*	1.67	318.00*	-.002	3.23	-.004	0.05	-.044	1.45	.001	0.00
Aggression (TRF) ^{a,c}	0.29	0.82	208.51*	.000	0.00	.002	0.04	.016	0.78	.047	0.54
Prosocial behavior ^b	65.60*	4.40*	0.95	-.152	8.91	-.008	0.57	-.004	0.00	-.007	0.00
Aggression (YSR) ^{b,c}	2.04	5.89*	11.83*	-.002	0.55	-.005	0.83	-.003	0.00	.037	0.32

a. Teacher reports of social competence and aggression are listed first, *n* ranges from 323 to 411.

b. Child self-reports of prosocial behavior and aggression, *n* ranges from 125 to 194.

c. TRF = Teacher Report Form of Achenbach's Child Behavior Checklist; YSR = Youth Self-Report Form of Achenbach's Child Behavior Checklist (Achenbach, 1991).

d. Multivariate *F* statistic is significant at **p* < .05.

variance in male teacher-reported aggression changes. The second step of the analyses demonstrated significant changes over time in each of the three levels of risk. Therefore, a series of analyses was completed in the second step of the Winer model; results are reported in Table 5.

*Winer Model Step 2:
Changes Over Time by Level of Risk*

High risk. Significant changes over time for children classified as high risk were found for male and female teacher-reported social competence and aggression scores; no significant changes over time were found for self-reported prosocial behavior or aggression. These significant differences were in the hypothesized direction for social competence and aggression. Social competence scores for high-risk children increased significantly for boys ($d = .36$) and girls ($d = .44$). Teacher-rated aggression scores decreased significantly for boys ($d = -.13$) and girls ($d = -.24$).

Medium risk. For children classified at medium-risk status, significant changes over time were found for male and female teacher-reported social competence. No significant changes over time were found for teacher-rated aggression or self-reported prosocial behavior and aggression. As hypothesized, medium-risk teacher-rated social competence scores increased for boys ($d = .34$) and girls ($d = .31$).

Low risk. For children classified at low risk, significant changes were found for male and female teacher-rated aggression. No significant changes were found for teacher-rated social competence or self-reported prosocial behavior and aggression. Contrary to hypotheses, teacher-reported aggression increased for boys ($d = .31$) and girls ($d = .15$).

Discussion

Based on criteria established by the surgeon general and the Centers for Disease Control and Prevention, the **PeaceBuilders** (Embry et al., 1996) violence prevention program targets decreasing risk factors and increasing protective factors in a universal school-based program utilizing effective strategies for behavior change (USDHHS, 2001). The current investigation examined whether the **PeaceBuilders** violence prevention program had a differential effect on children's behavioral outcomes by levels of risk (low, medium, and high); more specifically, we were interested in four outcomes, namely, teacher-reported aggression and social competence and self-reported aggression and prosocial behavior. In addition, we were interested in determining the effects of sex, age, and race on program effectiveness. Although researchers have classified children at risk for future problems in previous work (Lochman & The Conduct Problems Prevention Research Group, 1995; Patterson et al., 1991), most of these comparisons have considered children's behavior differences at one point in time and not in the context of an intervention.

Findings indicated that the effects of **PeaceBuilders** were not universal across risk categories. Significant behavior changes were found for children classified at high risk for future violence at baseline. Consistent with expectations and previous research on differential effectiveness (Farrell, Meyer, & White, 2001; Flannery et al., 2003; Stoolmiller et al.,

TABLE 5
 Winer Model (Step 2):
 Pretest-Posttest Scores by Risk, Within-Subjects *F* Value,
 and Significant Pairwise Comparisons

	<i>Low Risk</i>				<i>Medium Risk</i>				<i>High Risk</i>				<i>Time Risk F^d</i>	<i>Sig. Pairwise Comparisons^d</i>
	<i>Pretest</i>		<i>Posttest</i>		<i>Pretest</i>		<i>Posttest</i>		<i>Pretest</i>		<i>Posttest</i>			
	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD		
Males														
Social competence ^a	4.13	.56	4.18	.67	3.55	.63	3.78	.74	2.93	.57	3.16	.71	10.96*	<i>b,c</i>
Aggression (TRF) ^{a,c}	1.08	.18	1.15	.27	1.34	.39	1.36	.44	1.82	.51	1.75	.55	12.58*	<i>a,c</i>
Prosocial behavior ^b	1.86	.54	1.82	.55	1.84	.55	1.72	.57	1.82	.59	1.80	.56	1.65	
Aggression (YSR) ^{b,c}	1.26	.35	1.32	.39	1.35	.43	1.39	.46	1.53	.53	1.52	.51	1.55	
Females														
Social competence ^a	4.44	.49	4.44	.60	3.93	.63	4.13	.65	3.29	.59	3.58	.72	25.54*	<i>b,c</i>
Aggression (TRF) ^{a,c}	1.02	.07	1.06	.17	1.12	.22	1.14	.24	1.48	.48	1.37	.43	28.14*	<i>a,c</i>
Prosocial behavior ^b	2.17	.51	2.07	.53	2.10	.49	2.05	.50	2.13	.47	2.02	.55	0.58	
Aggression (YSR) ^{b,c}	1.10	.24	1.12	.21	1.15	.29	1.17	.23	1.20	.32	1.23	.34	0.34	

NOTE: *a*-low risk; *b*-medium risk; *c*-high risk.

a. Teacher reports of social competence and aggression are listed first, *n* ranges from 341 to 455 for teacher-reports (Grades K-5) and from 146 to 222 for child self-reports (Grades 3-5).

b. Child self-reports of prosocial behavior and aggression, *n* ranges from 125 to 194.

c. TRF = Teacher Report Form of Achenbach's Child Behavior Checklist; YSR = Youth Self-Report Form of Achenbach's Child Behavior Checklist (Achenbach, 1991).

d. *F* statistic and pairwise comparisons are significant at **p* < .05.

2000), high-risk children showed the most significant changes over time; teacher-reported aggression decreased, whereas teacher-rated social competence increased. Moreover, these effects were found for boys and girls. However, no positive program effects were found for either of the self-reported variables, prosocial behavior and aggression. For medium-risk children, only teacher-rated social competence increased, whereas no effects were found for teacher- or self-reported aggression. Findings for children classified at low risk showed unexpected changes over time, namely, increases in teacher-reported aggression. At the same time, these children maintained their relatively high levels of social competence. In addition, though aggression increased, the levels of aggression still remained substantially below medium- and high-risk groups, scores that would continue to result in low-risk classification.

In conclusion, the findings from the current evaluation effort are encouraging. Together with other recent efforts (e.g., CPPRG, 2002; Eron et al., 2002; Farrell, Meyer, & White, 2001; Shapiro et al., 2002), large-scale universal violence prevention programs such as **PeaceBuilders** show promise for changing children's behaviors, in particular for changing risk and protective factors for future violence (cf., CPPRG, 2002). Our findings add to a growing number of investigations that have provided evidence on differential program efficacy for high-risk children and youth (e.g., CPPRG, 2002; Eron et al., 2002; Farrell, Meyer, Kung, & Sullivan, 2001); they suggest that students classified at high risk for future behavior problems significantly decreased on measures of aggression and increased on measures of social competence. In addition to differential program effectiveness being examined via regression methodology as shown by previous work, the current study demonstrated differential effectiveness through the multiple-gating procedure that utilized two variables for risk classification, presence of negative and lack of positive behaviors at baseline. Future evaluation research should continue to evaluate the effectiveness of violence prevention programs in children who are most at risk.

Limitations of the Current Study

A number of limitations require some discussion. One important consideration is the insider versus outsider perspective. In the current study, teachers reported more significant behavior changes than did children's self-reports similar to Shapiro et al. (2002). However, in the current study, no significant results were found by risk level in the differential effectiveness of **PeaceBuilders** for aggression or prosocial behavior. Findings by Stanger and Lewis (1993) based on comparisons of behavior ratings between teacher, child, and parent reports on the Child Behavior Checklist have some important implications for the current study. They found that children generally report more problems than do teachers; they suggested that one possible reason for this is that teachers rate behaviors only during school hours, whereas children rate their behaviors across contexts. In addition, they suggested that teachers attend to externalizing behaviors, such as aggression, differently than do children, because these behaviors cause management problems and may be more salient for the teachers than children. It may be that teachers attended to children's changed behavior within the school environment, whereas children attended to their behaviors in school and in other contexts outside of schools with siblings or peers. Thus, the differential effectiveness of **PeaceBuilders** would be limited in generalizability to the school environment.

Another issue requiring discussion is the one of quasi-experimental design. The current study did not contain a true control condition. Due to Institutional Review Board (IRB)

requirements and practical considerations, all children received the intervention at some point, thus creating a wait-list control condition, where one half of the students received the intervention 1 year later. Children in this latter condition did complete data collections prior to the intervention and may have been aware of **PeaceBuilders** prior to actual intervention at their school. With quasi-experimental designs, the study is compromised because program effects cannot be clearly determined; however, quasi-experimental design emphasizes the ecological context and optimizes generalizability because programs are evaluated as they are implemented (Henrich, Brown, & Aber, 1999). Third, without comparing change over time among students classified in risk categories in intervention and control conditions, we could not determine whether changes in reported behaviors were due to regression to the mean. Therefore, one plausible explanation for our findings could include regression to the mean.

Fourth, the current study was limited by participant attrition. The **PeaceBuilders** evaluation study was conducted in high-risk neighborhoods that experienced very high residential mobility that limited the number of students with longitudinal data (for a discussion, see Flannery et al., 2003). A final limitation is that results may be attributable to teacher bias. Additional analyses conducted by Belliston (2000) and Flannery et al. (2003) have documented varied fidelity of implementation. However, analyses have indicated that fidelity of implementation did not affect the differential effectiveness of the program by risk category.

Conclusions/Implications

Universal, school-based programs such as **PeaceBuilders** show promise for reducing aggression and increasing social competence (Flannery et al., 2003; Shapiro et al., 2002). Such relatively low-cost programs that attempt to blanket the school population have important policy implications in that spending only a few hundred dollars per child during elementary school might save the criminal justice system millions later on, when individuals enter it during adolescence and adulthood (Cohen, 1998). Specifically, Cohen (1998) estimated the costs of a criminal on society based on calculations such as mean number of offenses, victim cost of crime, cost of investigation and adjudication, incarceration, foregone earnings, and opportunity cost of time. He noted that the benefits of programs that reduce crime might exceed the cost estimates computed, in terms of affecting large social problems, reducing fear of crime, reducing private security measures, or changing lifestyle due to decreased risk of victimization (e.g., walking vs. taking a cab). Cohen estimated that, for a juvenile career, the present lifetime costs range between U.S.\$80,000 and \$325,000; for an adult offender, \$1.2 million, total costs ranging from \$1.3 to \$1.5 million for juvenile and adult career offenses. When combining comorbid problems of criminality, drug use, and high school dropout, costs to society range from \$1.7 to \$2.3 million (Cohen, 1998). In contrast, the entire **PeaceBuilders** project budget for project administration, project development, project implementation, training, follow-ups, evaluation design, and data collection and analysis cost less than \$200 per child over the project's 3-year period. Thus, the cost of the program is minimal compared to potential costs due to a life of crime and violence. Universal programs such as **PeaceBuilders** seem effective and cost-efficient because they can reach an entire population of children, not only children at risk. By reaching a greater number of children, such programs change the school climate, reduce the number of classroom disruptions, and ultimately reduce the total number of children at risk for future violence.

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