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The Ecological Effects of Universal and Selective Violence Prevention Programs for Middle School Students: A Randomized Trial

The Multisite Violence Prevention Project

Abstract

This study reports the findings of a multisite randomized trial evaluating the separate and combined effects of 2 school-based approaches to reduce violence among early adolescents. A total of 37 schools at 4 sites were randomized to 4 conditions: (1) a universal intervention that involved implementing a student curriculum and teacher training with 6th-grade students and teachers, (2) a selective intervention in which a family intervention was implemented with a subset of 6th-grade students exhibiting high levels of aggression and social influence, (3) a combined intervention condition, and (4) a no-intervention control condition. Analyses of multiple waves of data from 2 cohorts of students at each school ($N = 5,581$) within the grade targeted by the interventions revealed a complex pattern. There was some evidence to suggest that the universal intervention was associated with increases in aggression and reductions in victimization; however, these effects were moderated by preintervention risk. In contrast, the selective intervention was associated with decreases in aggression but no changes in victimization. These findings have important implications for efforts to develop effective violence prevention programs.

Keywords

aggression; violence prevention; middle school; adolescent problem behavior

Although important progress has been made toward identifying promising approaches to youth violence prevention (e.g., U.S. Department of Health and Human Services [HHS], 2001; Wilson, Lipsey, & Derzon, 2003), further work is needed to identify the most effective strategies for use in specific settings (Farrell & Camou, 2006). Schools are frequently the setting in which violence prevention programs are implemented because they have several

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characteristics that make them a particularly appropriate focus for such efforts (Farrell, Meyer, Kung, & Sullivan, 2001; Gottfredson, 2001). Schools are among the primary contexts for social development and are frequently the setting in which interpersonal conflicts occur (Carlo, Fabes, Laible, & Kupanoff, 1999). Schools also provide an efficient way to reach a large number of youths, and because they represent stable institutions they have great potential for continuity.

A critical question facing developers of school-based programs concerns the most effective focus of prevention resources. Most school-based violence prevention programs take one of two forms: universal interventions that include all students or selective interventions that focus on a subset of high-risk students. Universal interventions can play an important role in reducing aggression by teaching students emotional and cognitive skills that support nonviolent behavior and reducing peer influences that support violence (Multisite Violence Prevention Project [MVPP], 2004b). Furthermore, schoolwide prevention programs that involve teachers and school administrators may lead to increased reinforcement of program goals and modeling of appropriate skills (Hawkins, Farrington, & Catalano, 1998). For children who already display elevated levels of aggressive behavior, however, a universal intervention may not be sufficient. Such youths may require more intensive interventions that focus on the risk and protective factors most relevant for them. There is growing evidence that family-focused interventions have promise for this segment of the population (Dishion & McMahon, 1998; Tolan & Gorman-Smith, 2002). In addition, because a small number of youths often account for a disproportionate share of violence at their school, effectively intervening with high-risk students may have a substantial impact on schoolwide rates of violent and aggressive behavior. Moreover, there is initial evidence to suggest that combining universal and selective interventions may be more effective than either alone (Leff, Power, Manz, Costigan, & Nabors, 2001; Stephens, 1997).

Middle schools are a particularly relevant target for violence prevention efforts. The transition from elementary schools to larger and less structured middle schools creates opportunities for interactions between students that may lead to conflicts. Middle schools often disrupt social structures by intermixing diverse groups of students from smaller elementary schools. This is also a developmental phase just prior to increases in aggression, particularly bullying (Tolan & Henry, 1996). Key developmental changes during early adolescence such as the growing influence of peers may also play a role. For example, more susceptibility to and associations with deviant peer groups may emerge during this time (Dishion & Andrews, 1995). Despite these trends, few efforts to develop violence prevention programs have focused on middle schools. In part, this reflects an emphasis on early intervention when development may be more malleable (HHS, 2001). Although a strong case can be made for early intervention, this does not negate the need for interventions during other critical periods in the life course (Tolan & Gorman-Smith, 2002). In fact, there is evidence that selective interventions during early adolescence can have effects as large as or even larger than early interventions (Aos, Lieb, Mayfield, Miller, & Pennucci, 2004). The question is not whether to focus prevention efforts on children or adolescents but rather how interventions might be developed to best meet the needs of individuals across important developmental stages (Farrell & Camou, 2006).

An important issue in the violence prevention literature is the disjuncture between how programs are designed to be implemented and the designs used to evaluate them. Although many youth violence prevention programs are intended to be implemented at the school level, studies evaluating their impact have often employed designs in which individual students or classrooms within schools are assigned to intervention and control conditions (MVPP, 2004b). Such designs limit the ability to make clear inferences about the effects of school-level implementation and to evaluate outcomes at the school level. Moreover, if the peer climate of a school represents a key influence on aggression, focusing a prevention effort on a subset of students may not be sufficient to alter this important influence. These considerations highlight

the need for designs that assign schools to intervention conditions (Farrell, Meyer, Kung, & Sullivan, 2001). Such studies, however, require large-scale projects that pose considerable resource and organizational challenges (MVPP, 2004a) and require larger numbers of schools than in most previous prevention trials to have adequate power to detect intervention effects (Henry, Farrell, & MVPP, 2004).

The present study was designed to fill several significant gaps in the current literature on youth violence prevention. It involved a large-scale, multisite effort with school-level assignment to compare the individual and combined effects of universal and selective interventions on violence and victimization among middle school-aged youths. More specifically, it examined the relative effects of (a) a universal prevention program directed at all sixth-grade students and teachers that focused on teaching individual-level skills and changing school norms related to aggression and violence, (b) a selective intervention focused on family management of the child and school functioning implemented with a subset of sixth-grade students at elevated risk for perpetration of violence and potential influence on their peers, and (c) implementation of both programs (MVPP, 2004b). The study's design and development of the interventions built upon previous prevention research by the team of collaborators and others (e.g., Farrell, Meyer, Kung, & Sullivan, 2001; Greenberg, Kusche, Cook, & Quamma, 1995; Reid, Eddy, Fetrow, & Stoolmiller, 1999; Tolan, Gorman-Smith, & Henry, 2004). The design involved implementing a common protocol by four teams of investigators in four separate communities to produce a strong test of the extent to which similar findings might emerge in different contexts.

The programs developed for this project are based on a developmental-ecologic perspective (Tolan & Gorman-Smith, 2002) and a focus on risk factors for aggression thought to be particularly salient at this age level (MVPP, 2004b). The universal intervention included both student and teacher components. The student component involved (a) a social-cognitive framework designed to promote problem-solving skills, motivation, and self-efficacy and (b) school norms against the use of violence and aggression (Meyer, Allison, Reese, Gay, & MVPP, 2004). The program was based upon the sixth-grade Responding in Peaceful and Positive Ways (RIPP) curriculum (Meyer, Farrell, Northup, Kung, & Plybon, 2000), which showed promise in previous studies evaluating its impact in both urban and rural schools (e.g., Farrell, Meyer, & White, 2001; Farrell, Valois, Meyer, & Tidwell, 2003). The teacher component involved a workshop and support groups that focused on (a) increasing teacher awareness of different forms of aggression and associated risk factors, (b) developing strategies for teachers to prevent aggression, (c) improving teacher classroom management skills, and (d) helping teachers team ways to aid students who are the victims of peer aggression (Orpinas, Horne, & MVPP, 2004).

The selective intervention was implemented with sixth-grade students identified by teachers at the beginning of the school year as having high levels of both aggression and peer influence (Miller-Johnson, Sullivan, Simon, & MVPP, 2004). The rationale for selecting these students was twofold. First, lowering rates of violence among students accounting for a disproportionate share of these acts would directly reduce the overall rate of aggression. Second, because these students have a high degree of influence on their peers, intervening with them could indirectly reduce the aggressive behavior of other students by affecting wider attitudes about the acceptability of aggression. The focus on a family intervention was based on previous studies indicating that altering parenting practices and family relationships can reduce childhood aggression and prevent increases in aggression and other antisocial behavior (Smith et al., 2004; Tolan et al., 2004). The GREAT (Guiding Responsibility and Expectations in Adolescents Today and Tomorrow) Families Program was rooted in developmental-ecologic theory, in which families are understood to provide a social context that can increase or reduce antisocial behavior among youths (Smith et al., 2004) and was derived from prior empirically

validated family-focused group interventions (e.g., Metropolitan Area Child Study: Metropolitan Area Child Study Research Group [MACS], 2002; SAFEChildren: Tolan et al., 2004) and related empirical and theoretical work on antisocial behavior and family functioning. The program focused on (a) developing home–school partnerships; (b) increasing parental monitoring and supervision; (c) promoting care and respect through discipline and rules; (d) improving parent and child coping, self-control, and management skills; (e) enhancing family communication and problem-solving skills; and (f) planning for the future.

The focus of this article is on the individual and combined impact of the two intervention approaches on reducing overall rates of aggression and victimization for students at each school within the grade targeted by the interventions. Although the two approaches differed in their focus—the universal intervention was targeted at all sixth-grade students and teachers, and the selective intervention was targeted at a subset of aggressive and influential sixth graders—both were intended to produce an ecological effect on all sixth-grade students during the intervention year. It was hypothesized that compared with schools assigned to the control condition, schools assigned to the universal and selective interventions would have (a) lower levels of aggression, victimization, school safety problems, and school norms supporting violence and (b) higher levels of school norms supporting nonviolence within the cohort of students in the sixth grade during the intervention year. It was also hypothesized that receiving both interventions would provide greater benefits than would either intervention alone.

The present study also examined the extent to which intervention effects on aggression and victimization were influenced by gender and risk level. Previous studies have found significant gender differences in program effects. Farrell and Meyer (1997), for example, found decreases in violent behavior among boys who participated in a sixth-grade violence prevention curriculum but a trend in the opposite direction for girls. The possibility that intervention effects may vary across risk was suggested by previous evaluations of violence prevention programs that have found stronger effects for adolescents with higher pretest levels of aggression (e.g., Farrell, Meyer, Sullivan, & Kung, 2003, Farrell, Meyer, & White, 2001; MACS, 2002). For the present study this involved developing (a) a risk factor index that was based on baseline measures and (b) analyses to determine the extent to which this risk index moderated intervention effects.

Method

Design and Settings

Participants were students at 37 school from four communities: Chicago; Durham, North Carolina; northeastern Georgia; and Richmond, Virginia (see Table 1). Participating middle school in Durham and Richmond represented nearly all middle schools in those public school systems. Middle schools in Georgia represented six school districts in Athens and the surrounding area. Chicago schools served grades K–8 and were selected on the basis of size (i.e., more than 1,100 students), residence of at least 75% of students within school district boundaries, and travel time of less than 1 hr from the project offices. All participating schools included a high percentage of students from low-income families determined on the basis of eligibility for the federal free or reduced price lunch program (i.e., 42%–96% across sites). Additional details regarding school recruitment and community characteristics are reported in Henry, Farrell, and MVPP (2004). The study employed a cluster-randomized design. Schools were first recruited within each site. An equal number of schools within each site¹ were then randomly assigned to four conditions: universal intervention, selective intervention, combined

¹Recruitment of nine schools at the Georgia site resulted in randomization of two schools in three of the conditions and three schools in the selective intervention condition.

(universal and selective) intervention, and no-intervention control. During a meeting held at each site, a representative from each school chose from a set of index cards placed face-down on a table. The school was then assigned to whatever condition was listed on the card. Beginning in 2001, all interventions were implemented with two successive cohorts of sixth graders. The current study examined intervention effects at the school level on the basis of data from a representative sample of students in each cohort. The more direct effects of the selective intervention on students meeting eligibility criteria for that intervention (i.e., aggressive and socially influential) are addressed in a separate report (MVPP, 2008a). Teacher ratings of individual students in each cohort were collected during the fall (pretest) and spring (posttest) of the sixth grade and the following two school years. Data were collected from students during the fall and spring of the sixth grade school year and in the spring of the subsequent two school years. An additional wave was collected from Cohort 2 in the fall after completion of the intervention.

Participants

Data were collected on a random sample of approximately 80 students per cohort from the rosters of each of the larger middle schools and from all eligible students at the smaller Chicago schools. Figure 1 provides a CONSORT diagram showing the flow of participants through the study. Because the universal intervention was not implemented in self-contained special education classrooms, these students were not included in the sample. Students selected for Cohort 1 who subsequently repeated the sixth grade were not eligible to also be included in Cohort 2. All study procedures were approved by the institutional review boards at the four participating universities and the Centers for Disease Control and Prevention (CDC). Consent and assent letters were sent home with students. At three sites where it was permitted, students received a \$5 gift card for returning the forms, whether or not they agreed to participate. Telephone follow-ups and home visits were used to increase participation rates. Active parental consent and student assent were obtained from 5,625 of the 7,364 eligible students, yielding a recruitment rate of 76% (see Figure 1). Because our focus was on school-level outcomes, data at each wave were obtained from only students who remained in their original school. One or more waves of data were available for 5,581 students (99% of those consenting and eligible) on student measures and for 5,529 students (98%) on teacher reports. The sample included approximately equal numbers of boys and girls and a high percentage of minority students and students living in single-parent homes (see Table 1).

Universal Intervention

The universal intervention had both student and teacher components. The 20-session GREAT Student curriculum (Meyer et al., 2004) provides instruction and practice in a social-cognitive problem-solving model and instructs students on avoiding dangerous situations, ignoring teasing, asking for help, talking things through, defusing situations, and helping peers. Interventionists use behavioral repetition and mental rehearsal of the skills, small-group activities, experiential learning techniques, and didactic modalities to engage students in learning and practicing the material. These strategies are intended to increase awareness and use of nonviolent options and to alter attitudes toward and engagement in aggressive behavior. In our study, interventionists included graduate students in a relevant field (e.g., counseling, clinical psychology) and former teachers who completed 36 hr of training based on a common protocol designed to enhance cross-site consistency. After each lesson, they completed a checklist to document whether major lesson elements were delivered as intended and rated students' engagement in the lesson. Review of fidelity data found that, on average, 95% of the planned elements of the sessions were delivered. The range was from 88% to 100%. Interventionists were observed several times by a site supervisor to identify and correct any implementation problems. The intervention began approximately 10 weeks into the school year after the bulk of pretest assessments were completed.

The GREAT Teacher Program (Orpinas et al., 2004) included a 12-hr workshop and 10 consultation/support group meetings. The 2-day workshop was open to all sixth-grade teachers of core academic subjects and was conducted a few weeks after the start of the school year. During the workshop, teachers were given an overview of the student program and ways they could support it. The remainder of the training focused on the four program goals. The support/consultation sessions were conducted every 2–3 weeks over the school year. All sixth-grade core academic teachers were encouraged to attend, regardless of whether they had attended the workshop. The goals of these sessions were to (a) enhance the development and application of new skills; (b) provide a forum where teachers could support one another and engage in mutual problem solving; (c) address schoolwide problems (e.g., school-wide discipline policies, development of a system to facilitate students' reporting of victimization); and (d) support the student program. Sessions began with a discussion of efforts teachers were making to reduce aggressive and disruptive behavior in their classroom. This was followed by activities that reinforced key elements of the workshop and opportunities to discuss and practice new skills and strategies. Teachers received \$75 for each workshop attended and \$20 for each consultation group attended. Workshop attendance rates were high at three sites ($M = 97%$ of eligible teachers, range = 88%–100%) and lower (i.e., 58% and 23% during Years 1 and 2, respectively) at a fourth site where it was not strongly supported by school principals. During the first intervention year, at least 9 of the 10 support sessions were held at all schools, and the average attendance rate was 79%. All 10 support sessions were held at all schools during the second year, and attendance averaged 86%.

Selective Intervention

The selective intervention was implemented with a sample of sixth graders from each school whom teachers considered both aggressive and influential among their peers. Details of the selection process and evidence for its validity may be found in Henry, Miller-Johnson, Simon, Schoeny, and MVPP (2006). The number of students selected at each school ranged from 15 to 25 depending on school size (i.e., we attempted to recruit at least 5% of sixth graders). Students were identified by two core sixth-grade teachers. The first step was to identify the most aggressive 25% of students. Teachers then rated each student's influence on his or her peers. Those within this group with the highest average influence ratings were invited to participate in the study. Parental consent and student assent were obtained from 274 of the 405 eligible students (68%) for Cohort 1 and 391 of 571 eligible Cohort 2 students (68%).

The GREAT Families Program is a 15-week intervention conducted in groups of 4–8 high-risk students and their parents or guardians (see Smith et al., 2004, for details). Its focus is on helping families manage child rearing within the constraints and opportunities provided by their social context. Multiple family groups are used to capitalize on participants' capabilities to help others, to normalize developmental and ecological challenges, and to reinforce skill attainment and use (Tolan et al., 2004). The program includes a Home-School Communication Plan wherein parents received weekly feedback from one of their child's teachers on the child's success in meeting academic and behavioral goals. The program progresses from initial orientation and basic parenting skills to issues in emerging adolescent relationships and school and educational issues to community related issues. Meetings start with sharing a meal provided by the project, reviewing the prior week's homework, and discussing a topic related to a core program area. Role plays and other activities designed to engage parents and students in interactive practical tasks related to common real-life family matters provide opportunities to develop and practice new skills. Meetings end with an assignment for families to complete prior to the next session.

All interventionists had prior experience in family intervention. Most had a master's degree in psychology, social work, or a related field and had worked with populations similar to those

in the program. Interventionists received approximately 20 hr of training in the theory, content, and delivery of the program and had ongoing weekly supervision with their site's trainer. Weekly phone calls helped to maintain consistency and fidelity across sites. Training addressed cultural issues for working with low-income, minority families. Each group was conducted by a facilitator who led two–four groups. Although efforts were made to match families and facilitators on race or ethnic background, this was not always possible. Site supervisors observed each interventionist during at least two sessions per cohort. Interventionists and family members rated completion of key activities on a 1 (*not initiated*) to 5 (*fully completed*) scale to assess fidelity. Across all activities, 75% of parent reports agreed with leaders on a rating of 5 (*fully completed*). The range for a rating of *fully completed* was 54%–97% across sessions.

All family members, including relatives living outside the home who had a significant role in caring for the child, were invited to attend sessions. Child care for younger siblings and transportation were provided. Families were paid increasing amounts for attendance over the course of the intervention (\$10–\$25 per session). Interventionists offered makeup sessions to families who missed sessions. At the smaller Chicago schools, an average of 7.7 Cohort 1 students per school (49% of those eligible) attended one or more sessions, and 6.3 (40%) attended eight or more. At the other three sites, the corresponding averages per school were 9.9 (41%) and 6.3 (26%). Efforts to recruit more participants and enhanced efforts to retain families increased the number of participating families per school for Cohort 2. At Chicago schools, an average of 10.7 families per school (63% of those eligible) attended at least one session, and 9.2 (54%) attended at least eight. At the other sites, an average of 19.5 students per school (55% of those eligible) attended at least one session, and 15.1 (43%) attended eight or more.

Measures

Students completed measures at school in groups of 10–20 using a computer-assisted survey interview.² Students used headphones to listen to audiotapes of the questions read by men and women from different ethnic groups while reading them on the computer screen and entered responses using the keyboard. At three sites, students received a \$5 gift card for participating in the assessment. Student behavior ratings were obtained from one teacher per student at each wave. The teacher in the best position to rate each student was identified by each team of teachers. Teachers were paid \$10 for each student measure completed. Because teachers participated in the universal intervention and selected students for the selective intervention, they were not blind to treatment condition. Alpha coefficients for the present study were calculated for each measure based on Cohort 1's pretest data.

Aggression and victimization—The Problem Behavior Frequency Scale (PBFS; Farrell, Kung, White, & Valois, 2000) was used to obtain students' reports of their frequency of aggression and victimization. The 18-item Aggression scale ($\alpha = .92$) included seven items representing physical aggression (e.g., “been in a fight in which someone was hit”), five items representing nonphysical aggression (e.g., “insulted someone's family”), and six items representing relational aggression (e.g., “spread a false rumor about someone”). The six-item Overt Victimization scale ($\alpha = .84$) asked students to indicate how frequently they had been the target of specific acts of physical aggression (e.g., “been hit by another kid,” “been pushed or shoved by another kid”). The six-item Relational Victimization scale ($\alpha = .84$) asked students to rate how frequently they had experienced specific acts of relational aggression (e.g., “been left out on purpose by other kids when it was time to do an activity”). For each item, students

²Thomas R. Simon and Roy Martin screened responses for patterns of random or implausible responses (e.g., 1, 2, 1, 2, 1, 2, 1, 2 throughout a scale) across multiple scales. This resulted in the screening out of 10 cases or less from each wave.

rated how frequently each item happened in the past 30 days using the following 6-point response scale: 1 (*Never*), 2 (*1–2 times*), 3 (*3–5 times*), 4 (*6–9 times*), 5 (*10–19 times*), and 6 (*20 or more times*). Scores on all three scales were log-transformed to reduce their skewness and kurtosis.

The Behavioral Assessment System for Children (BASC) Teacher Response Scale (Adolescent Form; Reynolds & Kamphaus, 1992) was used to obtain teacher ratings of each participating student. The BASC is a multimethod, multidimensional measure designed to assess the behavior problems and positive or adaptive skills of children ages 4–18 years. Teachers rate student behavior on a 4-point scale that ranges from 0 (*Never*) to 3 (*Almost Always*). The adolescent form was normed on 809 students aged 12–18 years from four regions of the United States. The 14-item Aggression scale ($\alpha = .95$) provided a measure of aggression from the teacher's perspective. Scores were log-transformed.

A Physical Aggression Composite scale comprised of four BASC and five PBFS items was developed to provide a cross-informant measure of the frequency of physical aggression. These items emerged from a single-parameter item response theory analysis (Rasch, 1980) of 13 physical aggression items drawn from the BASC Aggression subscale and the PBFS. Items were eliminated if they did not fit a unidimensional scale or had estimated scale positions redundant with other items. The resulting scale had a Kuder-Richardson reliability in excess of .99. Scores were log-transformed.

School variables—A nine-item School Safety Problems scale (Miller-Johnson et al., 2004; $\alpha = .89$) was used to assess students' perceptions of threats to their safety at school. Higher values indicated serious safety concerns. Students rated the seriousness of each problem on a 4-point scale with anchors ranging from 0 (*not a problem*) to 3 (*serious problem*). School norms were assessed using the Norms for Aggression and Alternatives scale ($\alpha = .80$). The School Norms for Aggression subscale was a shortened version of a scale developed by Henry (Henry, Cartland, Ruchcross, & Monahan, 2004) to assess students' perceptions about the extent to which students at their school approve or disapprove of aggressive behaviors (e.g., “How would the kids at your school feel if a kid hit someone who hit first?”). Items with a similar format were developed to create a School Norms for Nonviolent Behavior scale (e.g., “How Would the kids at your school feel if a kid ignored a rumor that was being spread about him or her?”; $\alpha = .70$). Items were rated on a 3-point scale, anchored by 1 (*disapprove*), 2 (*neutral*), and 3 (*approve*).

Construction of the Risk Factor Index

A risk factor index (RFI) was constructed from 10 variables representing social–cognitive variables, peer influences, and parental influences associated with increases in aggression. An initial set of 13 variables from the pretest battery was selected based on theoretical or empirical support associating them with the development of aggression among adolescents (see Miller-Johnson et al., 2004, for details on scales in the battery). The relevance of each scale was evaluated by determining if it predicted aggression at Wave 6 after controlling for Wave 1 aggression, gender, ethnicity, family structure, cohort, and site. These analyses were restricted to students at no-intervention control schools to avoid the influence of intervention effects. Ten of the 13 variables meeting this criterion at $p < .05$ were included in the RFI. Each variable was converted to a binary risk factor (presence/absence). The following variables that were positively associated with changes in aggression were scored as present for students with scores in the upper quartile: individual norms for aggression, beliefs supporting aggression, revenge goals, and parental support for fighting. The following variables negatively associated with changes in aggression were scored as present for students with scores in the lower quartile: individual norms for nonviolent behavior, use of nonviolent strategies, self-efficacy for

nonviolent responses, parental support for nonviolent responses, parental monitoring, and school norms for nonviolent behavior. The RFI reflected the number of risk factors present for each student. Although representing a diverse set of variables, the RFI had an acceptable internal consistency ($\alpha = .71$). The total number of risk factors ranged from 0 to 10 (see Table 2). Because less than 1.5% of students had more than 8 risk factors, those with 8 or more were combined into a single group. Boys had significantly higher scores on the RFI than did girls ($M_s = 3.3$ and 2.6 , respectively), $t(5291) = 11.71$, $p < .001$.

Demographic data including information about participants' race, ethnicity, and family structure were also obtained from the students.

Results

Attrition

Attrition analyses revealed no significant differences across conditions or cohorts in the number of waves of BASC or student report data available. Amount of missing data was unrelated to gender, family structure, site, or race/ethnicity. Only two interactions between covariates and attrition variables were found: Having an adult male in the home was more strongly related to the amount of data available in the selective condition, and one site differed significantly from others in the amount of BASC data collected in the universal condition. Further examination found that the number of waves of BASC and student data collected were modestly related to the Physical Aggression Composite ($r = -.06$, and $-.07$, respectively); PBFS Aggression ($r_s = -.03$), Overt Victimization ($r_s = -.04$), and Relational Victimization scales ($r_s = -.04$); and BASC Aggression ($r_s = -.05$). The absence of significant Baseline Outcome \times Condition interactions suggested that these effects were consistent across conditions.

Descriptive Statistics at Pretest

Means, standard deviations, and intraclass correlations (ICCs) reflecting the proportion of variance attributable to school-level differences for each outcome variable at baseline are reported in Table 3. Overall, the ICCs suggest a modest degree of similarity among students within the same schools. The higher ICC for the BASC Aggression scale most likely reflects the fact that all students within each school were rated by a small number of teachers. Correlations among the pretest measures are also reported in Table 3. All were significant at $p < .001$. The BASC Aggression and PBFS Aggression scales reflecting different sources (i.e., teacher vs. student ratings) were moderately correlated ($r = .30$). Measures of aggression and victimization were also positively correlated. Students' ratings of school variables, including school safety and school norms, were significantly but not strongly related to their individual levels of aggression or victimization. School norms for aggression and school norms for nonviolent behavior were moderately negatively correlated. The RFI was significantly correlated with pretest aggression and victimization (see Table 3).

There were no significant differences across conditions in gender, $\chi^2(3, N = 5,521) = 4.35$, $p = .23$, or presence of an adult male in the household, $\chi^2(3, N = 5,479) = 4.25$, $p = .22$. There were, however, significant differences in ethnic composition, $\chi^2(6, N = 5,479) = 96.86$, $p < .001$. Follow-up tests indicated that compared with control schools, there were higher percentages of both Hispanic/Latino and non-Hispanic African American students at universal and combined intervention schools (see Table 4). Pretest means on outcome measures were compared across conditions using SAS Proc Mixed to address clustering of students within schools. Models controlled for gender, ethnicity, family structure, cohort, and site and compared students at each intervention school with those at control schools. There were no significant differences across conditions on measures of aggression, school norms, or risk (see Table 4). Students at universal intervention schools reported higher levels of overt ($d = 0.13$,

$p < .01$) and relational ($d = 0.10, p < .05$) victimization. Students at selective intervention schools reported higher levels of overt victimization ($d = 0.11, p < .05$). Students at combined intervention schools reported higher levels of school safety problems ($d = 0.17, p < .05$).

Intervention Effects at the End of the Intervention Year

The first set of analyses focused on changes at the end of the intervention year (i.e., initial posttest), controlling for pretest levels of each outcome. Random regression models were estimated with SAS PROC Mixed to account for the nesting of individual observations (Level 1) within students (Level 2) and nesting of students within schools (Level 3). For each outcome, scores across all available posttest waves were modeled as a function of intervention condition, time since the end of the sixth-grade school year, and student- and school-level covariates.³ Student-level covariates included pretest scores on the outcome measure, gender, race/ethnicity, family structure, and cohort. Site was included as a school-level covariate. Covariates were mean-centered to facilitate interpretation. The model used a full-information maximum likelihood approach in which parameter estimates were based on all students with pretest data and at least one posttest observation on the outcome measure ($Ns = 5,126$ to $5,184$ on the basis of missing data on specific measures). Changes following the initial posttest were modeled by a linear slope, quadratic trend, and fall to spring indicator to take seasonal variation into account.⁴ The model included main effects for each student- and school-level variable and interactions of each of these variables with the linear slope for time.⁵

Intervention conditions were dummy-coded, such that each intervention was compared with the control condition. Analyses were based on an intent-to-treat approach in which all students were included on the basis of the condition their school was assigned. Within this model, main effects for each intervention represent differences in estimated scores at the end of the intervention year for students at schools assigned to that intervention versus those at control schools after controlling for pretest scores and other covariates. Cohen's d coefficients were calculated as measures of effect size for each intervention effect. The consistency of intervention effects across gender was examined by testing interactions of gender with intervention conditions and with Intervention Condition \times Time interactions. Follow-up tests of significant interactions were conducted to identify any significant gender-specific intervention effects.

Aggression—Students at universal intervention schools and those at combined intervention schools had higher adjusted means on PBFS Aggression at posttest than did students at control schools (see Table 5). Similar differences were not found on the other two measures of aggression. There were no significant initial posttest differences in aggression between students at selective intervention and control schools. The effects of the universal intervention on initial posttest scores for the Physical Aggression Composite differed across gender ($d = -0.15, p < .05$). Girls at universal intervention schools had significantly higher scores than did girls at control schools ($d = 0.16$). This effect was not significant for boys ($d = 0.00$). The effects of the selective and combined intervention on initial posttest scores were consistent across gender.

Victimization—There were no significant effects on initial posttest scores on victimization for any of the three intervention conditions. These effects were consistent across gender.

³This has an advantage over simpler models based on only the first two waves of data in that the inclusion of the additional waves of posttest data provides a more accurate estimate of each individual's score at the end of the intervention year by making use of all available data.

⁴Random effects were specified for intercepts and slopes at the student level and for intercepts at the school level. The quadratic and fall to spring indicator were treated as fixed effects to facilitate the interpretation of intervention effects on linear slopes.

⁵Degrees of freedom for main effects of the school-level variables (i.e., condition and site) were set at 30 (37 schools minus 3 for condition minus 3 for sites minus 1 for intercept). Degrees of freedom for other effects were set at the number of individuals minus the number of individual-level terms and interactions in the model minus 1.

School atmosphere—A significant universal intervention effect was found for initial posttest scores on one of the three measures of school atmosphere. Students at universal intervention schools reported higher levels of school norms supporting aggression at initial posttest than did students at control schools ($d = 0.13, p < .05$). There were no significant selective intervention effects at initial posttest for school atmosphere variables. One significant posttest effect was found for the combined intervention. Students at combined intervention schools reported higher initial posttest levels of school safety problems than did students at control schools ($d = 0.14, p < .05$). Effects on school atmosphere variables were consistent across gender.

Risk as a Moderator of Intervention Effects at the End of the Intervention Year

Analyses were conducted to determine if intervention effects on aggression and victimization at initial posttest differed for students at different levels of pretest risk. Pretest scores on the RFI were incorporated into the model used to evaluate overall intervention effects by adding the main effect for the RFI, $\text{RFI} \times \text{Time}$, $\text{RFI} \times \text{Intervention Condition}$, and $\text{RFI} \times \text{Intervention Condition} \times \text{Time}$ interactions. In order to control for gender differences in risk factors, we also included in the model a main effect for gender and $\text{Gender} \times \text{Intervention Condition}$ interaction terms.

Aggression—As expected, the RFI significantly predicted pretest-adjusted scores on all three aggression measures at the initial posttest ($\beta = .11$ to $.20, p < .001$). The RFI also moderated the effects of both the universal, $t(5134) = -2.18, p < .05$, and selective, $t(5134) = -2.11, p < .05$, interventions on posttest scores for PBFS Aggression but not for either of the other two measures of aggression. Confidence intervals for effect size estimates (d coefficients) on PBFS Aggression for students at each level of the RFI is shown in Figure 2A. Students at intervention schools with low pretest scores on the RFI had higher levels of aggression at the initial posttest than did their counterparts at control schools. The differences between students at universal schools and those at control schools were statistically significant for students with three or fewer risk factors. In terms of clinical significance, for students with zero risk factors this is equivalent to an expected posttest difference of about 2.2 acts of aggression ($M = 7.0$ and 9.2 for control and universal schools, respectively), including 0.9 acts of physical aggression ($M = 2.0$ and 2.9 for control and universal schools, respectively) in the past 30 days per student.⁶ Intervention effects were in the opposite direction for students with high pretest risk factor scores. This effect was significant for students with eight or more risk factors at selective intervention schools.⁷ The lower posttest scores for high-risk students at selective intervention schools compared with those at control schools was equivalent to a difference of 11.8 fewer acts of aggression ($M = 92.8$ and 81.0 for control and selective schools, respectively), including 3.3 acts of physical aggression ($M = 27.9$ and 24.6 for control and selective schools, respectively) in the past 30 days.

Additional analyses were conducted to determine whether the moderating effects of the RFI were due to its serving as a proxy variable for aggression. Separate analyses were conducted with pretest scores on the PBFS Aggression and the Physical Aggression Composite measures as moderators of intervention effects. There were no significant $\text{Intervention Condition} \times \text{Pretest Aggression}$ interaction effects on any of the measures of aggression.

Victimization—The RFI significantly moderated the effects of the universal, $t(5137) = -2.58, p < .01$, and combined, $t(5137) = -2.80, p < .01$, interventions on initial posttest scores for

⁶These are approximations based on transforming the log-transformed scores at Initial posttest predicted by the model back into raw scores and converting them into frequencies based on the original 6-point rating scale anchors.

⁷It should be noted that larger effect sizes were required to reach significance at higher levels of risk because of larger standard errors based on the relatively smaller number of students in the high risk categories.

overt victimization and the effects of the universal, $t(5136) = -2.39, p < .05$; selective, $t(5136) = -2.16, p < .05$; and combined, $t(5136) = -3.43, p < .001$, interventions on relational victimization. In each case, low-risk students at intervention schools reported higher levels of victimization than did their counterparts at control schools, and high-risk students reported relatively lower levels. Students at universal schools with zero risk factors and those at combined intervention schools with two or fewer risk factors had significantly higher posttest scores than did their counterparts at control schools on the PBFS Overt Victimization scale (see Figure 2B). For students with zero risk factors, this is equivalent to experiencing 0.6 and 0.9 more acts of overt victimization in the past 30 days for students at universal and combined schools, respectively ($M_s = 3.1, 3.7, \text{ and } 4.0$ for control, universal, and combined schools, respectively). Lower mean scores relative to controls were significant for students at universal intervention schools with eight or more risk factors. This is equivalent to experiencing 2.7 fewer acts of overt victimization in the past 30 days ($M = 16.6$ and 13.9 for control and universal schools, respectively).

Higher mean scores on the PBFS Relational Victimization scale relative to controls were significant for students at combined schools with one or fewer risk factors (see Figure 2C). For students with zero risk factors, this is equivalent to 0.9 more acts of relational victimization in the past 30 days for students at combined schools ($M_s = 3.2, \text{ and } 4.1$ for control and combined schools, respectively). In contrast, lower mean scores were significant for students with five or more risk factors at selective intervention schools and those with six or more risk factors at combined intervention schools. For students with eight or more risk factors, this is equivalent to experiencing 1.4 and 1.6 fewer acts of relational victimization in the past 30 days for students at selective and combined schools, respectively ($M_s = 8.4, 7.0, \text{ and } 6.9$ for control, selective, and combined schools, respectively).

Analyses were again conducted to determine if similar results could be obtained with pretest aggression as the moderator. Pretest aggression, as measured on the PBFS, significantly moderated the effects of the combined intervention on overt victimization at the initial posttest, $t(5137) = -1.96, p < .05$. Similar effects were not found with the Physical Aggression Composite scale. Follow-up analyses indicated that students at combined intervention schools with PBFS aggression pretest scores at or below the 25th percentile reported significantly higher levels of posttest overt victimization than did their counterparts at control schools ($d = 0.12, p < .05$). Pretest aggression on both the PBFS Aggression and Physical Aggression Composite scales moderated effects of both the selective, $t(5136) = -2.03, p < .05$, and $t(5136) = -2.05, p < .05$, respectively, and combined, $t(5136) = -2.97, p < .01$, and $t(5136) = -3.19, p < .01$, respectively, interventions on relational victimization. Follow-up analyses indicated that students at selective intervention schools reported significantly lower levels of relational victimization at pretest aggression levels at or above the 90th percentile (both $d_s = -0.14, p < .05$), with no significant intervention effects for those at lower levels of pretest aggression. In contrast, students at combined intervention schools reported higher levels of relational victimization relative to controls when their pretest aggression fell below the 25th percentile ($d_s = 0.12$ and 0.11 , respectively, $p < .05$), with no significant intervention effects for those at higher levels of pretest aggression.

Intervention Effects on Growth Curves

Analyses of the longer term intervention effects were conducted by comparing growth curve trajectories for students attending schools assigned to the universal intervention with more normative development represented by growth trajectories for students at control schools (MacKinnon & Lockwood, 2003) with random regression models via SAS PROC Mixed. Changes in outcomes since pretest were modeled by an intercept, linear slope, quadratic trend, and fall to spring indicator. These models were similar to those described in the preceding

section but with several important differences. Pretest scores on outcome variables were included as one of the waves of data collection rather than as a covariate, and the reference point for time was set to the date of the pretest assessment. Within this model, main effects represent each variable's relation to pretest scores on the outcome variable, and interactions with the linear slope indicate their impact on the linear trajectory. The model used a full-information maximum likelihood approach in which parameter estimates were based on all students with at least one observation on the outcome measure.

Aggression—Coefficients reported in Table 6 represent the mean growth curve parameters for students at the control schools. As such, they represent the trajectories that would be expected if no interventions were conducted. Both the Physical Aggression Composite and PBFS Aggression scales had significant positive linear slopes, negative quadratic coefficients, and positive fall/spring coefficients. This suggests an overall trend of increasing aggression, with the rate of increase decelerating over time and with aggression increasing from fall to spring within each school year. In contrast, the BASC Aggression scale had a small negative linear trend with a significant fall to spring increase—the amount of increase within the school year was nearly 4 times larger than the degree of decrease across years. Significant effects for the universal intervention were found for one of the three aggression measures (see Table 7). Contrary to expectations, students at universal intervention schools did not show the decrease over time on the BASC Aggression scale that was found for students at control schools. Significant effects for the selective intervention were found for two of the measures of aggression. Students at selective intervention schools showed less of an increase on the physical Aggression Composite and more of a decrease on the BASC Aggression scale than did those at control schools. Students at schools assigned to the combined intervention did not differ from those at control schools on linear slopes for any of the aggression measures. Intervention effects on linear slopes were consistent across gender.

Victimization—Growth trajectories for victimization at control schools were characterized by a linear decrease, a positive quadratic trend, and an increase between the fall and spring within each school year. Examination of intervention effects on linear slopes indicated that students at universal intervention schools reported greater decreases in relational victimization than did students at control schools. Although there was a similar trend for overt victimization, it was not significant. There were no significant effects for the selective or combined interventions. Intervention effects on linear slopes were consistent across gender.

School environment—Students at control schools reported decreases in school safety problems, increases in school norms for aggression, and decreases in school norms for nonviolent behavior. School norms for aggression also showed a significant fall to spring increase. There were no significant differences in linear slopes across intervention conditions for any of the three measures of school environment (see Table 7). Although there was a significant Gender \times Selective Intervention \times Time interaction on school norms for aggression ($d = 0.08, p < .05$), follow-up analyses did not reveal any significant gender-specific intervention effects.

Preintervention Risk as a Moderator of Intervention Effects on Growth Curves

The growth curve model was expanded to determine the extent to which intervention effects were moderated by pretest scores on the RFI by adding the same main effects and interaction terms included in the risk models for analyses of initial posttest effects. Within these models, the RFI did not significantly moderate intervention effects on linear slopes for the measures of aggression or victimization.

Discussion

This study examined the impact of two frequently promoted strategies for addressing school-level aggression and victimization among middle school students: (1) a universal intervention directed at all students and teachers within a given grade level, with a focus on school norms, students' social-cognitive processes, and teachers' knowledge and disciplinary practices, and (2) a selective intervention directed at students displaying high levels of aggression and influence, with an emphasis on parenting and family relations. The present study applied a developmental-ecological approach that focused on measuring impact against normal developmental trends within a major social setting of presumed great influence on youth risk—the school. This study is one of the largest trials of violence prevention to randomize entire middle schools to conditions and may be unique in its attempt to provide a methodologically rigorous test of these approaches for this age group across a large and diverse set of schools. The findings reflect a complex pattern in which effects differed across intervention conditions, 2-year follow-up versus initial outcomes, outcome domains, and level of risk.

Effects of the Universal Intervention

The pattern of effects for schools assigned to the universal intervention was mixed. Students at universal intervention schools showed some benefit in terms of greater decreases in relational victimization over time relative to students at control schools. In contrast, they also showed relatively smaller decreases over time in teachers' ratings of their aggression and, in the shorter term, reported relatively higher levels of both aggression and school norms for aggression at the end of the intervention year. Anticipated intervention effects on overt victimization, school safety problems, and school norms supporting nonviolent behavior were not found. The universal intervention effects on reductions in victimization are consistent with several previous studies (Farrell, Valois, & Meyer, 2002; Farrell, Valois, et al., 2003) examining the impact of RIPP (Meyer et al., 2000), the universal student curriculum on which the student intervention was based.

The relative increase in aggression at universal intervention schools was unexpected and inconsistent with previous studies that have found lower posttest levels of aggression for RIPP participants relative to students in control conditions on school-disciplinary code violations for violent offenses (Farrell, Meyer, & White, 2001) and on student reports of their frequency of aggression (Farrell et al., 2002; Farrell, Valois, et al., 2003). A variety of factors, including modifications to the curriculum and its method of delivery, could account for these discrepancies. In previous studies, RIPP has been implemented by a full-time violence prevention specialist assigned to each school who had additional duties (e.g., monitoring bus loading and unloading). Whereas the current project implemented the student curriculum in conjunction with teacher training, previous evaluations implemented RIPP in conjunction with a peer mediation program. There are also differences in research design. In contrast to the present study, which randomized schools to conditions, previous evaluations of RIPP have randomized classrooms within schools (Farrell, Meyer, & White, 2001; Farrell et al., 2002) or used a quasi-experimental design in which control schools were compared with schools in which a 3-year curriculum was implemented (Farrell, Valois, et al., 2003). It should be noted that although previous evaluations of RIPP have reported more promising results than does the present study, effects in previous studies have not been consistent across measures, and not all have been maintained over time.

Effects of the Selective Intervention

One of the unique aspects of this study was the evaluation of the extent to which implementing a family-focused intervention with a selected subset of students could produce an ecological effect on other students within the same grade level. Although previous studies have evaluated

the impact of selective interventions for middle school students (e.g., Dishion, Kavanagh, Schneiger, Nelson, & Kaufman, 2002; Hammond & Yung, 1991), the focus has been on evaluating the impact on those who participated rather than their social impact on peers. In contrast, the effects for the selective intervention reported here are not the effects on the students targeted by the selective intervention but the effects on the behavior of the larger cohort of students within their school. This study also differed from previous studies by targeting students who were not only aggressive but also socially influential.

Small but significant intervention effects were found on growth trajectories for two of the three measures of aggression. These reflected increasingly lower frequencies of physical aggression and teacher ratings of aggression for students at selective intervention schools relative to those at control schools. These effects were not evident at the end of the intervention year but represented increasing divergence over time. This suggests that intervention with high-risk youths who are socially influential can affect the overall aggression among other students in their grade, albeit moderately and emerging gradually over time. Such effects are consistent with our ecological social-network view that targeting those who are high risk and influential can lead to lower aggression overall. Whether this is due to a reduction in the targeted youths' contribution to overall aggression levels or to their influence on other students is unclear. A separate article examining the direct impact of the selective intervention on students who participated in the intervention revealed a complex pattern (MVPP, 2008a). There was, as occurred here, evidence of selective intervention effects on aggression among the highest risk students in the targeted subsample and more general effects on key family variables targeted by the intervention, including parental monitoring and family cohesion. Further work is needed to clarify the extent to which these effects may be responsible for the effects of the selective intervention on the broader sample of students that were the focus of the present study.

The absence of comparable effects on measures of victimization, school safety, and school norms was surprising. Intervening with students who were high on aggression and social influence was expected to impact school norms about acceptance of and use of aggression and lead to reductions in targeted students' levels of aggression. Such changes would be expected to reduce levels of victimization and create a sense of a safer and more welcoming school. It is possible that perceptions of safety and victimization are less reactive to changes in aggression than expected, particularly given the focus on a single grade level. Moreover, the current study selected 10–20 students at each school, which represented only 4%–8% of the sixth graders at the larger middle schools, and their potential impact may have been reduced by the fact that many transferred out of their original schools during the study. Further work is needed to establish the number of high-risk students that need to be targeted to produce an observable ecological effect.

Another important aspect of this study was its examination of the combined effects of the universal and selective interventions. Although we anticipated that combining these approaches would exceed their individual effects, such effects were not found. It is important to note that the two interventions were not designed to be complementary but were grounded in different models of change. Whereas the universal intervention focused directly on students and attempted to alter social norms and social-cognitive processes, the selective intervention focused on changing the school ecology by altering the behavior of influential aggressive students through a family-based approach. This suggests that efforts to build comprehensive programs across the social ecology by combining evidenced-based strategies should carefully consider the potential differential influence of interventions that are not designed to be complementary.

Variations in Effects on the Basis of Preintervention Risk Level

The pattern of main effects should be interpreted cautiously because the effects of both interventions at the end of the intervention year differed for students on the basis of their pretest level of risk. Students at lower risk levels at intervention schools reported higher levels of aggression and victimization at the initial posttest than did their counterparts at control schools, and those at higher risk reported relatively lower levels. The differential direction of effects for low- and high-risk students suggests that the intervention may produce some movement toward a group mean that works to the benefit of those at higher levels of risk but may elevate levels of aggression among low-risk students. A similar pattern of effects was found in recent analyses of the effects of the universal intervention on social-cognitive processes (MVPP, 2008b).

Compared with their counterparts at control schools, low-risk students at universal intervention schools reported higher levels of aggression at the end of the intervention year and low-risk students at universal and combined intervention schools reported higher levels of overt victimization. The pattern of moderated effects suggests that the overall increase in aggression for students at universal intervention schools reflects changes among the relatively higher percentage of students at the lowest levels of risk. Small increases in aggression among low-risk youths participating in interventions that focus on changing norms have been found in other studies (MACS, 2002). Whether such effects represent increased awareness and reporting of aggression, an increase in “acting up” or assertiveness, or some increase in more serious forms of aggression remains to be determined. Comparisons of means for the high- and low-risk groups indicate that levels of aggression for low-risk students remained substantially lower than those for high-risk students. Nevertheless, this finding suggests the need for further research on the qualitative nature and magnitude of these effects and examination of how student-focused universal interventions training might be refined or revised to eliminate any such effect even if ultimately of limited clinical/policy concern.

The effects for high-risk students are consistent with the prevention focus of the intervention in terms of reducing the overall increase in aggression evident from the pattern of growth curves for students at control schools. These effects were evident for both intervention approaches and are consistent with those of several previous studies that have found more favorable intervention effects for youths displaying higher initial levels of aggression (Farrell, Meyer, et al., 2003; Farrell, Meyer, & White, 2001; MACS, 2002; Wilson et al., 2003). The current study differs from previous studies in its use of a risk index representing multiple sources of influence rather than baseline aggression as a moderator of intervention effects. Although the two variables are correlated, comparable sets of analyses indicated that the risk index provided a more consistent pattern of moderating effects across outcomes. The RFI also provided a better basis for differentiating among the relatively large group of students at the lower end of the risk continuum who may have similar scores on measures of aggression due to floor effects. The ability of the RFI to moderate outcomes also suggests the possibility that interventions may be able to produce positive effects for students exposed to higher levels of risk who may not yet have displayed higher levels of aggression.

Because this study focused on a random sample of students, there was some overlap between participants in this study and those meeting eligibility criteria for being targeted by the selective intervention (i.e., about 12% of this sample met these criteria). This targeted sample would be expected to be disproportionately represented among students with higher scores on the RFI. Although this was, in fact, the case ($d = 0.34$), $t(5290) = 8.27$, $p < .0001$, the targeted sample represented a minority (22%) of students at the highest level of the RFI, and nearly half the targeted sample (47%) had three or fewer risk factors. This suggests that the risk-moderated effects are most likely not a simple artifact of overrepresentation by the targeted sample.

Limitations

This study had several limitations that merit discussion. Although a large sample of schools was recruited, the number of schools assigned to each condition (i.e., 9–10) was not sufficiently large to ensure that there were not important differences in schools across conditions. Although few differences were found at baseline, schools assigned to both the universal and combined conditions had initially higher levels of victimization than did control schools. The small number of schools within each condition also introduces the possibility that key changes at one or two schools within a condition (e.g., changes in teaching staff or school policies) could have influenced the findings. Because schools often employ a variety of intervention programs (Gottfredson, 2001), the evaluation of intervention effects in the present study may have been confounded with effects of other programs implemented in the schools. The timing of the start of the intervention was also less than optimal. Efforts to change the social ecology of a school, particularly those that include teacher training, would ideally begin prior to the start of the school year, before patterns are established. Interventions within the current study began several months into the school year because of the need to identify, recruit, consent, and collect pretest data from participants. The fact that the interventions were implemented as part of a research project may have also reduced school staff commitment to the interventions. The multisite nature of this study was both a strength and a weakness. It enhanced generalizability by including schools that differed across important characteristics such as size, structure, geographic region, and demographic and ethnic composition. Although efforts were made to standardize intervention procedures, site differences led to some variability in the selection, training, and supervision of interventionists. The effects of the interventions introduced under such varied circumstances may simply not have been sufficiently robust to generate a consistent pattern of main effects. Unfortunately, the limited number of schools per condition by site limited our ability to examine the influence of this variability on outcomes.

Several important measurement issues should also be noted. Because the universal intervention included a teacher component, it is possible that the higher levels of aggression on the basis of teachers' ratings at schools that received the universal intervention may have reflected their increased awareness of students' aggression rather than actual changes in behavior. Although changes in students' aggression were measured by both teacher and student ratings, it should be noted that victimization and school norms were measured solely by student reports. In addition, although a 2-year follow-up is substantial, these results do not extend through the age when violence risk is greatest and may not reflect long-term effects. Finally, the analyses were based on a conservative intent-to-treat approach and may not accurately reflect the outcomes for students who received the intended dosage.

General Implications

This study is one of few that have examined the impact of randomly assigning entire schools rather than individual students or classrooms to conditions and that collected follow-up data across several years postintervention. Moreover, the majority of studies randomizing schools to conditions have focused on smaller, elementary schools (e.g., Conduct Problems Prevention Research Group, 1999; MACS, 2002). To our knowledge, this study also represents the first effort to examine the larger ecological effects of intervening with youths who are high in both aggression and social influence. Evaluating impact of implementation at the school level provides a better basis for evaluating school-based programs as they are most likely to be implemented in practice. Attempting to impact the social ecology of large middle schools is a challenging undertaking. In contrast to elementary schools, where there is more limited interaction among students across grades and classrooms, middle schools have a less formal structure, where students from different grades frequently interact both in school and at school-sponsored social events. Middle school youths are also generally less closely monitored than

are younger children, making them more susceptible to influences outside of school within their neighborhood and peer group.

The findings of this study must be viewed within the context of the results of other studies that have evaluated the impact of school-based violence prevention programs on middle school students. In general, the effects of such programs have not been as consistent or favorable as interventions focused on younger children. Several previous evaluations of universal interventions for middle school students have reported no differences between intervention and control groups on various measures of aggression (e.g., Orpinas et al., 2000; Orpinas, Parcel, McAlister, & Frankowski, 1995) and in some cases adverse effects (Skroban, Gottfredson, & Gottfredson, 1999). Others have found effects on some measures of aggression but not on others (e.g., Botvin, Griffin, & Nichols, 2006; Farrell, Meyer, & White, 2001). Intervention effects have varied as a function of contextual differences such as neighborhood (e.g., MACS, 2002, 2007) and individual characteristics including ethnicity (Harrington, Giles, Hoyle, Feeney, & Yungbluth, 2001) and gender (Farrell & Meyer, 1997). These studies suggest that school-based strategies to reduce violence may not produce uniform effects across settings or even across individuals within settings. These efforts to go beyond the examination of simple main effects to identify those factors that influence program effects illustrate the increasing sophistication of violence prevention research.

One of the key reasons for this study was to provide guidance to school administrators regarding the relative merits of targeting high-risk youths versus implementing universal programs to affect the overall atmosphere and the general student and teacher population. Overall, the findings provide more support for the selective family-focused intervention than for the universal intervention. It is, however, important not to generalize from one study that includes a single example of each preventive approach (social-cognitive, teacher training, and family). The findings do point to a need for further efforts to refine the universal student and teacher interventions. Because the current study focused intervention efforts on a single grade level, students at intervention schools were not isolated from the influences of students in other grade levels who were not the focus of any intervention efforts. At three of the four sites, the universal intervention was implemented with the youngest cohort of students within large middle schools and was not accompanied by other school-level efforts (e.g., changes in disciplinary policies, environmental changes) that may have supported the intervention. Sixth graders were seen as at particular risk because of their transition from elementary schools and because of the variety of developmental changes that occur. Nonetheless, they also often represent the smallest and least influential group of students within middle schools. Whether more intensive or comprehensive efforts directed across grade levels could produce clearer effects has yet to be determined. Further analyses are needed to establish the extent to which the universal intervention components were successful in altering the specific processes they were designed to address. The findings supporting the selective intervention were encouraging and suggest the potential benefit of employing selective interventions as a vehicle for producing broader ecological effects. As with the universal intervention, further work is needed to identify how best to strengthen the effects of this approach to prevention. This includes research to establish the proportion of high-risk youths within a school with whom to intervene in order to produce the optimum ecological effect and to identify other strategies to strengthen the diffusion of that effect. Further examination of these issues should provide a foundation to inform efforts to develop more effective violence prevention programs for middle school students.

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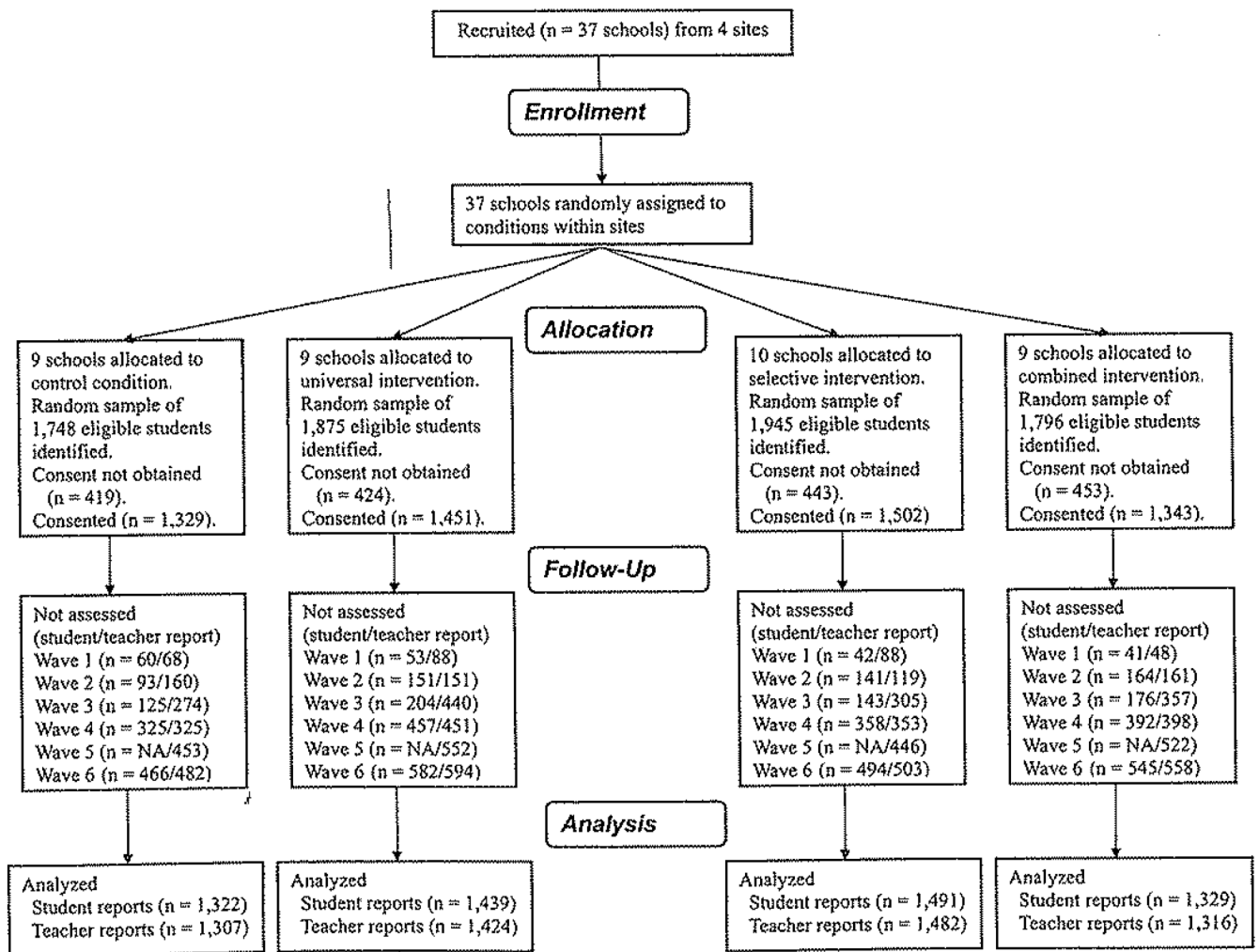


Figure 1. CONSORT diagram indicating flow of participants through the Multisite Violence Prevention Project. Students not available at specific waves of assessment either left the school or could not be located. Data based on student report were not collected from Cohort 1 at Wave 3 and were not collected from either cohort at Wave 5 by design. Analyses employed full-information maximum likelihood estimation on the basis of all students who provided data at one or more waves.

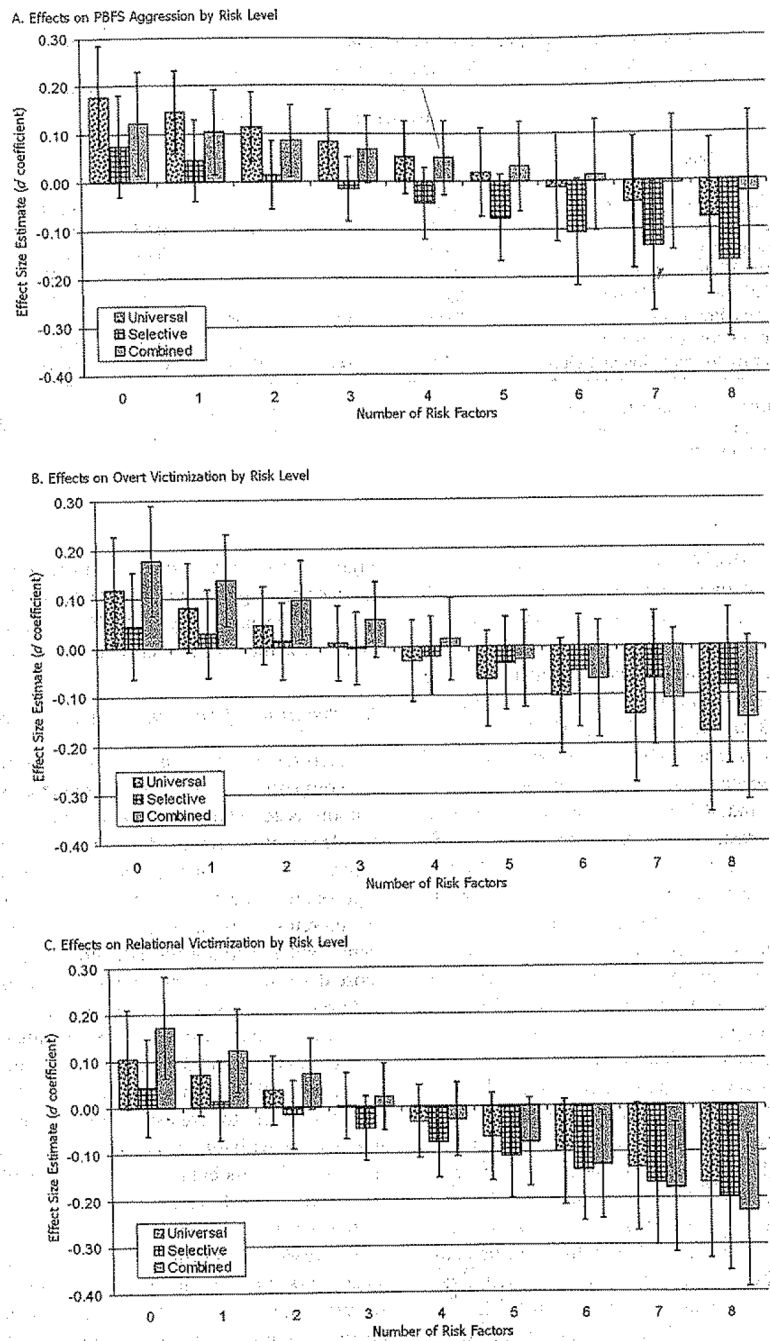


Figure 2. Differences in adjusted means (d coefficients) between students at schools assigned to each intervention condition versus those at control schools as a function of scores on the risk factor index at pretest. Figures represent significant intervention effects found on the Aggression, Overt Victimization, and Relational Victimization scales of the Problem Behavior Frequency Scale (PBFS). Bracketed lines represent 95% confidence intervals.

Table 1
 Multisite Violence Prevention Project: School and Sample Characteristics by Site

Variable	Chicago	Durham, NC	Northeastern GA	Richmond, VA	Total	Average
School characteristics						
No. of participating schools	12	8	9	8	37	
Grade levels	K-8	6-8	6-8	6-8		
% eligible for federal lunch program	96	42	47	75		
Average no. of sixth graders	70	241	239	236		
Overall sample						
No. of student reports completed (% of consented)	1,726 (98)	1,192 (98)	1,370 (100)	1,292 (98)	5,580 (99)	
No. of teacher reports obtained (% of consented)	1,681 (96)	1,187 (97)	1,368 (100)	1,292 (98)	5,528 (98)	
Hispanic (%)	53	9	12	5		23
Non-Hispanic Black (%)	37	56	29	75		48
Non-Hispanic White (%)	2	23	46	6		18
Multiracial (%)	6	8	9	11		8
Gender (% boys)	50	47	50	49		49
Two-parent families (%)	47	44	53	30		44
Single-parent families (%)	35	36	27	44		35
Single-parent and stepparent families (%)	11	12	15	15		13

Table 2

Distribution of Risk Factors by Gender at Pretest

No. of risk factors	Girls		Boys		Total	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
0	506	19	321	12	827	15
1	543	20	436	17	979	18
2	467	17	379	15	846	16
3	371	14	361	14	732	14
4	305	11	267	10	572	11
5	182	7	270	10	452	8
6	150	5	230	9	380	7
7	110	4	174	7	284	5
8 or more	95	3	171	7	266	5

Table 3
Means, Standard Deviations, Intraclass Correlations, and Correlations Among Outcomes at Baseline

Variable	1	2	3	4	5	6	7	8	9
Measure									
1. Physical Aggression Composite ^a	—								
2. BASC Aggression ^a	.66	—							
3. PBFS Aggression ^a	.70	.30	—						
4. PBFS Overt Victimization ^a	.41	.20	.54	—					
5. PBFS Relational Victimization ^a	.24	.12	.38	.69	—				
6. School Safety Problems	.11	.10	.08	.13	.12	—			
7. School Norms for Aggression	.12	.04	.21	.15	.11	-.04	—		
8. School Norms for Nonviolent Behavior	-.09	-.05	-.13	-.11	-.07	-.08	-.31	—	
9. RFI	.43	.27	.49	.24	.10	.09	.19	-.37	—
<i>M</i>	0.35	1.50	0.44	0.53	0.47	1.83	1.99	1.75	2.96
<i>SD</i>	0.33	1.15	0.35	0.43	0.41	0.82	0.4	0.53	2.34
Intraclass correlation	.05	.05	.02	.02	.01	.09	.04	.02	.04

Note. All *r*s above .04 in absolute value are significant at $p < .001$. Sample size for individual correlations ranged from 5,109 to 5,423 due to missing data from specific sources (e.g., teacher ratings and student reports). BASC = Behavioral Assessment Scale for Children; PBFS = Problem Behavior Frequency Scale; RFI = risk factor index.

^aVariable was log-transformed.

Table 4
 Comparison of Participant Characteristics and Pretest Means and Standard Errors on Outcome Measures Across Conditions

Characteristic and measure	Control		Universal		Selective		Combined	
	M	%	M	%	M	%	M	%
Demographic variable								
Gender (boys)	48.61	51.55			48.85	47.85		
Adult man in household	69.12	69.22			71.79	68.53		
Non-Hispanic Black	45.54	59.15	48.49 ^{***}	47.04	0.55	58.06	39.23 ^{***}	
Hispanic/Latino	24.13	18.51	12.99 ^{***}	25.97	1.17	16.35	24.80 ^{***}	
	M	$\chi^2(1, N = 2,718)^a$	M	$\chi^2(1, N = 2,778)^a$	M	$\chi^2(1, N = 2,617)^a$	M	$\chi^2(1, N = 2,617)^a$
Pretest measures	SE	d^b	SE	d^b	SE	d^b	SE	d^b
Physical Aggression Composite	0.33	0.02	0.36	0.09	0.35	0.35	0.06	0.05
BASC Aggression	1.48	0.07	1.47	-0.01	1.52	1.50	0.04	0.01
PBFS Aggression	0.42	0.01	0.45	0.10	0.45	0.43	0.10	0.04
PBFS Overt Victimization	0.51	0.01	0.56	0.13 ^{**}	0.55	0.51	0.11 [*]	0.02
PBFS Relational Victimization	0.46	0.01	0.50	0.10 [*]	0.47	0.46	0.03	0.00
School Safety Problems	1.76	0.04	1.84	0.09	1.81	1.91	0.06	0.17 [*]
School Norms for Aggression	1.74	0.03	1.76	0.04	1.75	1.74	0.03	0.01
School Norms for Nonviolent Behavior	2.00	0.02	2.01	0.03	1.99	1.98	-0.02	-0.05
Risk factor index	2.81	0.12	2.96	0.06	3.07	2.97	0.11	0.07

Note. BASC = Behavioral Assessment Scale for Children; PBFS = Problem Behavior Frequency Scale.

^a $\chi^2(1)$ comparing specific intervention groups with control provided when overall chi-square across conditions was significant (see article).

^b d coefficient intervention versus control, controlling for demographic variables and site.

* $p < .05$.

** $p < .01$.

*** $p < .001$.

Table 5
Differences in Adjusted Means (d coefficients) at End of Intervention Year for Students at Schools Assigned to Three Intervention Conditions Versus Control Condition

Measure	Universal only		Selective only		Combined	
	d	SE	d	SE	d	SE
Physical Aggression Composite	0.08	0.06	0.00	0.06	0.04	0.06
BASC Aggression	0.01	0.05	0.00	0.05	0.00	0.05
PBFS Aggression	0.09*	0.04	0.00	0.04	0.09*	0.04
PBFS Overt Victimization	0.02	0.04	0.01	0.04	0.07	0.04
PBFS Relational Victimization	0.01	0.04	-0.03	0.03	0.04	0.04
School Safety Problems	0.05	0.06	0.07	0.06	0.14*	0.06
School Norms for Aggression	0.13*	0.06	0.04	0.06	0.07	0.06
School Norms for Nonviolent Behavior	0.01	0.06	-0.05	0.06	0.00	0.06

Note. Effects were adjusted for the following covariates: pretest scores on outcome measure, cohort, gender, ethnicity, family structure, and site. BASC = Behavioral Assessment Scale for Children; PBFS = Problem Behavior Frequency Scale.

* $p < .05$.

Table 6
Growth Curve Coefficients in Control Group for Outcome Measures Across All Waves of Data

Measure	Intercept		Linear		Quadratic		Fall/spring ^a	
	Coefficient	SE	Coefficient	SE	Coefficient	SE	Coefficient	SE
Physical Aggression Composite	0.39	0.018	0.03***	0.008	-0.01***	0.003	0.06***	0.004
BASC Aggression (teacher report)	1.70	0.061	-0.06*	0.024	-0.01	0.008	0.23***	0.009
PBFS Aggression	0.46	0.014	0.08***	0.009	-0.02***	0.003	0.05***	0.004
PBFS Overt Victimization	0.49	0.012	-0.11***	0.011	0.02***	0.003	0.04***	0.005
PBFS Relational Victimization	0.55	0.014	-0.07***	0.011	0.01*	0.004	0.04***	0.006
School Safety Problems	1.78	0.049	-0.15***	0.018	0.02***	0.006	0.02	0.009
School Norms for Aggressions	1.74	0.028	0.28***	0.014	-0.06***	0.005	0.02*	0.007
School Norms for Nonviolent Behavior	1.99	0.019	-0.09***	0.013	0.02***	0.004	-0.01	0.007

Note. Intercepts represent estimated scores at baseline. Interventions were dummy-coded such that control schools represent the reference group. All other variables were mean-centered. Models included the following effects: main effects and interactions with linear slope for intervention condition, cohort, gender, ethnicity, family structure, and site and Condition \times Cohort, Condition \times Linear \times Cohort, Cohort \times Site, and Cohort \times Site \times Linear interactions. BASC = Behavioral Assessment Scale for Children; PBFS = Problem Behavior Frequency Scale.

^aVariable coded as fall = -1, spring = 0.

* $p < .05$.

*** $p < .001$.

Table 7
 Linear Slope Coefficients for Students at Intervention Schools and Slope Differences (d coefficients) Relative to Students at Control Schools

Variable	Universal only			Selective only			Combined		
	Slope	SE	d	Slope	SE	d	Slope	SE	d
Physical Aggression Composite	0.04	0.008	0.03	0.02	0.008	-0.05*	0.03	0.008	0.00
BASC Aggression (teacher report)	0.00	0.024	0.06**	-0.12	0.023	-0.05**	-0.03	0.024	0.03
PBFS Aggression	0.09	0.009	0.03	0.07	0.009	-0.02	0.08	0.009	0.00
PBFS Overt Victimization	-0.08	0.011	-0.02	-0.08	0.011	-0.01	-0.08	0.011	-0.02
PBFS Relational Victimization	-0.13	0.010	-0.04*	-0.12	0.010	-0.02	-0.11	0.011	0.01
School Safety Problems	-0.15	0.018	-0.01	-0.15	0.018	-0.01	-0.14	0.019	0.01
School Norms for Aggression	0.28	0.014	0.00	0.28	0.014	0.00	0.27	0.014	-0.02
School Norms for Nonviolent Behavior	-0.10	0.012	-0.01	-0.09	0.012	0.00	-0.09	0.013	0.02

Note. Effects adjusted for cohort, gender, ethnicity, family structure, and site. BASC = Behavioral Assessment Scale for Children; PBFS = Problem Behavior Frequency Scale.

* $p < .05$.

** $p < .01$.