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Effects of 2 Prevention Programs on High-Risk Behaviors Among African American Youth:

A Randomized Trial

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Abstract

Objective—To test the efficacy of 2 programs designed to reduce high-risk behaviors among inner-city African American youth.

Design—Cluster randomized trial.

Setting—Twelve metropolitan Chicago, Ill, schools and the communities they serve, 1994 through 1998.

Participants—Students in grades 5 through 8 and their parents and teachers.

Interventions—The social development curriculum (SDC) consisted of 16 to 21 lessons per year focusing on social competence skills necessary to manage situations in which high-risk behaviors occur. The school/community intervention (SCI) consisted of SDC and school-wide climate and parent and community components. The control group received an attention-placebo health enhancement curriculum (HEC) of equal intensity to the SDC focusing on nutrition, physical activity, and general health care.

Main Outcome Measures—Student self-reports of violence, provocative behavior, school delinquency, substance use, and sexual behaviors (intercourse and condom use).

Results—For boys, the SDC and SCI significantly reduced the rate of increase in violent behavior (by 35% and 47% compared with HEC, respectively), provoking behavior (41% and 59%), school delinquency (31% and 66%), drug use (32% and 34%), and recent sexual intercourse (44% and 65%), and improved the rate of increase in condom use (95% and 165%). The SCI was significantly more effective than the SDC for a combined behavioral measure (79% improvement vs 51%). There were no significant effects for girls.

Conclusions—Theoretically derived social-emotional programs that are culturally sensitive, developmentally appropriate, and offered in multiple grades can reduce multiple risk behaviors for inner-city African American boys in grades 5 through 8. The lack of effects for girls deserves further research.

Violence, substance use, and unsafe sexual practices are major public health problems challenging today's urban African American youth.^{1,2} Urban African American youth are at high risk for violence owing to exposure to violence in their communities.^{3–6} They also experience more exposure, easy access, and daily pressure to use or traffic illicit drugs.^{7–9} Compared with white youth, African Americans are more likely to report earlier initiation of

sex, higher lifetime rates of sexual intercourse, and more sexual partners in their lifetimes, with resulting high rates of pregnancy and human immunodeficiency virus infection.^{10–12}

Investigators have theorized that the seemingly separate behaviors of violence, substance use, delinquency, and risky sexual activity reflect an underlying “problem behavior” construct,^{13–15} and empirical evidence increasingly supports this premise,^{16,17} regardless of ethnicity or race. Given the strong correlations among these behaviors and their predictors, prevention efforts may best be served by addressing multiple behaviors concurrently.^{13,18,19} Only a handful of interventions aimed at multiple behaviors have been tested,^{20–23} and most have not used randomized designs. The current study was designed to overcome this methodological limitation and to meet recommendations for effective prevention programs.²⁴

The Aban Aya Youth Project—which derives its name from 2 Ghanian symbols, *aban*, a fence signifying double (social) protection, and *aya*, an unfurling fern signifying self-determination—compared 3 interventions that were implemented in grades 5 through 8. Two experimental interventions (one a classroom-based curriculum and one that also included school and community-wide components) targeted the risk behaviors of violence, provoking behavior, substance use, school delinquency, and sexual practices (engaging in sexual intercourse and using condoms). The control program targeted health-enhancing behaviors (nutrition, exercise, and health care) and was of equal length and intensity. We hypothesized that both experimental conditions would result in reductions in the rate of increase of targeted behaviors compared with the control condition.

METHODS

SCHOOL SELECTION AND RANDOMIZATION

The longitudinal trial of 3 interventions was conducted in a high-risk sample of 12 poor, African American metropolitan Chicago, Ill, schools (9 inner-city and 3 near-suburban) between 1994 and 1998. School inclusion criteria included enrollment of greater than 80% African American and less than 10% Latino or Hispanic students; grades kindergarten through 8 (or through 6 if students were tracked to 1 middle school); enrollment greater than 500; not on probation or slated for reorganization; not a special designated school (ie, magnet, academic center); and moderate mobility (<50% annual turnover, meaning approximately <25% transferred in and <25% transferred out). Eligible schools (n=141 inner-city and 14 near-suburban) were stratified into 4 quartiles of risk on the basis of a score that combined proxy risk variables using the procedures described by Graham et al.²⁵ The proxies of risk came from school report card data (1991–1992) and included enrollment, attendance and truancy, mobility, family income, and achievement scores. Using a randomized block design, we assigned to each condition 2 inner-city schools from the middle of the highest risk quartile, 1 inner-city school from the middle of the second risk quartile, and 1 near-suburban school (also from the second quartile) per condition. One inner-city school refused to participate and was replaced with one from the same risk level. Schools signed an agreement to participate in the study for 4 years and agreed not to participate in another prevention initiative during that time. Study schools were 91% African American. Each school received the intervention free of charge (provided to all students in the appropriate grade levels) plus \$250 for each participating classroom up to a maximum of \$1000 each year of the study.

PARTICIPANTS

Participants were students in fifth-grade classes in the 12 schools during the 1994–1995 school year or who transferred in during the study; students who transferred out were not followed up, but their data from the times before they transferred out were included in the analysis sample. Students who transferred into study schools were similar to students who transferred

out; both groups were more likely to engage in risky behavior than students who stayed in the same school for the duration of the project (significant only for violence and substance use). Parents or legal guardians were informed of the study and procedures and were provided with an opportunity to opt out in grades 5 through 7 and then again in grade 8. Less than 1% of parents denied consent during grades 5 through 7 and 1.7% did so at grade 8. The University of Illinois at Chicago Institutional Review Board approved the research protocol and informed consent procedures.

INTERVENTIONS

The conceptual framework of the experimental interventions was derived from established theories of behavior change¹⁴ to focus the interventions on risk and protective factors and skills related to the targeted behaviors. Activities and materials were either developed de novo or adapted from other theoretically derived prevention curricula (eg, New Haven Social Development Program,²⁶ Youth AIDS Prevention Project,²⁷ and Know Your Body²⁸). New or adapted activities were piloted before being added to the curricula, and each grade-level curriculum was piloted the year before its use in the main study. As a result of piloting, minor changes were made to improve flow or language.

Studies suggest that programs for African American youth should incorporate components that (1) enhance growth of sense of self and cultural pride and (2) strengthen family and community ties.^{29,30} Hence, the interventions included the Nguzo Saba principles,³¹ which promote African American cultural values such as unity, self-determination, and responsibility; culturally based teaching methods³² (eg, storytelling and proverbs) and African and African American history and literature; and homework assignments that involved parents to encourage review and generalization of the information and skills and to expand the target of the intervention to parents.³³

The 2 experimental conditions were the social development curriculum (SDC) and the school/community intervention (SCI) (Table 1). The SDC was classroom based, consisting of 16 to 21 lessons per year in grades 5 through 8. The SDC was designed to teach cognitive-behavioral skills to build self-esteem and empathy, manage stress and anxiety, develop interpersonal relationships, resist peer pressure, and develop decision-making, problem-solving, conflict-resolution, and goal-setting skills. It was structured to teach application of these skills to avoid violence, provocative behavior, school delinquency, drug use, and unsafe sexual behaviors.

The SCI included the SDC plus parental support, school climate, and community components to impact all social domains of influence on children.^{34,35} The parent support program reinforced skills and promoted child-parent communication. The school staff and school-wide youth support programs integrated skills into the school environment. The community program forged linkages among parents, schools, and local businesses. Each SCI school formed a local school task force consisting of school personnel, students, parents, community advocates, and project staff to implement the program components,³⁶ propose changes in school policy, develop other school-community liaisons supportive of school-based efforts, and solicit community organizations to conduct activities to support the SCI efforts. A goal of these linkages was to “rebuild the village” and create a “sense of ownership” by all stakeholders to promote sustainability of these efforts on completion of the project.³⁷

The control condition was the health enhancement curriculum (HEC). It consisted of the same number of lessons as the SDC and taught some of the same skills (eg, decision making and problem solving), but with a focus on promoting healthy behaviors related to nutrition, physical activity, and general health care (see Table 1). It also integrated the importance of cultural pride and communalism.

STAFF TRAINING AND IMPLEMENTATION

University-based health educators delivered curricula in all 3 conditions, usually in social studies classes. Each health educator delivered 1 of the curricula to 1 or more schools and, in most cases, health educators stayed with the same school from year to year. This avoided contamination across conditions and developed continuity in relationships between educators and the schools and students. To ensure fidelity of implementation across health educators, experimental conditions, and times, 2 training sessions were held before each lesson. The health educators role-played each activity and senior staff provided feedback. Weekly debriefings were held to discuss issues that may have affected implementation. Senior staff also conducted observations to ensure fidelity and help target training needs. In addition, each year the regular classroom teachers received a 4-hour workshop to provide an overview of program philosophy, curriculum content, and clarification of their support roles.

ASSESSMENT

Constructs were derived from the theory of triadic influence¹⁴ and program content, and included background covariates, process variables, mediating variables, and behaviors. Only student self-reports of behaviors (violence, provoking behaviors, school delinquency, substance use, and sexual behaviors) are reported in this article. Measures were based on instruments previously used with inner-city populations.^{20,27,38–41} Survey questions were modified for grade 4 readability and cultural sensitivity by means of feedback from focus groups and piloting.

The items, response categories, scale score ranges, and reliability coefficients of each behavioral scale at each grade are available from one of us (B.R.F.). Violence, school delinquency, and substance use were measured from grade 5 onward; provoking behaviors, recent sexual intercourse, and condom use were added at grade 6. Each behavior was assessed with multiple items. For violence, provoking behavior, and substance use, scale scores were formed for each behavior by summing multiple items. For sexual behaviors (having sexual intercourse and use of condoms), single item scores were used. For school delinquency, a more complicated approach was necessary to produce a “scale score” because of “planned missingness.”⁴² To reduce respondent burden, starting in the spring of fifth grade, 3 versions of the survey, each containing the core and 2 of the modules, were randomly assigned to classrooms (evenly distributed across the 3 interventions) at each wave of data collection. The core unit, answered by every student, included items assessing demographics and all of the behavioral outcomes except school delinquency. Each of the 3 modules contained two thirds of the items from the measure of school delinquency. The scale and change scores were computed by fitting growth curves to each item simultaneously by means of mixed-effect models and summing them to form the intercept (baseline score) and growth (change) of delinquency. We created a combined behavior measure by adjusting the range of the variables to be the same (0–10) and reversing the direction of scoring for condom use.

DATA COLLECTION

Students completed surveys in classrooms at the beginning and end of grade 5 and at the end of each subsequent year. We took several precautions to ensure the validity of the data. To ensure even completion, staff read the survey aloud to students. To minimize underreporting of behaviors, trained project staff, not the teacher or health educator assigned to that classroom, administered the surveys. To emphasize the confidential nature of their answers, we assured students that results would not be shared with anyone and we used identification numbers rather than names to track students over time. Students without consent completed teacher-assigned tasks during survey administration.

ANALYTICAL METHODS

To estimate mean responses at baseline and in response to the program, we used hierarchical statistical models that accommodate nested observations (times within subjects, subjects within schools) and missing data.^{43–45} For the major reported analyses, we included all students who provided one or more waves of data.

We used mixed models for continuous outcomes (violence, provoking behavior, school delinquency, and the combined behavior) and generalized estimating equations for ordinal outcomes (substance use, sexual activity, and condom use). We present 2-level models throughout, as school effects proved negligible in 3-level models for continuous outcomes (and the pattern of results were the same) and 3-level software for ordinal outcomes is not available. All models included terms for condition, sex, time (quadratic trends where necessary), and all interactions, except for condom use, which was estimated separately for boys (because of low rates of sexual intercourse for girls). Inference was based on tests of regression coefficients and contrasts among estimated means. Contrasts were used to test baseline differences between boys and girls and between conditions (HEC, SDC, and SCI), change from baseline to end point within condition, and differences between conditions in the amount of change, or program effects. All statistical tests are 2-tailed.

RESULTS

We first describe our sample, then baseline differences by sex, and finally program effects. Survey completion rates were 93.2% of students with consent at baseline, and between 89.5% and 92.7% at the other waves. Non-completions were due primarily to school absenteeism (4%–9%) or opting out. An average of 20% turnover occurred each year, resulting in an average sample of 644 students (range, 597–674) at each wave, with 339 (51%) of the 668 original grade 5 students still present at the end of grade 8 and a total analysis sample (students with one or more waves of data) of 1153. The final sample was 49.5% male, with an average age of 10.8 years (SD, 0.6 year) at the beginning of grade 5; approximately 77% received federally subsidized school lunches, and 47% lived in 2-parent households.

Table 2 shows baseline (grade 5 or grade 6), end point (grade 8), and change in scale scores or proportions engaging in behaviors, percentage relative reductions, significance levels, and effect sizes by condition for boys and girls. Boys engaged in higher levels of behaviors at baseline than girls for all behaviors ($P<.001$) except provoking ($P=.17$). The prevalence of all behaviors increased over time across sex and conditions. There was one significant baseline (grade 5) difference between conditions: boys receiving the SCI engaged in more violence than boys in the SDC ($P=.02$).

There were no significant program effects for girls. Program effects for boys were significant for all 6 behaviors in the SCI and marginally so in the SDC (except for condom use); boys receiving the SDC and SCI increased these behaviors less (more for condom use) than boys in the HEC. The Figure shows the developmental pattern of behavior change and program effects for school delinquency. It exemplifies the nature of program effects for boys, occurring gradually between grades 6 and 7.

Effect sizes for the comparison of SDC and SCI with HEC for boys ranged from 0.29 to 0.66, and relative improvements were 31% to 165%. For boys in the SDC and SCI, the increase in negative behaviors from fifth to eighth grade was less than in the HEC: violence by 35% and 47%, respectively; provoking behavior, 41% and 59%; school delinquency, 31% and 66%; drug use, 32% and 34%; and recent sexual intercourse, 44% and 65%. The relative improvement in the rate of condom use was 95% and 165%. The effect sizes for the combined

behavior score were 0.52 for the SDC and 0.82 for the SCI, and the relative improvements were 51% and 79%.

In addition, all 6 behaviors increased less (more for condom use) for boys in the SCI than for boys in the SDC. This difference was significant for the combined behavior measure (mean difference in change, -3.35 ; effect size, 0.82 vs 0.52; or 79% vs 51% relative improvement) but only for one of the individual behaviors (school delinquency: effect size, 0.61 for the SCI and 0.29 for the SDC; relative reductions of 66% and 31%, respectively).

COMMENT

This randomized controlled study provides evidence that a prevention program that teaches skills and is theoretically derived, developmentally appropriate, and culturally sensitive can have concurrent effects on multiple risk behaviors for inner-city African American boys in grades 5 through 8. The effect sizes for violence (0.31 and 0.41) and substance use (0.42 and 0.45) are substantially better than those reported in meta-analyses for interactive school-based violence (0.16),²³ drug (0.24),⁴⁶ sex (0.05),⁴⁷ and other problem behavior (0.16)⁴⁸ prevention programs that address only 1 behavioral domain. Schools and communities should be encouraged to adopt programs that have effects on multiple outcomes. Public pressure on schools has resulted in school systems being mandated or expected to provide multiple prevention programs. Adoption of one effective multiple-behavior program would reduce the costs and burdens on school personnel. It may also lead to reduced school dropout rates and improved learning.¹³

Previous studies suggest that comprehensive programs that address multiple behaviors (like the SDC) and involve families and the community (like the SCI) are generally more effective than programs that address single behaviors or do not involve families or community.^{13,36,49,50} Both programs significantly reduced the rate of increase of multiple risk behaviors for boys. The significantly larger effect found for SCI in the combined behaviors analysis (and the generally larger effect sizes for SCI) suggest that the SCI may be even more effective than the SDC in reducing the targeted behaviors.

The effects of our programs may be underestimated because of the design of our control condition. We wanted to design a placebo-attention condition that would involve providing the same amount of attention to students as the SDC and be seen as equally interesting, engaging, and helpful by students. We probably erred on the side of making the HEC too similar to the SDC, in that the HEC included some of the same skills as the SDC, but with a focus on different behaviors. This means that the HEC might have been more effective than a standard placebo-attention condition or than “standard care” in most schools. If so, this would mean that our reported results underestimate the actual effectiveness of the SDC and SCI. It might also partially explain the lack of effects detected for girls.

Our program effects are of practical significance for public health and education. From a public health perspective, reducing these risk behaviors can decrease morbidity and mortality related to these behaviors. For example, a reduction in the use or carrying of weapons not only can prevent homicides, the leading cause of death for young African American males, but also can help decrease other crimes that impact African American communities. Reduced drug use and safer sexual practices can diminish the substantial morbidity and social problems associated with human immunodeficiency virus infection, unintended pregnancy, and sexually transmitted diseases.

Because the incidence of all measured risk behaviors increased for girls, and no program effects were found, an obvious question is why. Others have also reported sex-specific results for these behaviors.^{51–54} One possibility is that the targeted behaviors are more difficult to reduce

among girls because they already occur at lower levels. The fact that the interventions reduced the frequency of the targeted behaviors for boys down to the levels for girls in some cases provides some support for this possibility. Nevertheless, the fact that the incidence of these behaviors increased for girls is still of concern.

In 2 previous studies, differential effects may have resulted from program implementers being male; they may have served as more effective role models for boys than girls.^{51,54} Findings from one review⁵⁵ suggested that programs that provide positive female role models might improve intervention effects for girls. However, in our study, about equal numbers of classes were taught by men and women. Nevertheless, given the relative lack of male teachers in public schools, it is still possible that our male health educators contributed to the observed effects for boys.

Another possible explanation for the lack of female effects may be that, like at least one other intervention,⁵¹ the SDC did not address the types of aggressive behaviors used more by girls, ie, indirect aggressive behaviors, such as spreading rumors, and creating friendship alliances for the purpose of revenge.⁵⁶ In addition, the SDC did not take into consideration the functions that violence may provide for girls in high-risk environments (ie, presenting a tough persona for protection).⁵⁷

Our study supports evidence that the dominant prevention strategies may work better for boys than girls.⁵⁸ Although research focusing on sex differences is sparse,⁵⁸ current research is identifying factors that may enhance prevention strategies for young girls. This literature suggests that to be effective for girls, programs may need to focus more on internal manifestation of risks and on connectedness to school and family.^{54,59} In addition, further studies are warranted to help prevention researchers better understand when and how risk factors come into play at the various stages of female development so that programs can address these crucial variables.

A major strength of the SCI program was the strong partnership that was developed with community organizations, including a community-based mental health organization. All stakeholders, including academia, the schools, and their communities, had very different strengths and weaknesses that provided challenges as well as opportunities.⁵⁹ The community mental health organization was instrumental in developing collaborative relationships and facilitating implementation of SCI components. However, it is not clear that this would be easily replicated in other communities because of the amount of coordination required, or worth the additional effort for what appears to be marginal improvement.

Some limitations of this study need to be noted. First, the number of schools was small. This leads to low statistical power to detect small differences, especially between the 2 intervention conditions. However, the significant effects have clear practical public health and educational relevance and application.

Second, as expected with a high-risk sample, student turnover in study schools was relatively high. This led us to adopt program and analytical strategies that included all students for whom we had 1 or more waves of data and who received at least some of the program, regardless of how much of the program they received. The idea was that the intervention would diffuse throughout the grade level and affect all students in that cohort. The curriculum was designed so that appropriate review and sequencing of content allowed new students to “catch up” reasonably well. Our results suggest that this approach was successful and needs to be adopted by future prevention studies in high-risk schools and communities.

The Aban Aya Investigators

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What This Study Adds

Most school-based prevention programs are of short duration and address only one behavioral domain (eg, substance use) or one behavior (eg, smoking). High correlations among risky behaviors suggest the need for multibehavior programs, but few have been developed and even fewer have been tested in randomized trials. Risky behaviors are particularly problematic for African American youth; however, few school-based prevention interventions have been developed for them.

The Aban Aya Youth Project developed a culturally sensitive classroom curriculum and community program for inner-city African American students (grades 5–8) that targeted multiple risky behaviors (violence, provocative behavior, school delinquency, substance use, and sexual behavior). This study evaluated the curriculum and a combined curriculum plus community intervention in a school-based randomized trial. Results demonstrate that a single curriculum or intervention can have large effects on multiple behaviors, at least for boys, reducing their risky behavior to the levels observed in girls by the end of grade 8. A lack of effects for girls replicates other investigators' findings, suggesting an area for new research.

Further analyses are needed to determine whether the interventions enhanced student bonding with their parents, connection with their heritage, and attachment to their school and community. Analyses are also needed to explore the role of mediators (eg, intentions and attitudes) in reducing the growth of problem behaviors in African American boys. Finally, further research is needed on why programs like this are ineffective for girls.

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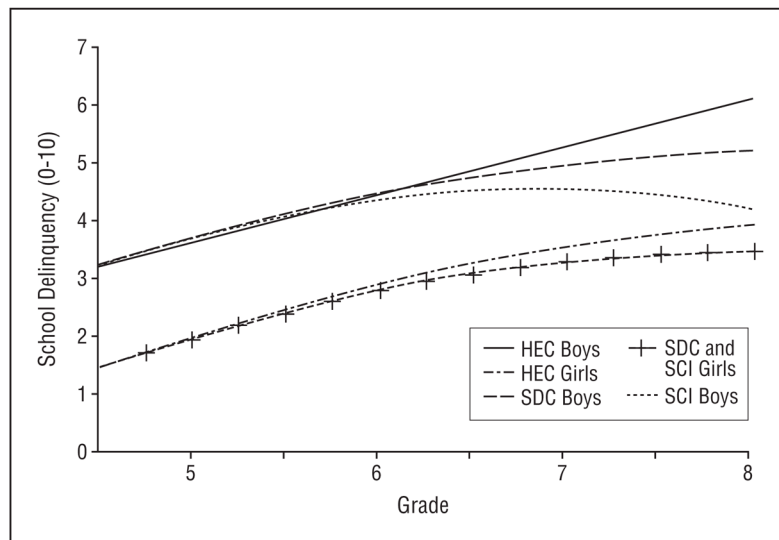


Figure. Changes in school delinquency for boys and girls by condition from the beginning of grade 5 to the end of grade 8. Baseline intercepts shown are the average of the 3 conditions for each sex. HEC indicates health enhancement curriculum; SDC, social development curriculum; and SCI, school/community intervention.

Table 1

Intervention Content by Condition*

Health Enhancement Curriculum	Social Development Curriculum	School/Community
Target Behaviors	Target Behaviors	Target Behaviors
<ul style="list-style-type: none"> • Nutrition • Physical activity • Dental hygiene • Injury prevention • Mental health 	<ul style="list-style-type: none"> • Violence • Provoking • Safe sex and abstinence • Substance use • School delinquency 	<ul style="list-style-type: none"> • Violence • Provoking • Safe sex and abstinence • Substance use • School delinquency
Content Skills	Content Skills	Components
<ul style="list-style-type: none"> • Decision making • Problem solving • Goal setting • Refusal skills • Stress management • Health assessment: physical, mental, and social • Cardiovascular fitness: taking pulse and target ranges • Strengthening and flexibility exercises 	<ul style="list-style-type: none"> • Anger management • Communication • Negotiation, conflict resolution • Social networking • Decision making • Problem solving • Goal setting • Refusal skills • Stress management 	<p>Social development curriculum</p> <ul style="list-style-type: none"> • See middle column • Teacher and staff in-service training • Review and model curriculum skills • How to integrate prosocial skills into school environment • Provide example of school activities to reinforce curriculum skills • Model proactive classroom management skills • Promote interactive and cultural teaching methods
Sense of self and purpose	Sense of self and purpose	Local school task force
<ul style="list-style-type: none"> • Feelings • Personal strengths • Cultural pride • Mentors • Communalism 	<ul style="list-style-type: none"> • Empathy • Career planning • Feelings • Personal strengths • Cultural pride • Mentors • Communalism 	<ul style="list-style-type: none"> • Propose school policy • Conduct school-wide fairs • Provide annual field trips for program parents and children • Write grants for local monies • Solicit monies and supplies from local businesses
Culture, values, and history	Culture, values, and history	Parent training workshops
<ul style="list-style-type: none"> • African American heritage • Ethnic values—Nguzo Saba • Normative beliefs • Environmental influences • Role models 	<ul style="list-style-type: none"> • Influence of racism and stereotypes on self and community • African American heritage • Ethnic values—Nguzo Saba • Normative beliefs • Environmental influences • Role models 	<ul style="list-style-type: none"> • Reinforce skills taught in social development curriculum • Improve child supervision and methods of discipline • Enhance anger and stress management • Enhance parent-child communication • Promote parent-teacher communication

* The first 2 columns show the content of the 2 curricula. Note that when the same skills were taught in the 2 curricula, the targeted behaviors always differed by condition. The third column shows the content of the school/community condition—the social development curriculum (column 2) plus the other components listed.

Table 2 Baseline, End Point, and Growth of Risk Behaviors With P Values From Growth Curve Analysis by Condition and Sex

Measure	HEC (n = 184)	SDC (n = 204)	SCI (n = 185)	Relative Reduction, P Value, Effect Size*		
				SDC-HEC	SCI-HEC	SCI-SDC
Boys						
Violence (0–21)						
Baseline score [†]	3.39 (0.29) [‡]	3.17 (0.25)	4.04 (0.26)	.58	.09	.01
End point score	7.63 (0.53)	5.92 (0.50)	6.28 (0.58)			
Growth	4.25 (0.57)	2.75 (0.53)	2.24 (0.60)	35%, .05, 0.31	47%, .02, 0.41	19%, .52, 0.10
Provoking behavior (0–40)						
Baseline score [‡]	8.99 (0.75) [‡]	9.55 (0.69)	10.71 (0.77)	.58	.11	.26
End point score	14.70 (0.90)	12.89 (0.85)	13.06 (0.97)			
Growth	5.71 (1.05)	3.35 (0.98)	2.35 (1.16)	41%, .10, 0.29	59%, .03, 0.41	30%, .51, 0.12
School delinquency (0–10)						
Baseline score [‡]	3.14 (0.21) [‡]	3.06 (0.18)	3.53 (0.19)	.76	.17	.07
End point score	6.00 (0.33)	5.03 (0.31)	4.49 (0.37)			
Growth	2.86 (0.35)	1.97 (0.33)	0.97 (0.38)	31%, .06, 0.29	66%, <.001, 0.61	51%, .04, 0.32
Substance use						
Baseline proportion [†]	0.31 (0.23–0.41)	0.30 (0.24–0.38)	0.32 (0.25–0.41)	.87	.91	.77
End point proportion	0.83 (0.75–0.89)	0.69 (0.59–0.77)	0.69 (0.57–0.79)			
Growth	0.52	0.38	0.37	32%, .05, 0.42	34%, .05, 0.45	4%, .89, 0.03
Recent sexual intercourse						
Baseline proportion [‡]	0.16 (0.11–0.25)	0.29 (0.22–0.38)	0.38 (0.29–0.47)	.02	.001	.18
End point proportion	0.55 (0.43–0.66)	0.53 (0.43–0.63)	0.53 (0.41–0.65)			
Growth	0.38	0.24	0.16	44%, .08, 0.44	65%, .02, 0.65	37%, .38, 0.21
Condom use						
Baseline proportion [‡]	0.47 (0.34–0.61) [‡]	0.49 (0.36–0.61)	0.34 (0.24–0.45)	.89	.12	.09
End point proportion	0.65 (0.51–0.77)	0.80 (0.67–0.88)	0.78 (0.66–0.86)			
Growth	0.18	0.31	0.44	95%, .28, 0.38	165%, .045, 0.66	35%, .42, 0.28
Combined model (0–60)**						
Baseline score	15.65 (0.86) [‡]	16.06 (0.77)	19.22 (0.80)	.72	.002	.004
End point score	27.33 (1.15)	21.84 (1.09)	21.65 (1.36)			
Growth	11.68 (1.41)	5.78 (1.31)	2.43 (1.55)	51%, .002, 0.52	79%, <.001, 0.82	58%, .10, 0.30
Girls						
Violence						
Baseline score [†]	2.34 (0.26) [‡]	2.16 (0.24)	1.88 (0.25)	.60	.21	.44
End point score	6.39 (0.50)	6.97 (0.47)	5.20 (0.57)			
Growth	4.05 (0.52)	4.81 (0.49)	3.31 (0.58)	.28	.35	.049
Provoking behavior						
Baseline score [‡]	8.72 (0.70) [‡]	8.89 (0.67)	9.23 (0.72)	.86	.61	.73
End point score	12.77 (0.84)	12.57 (0.79)	11.95 (0.95)			
Growth	4.05 (0.95)	3.68 (0.91)	2.73 (1.08)	.78	.36	.50
School delinquency						
Baseline score [†]	1.35 (0.19) [‡]	1.55 (0.18)	1.50 (0.18)	.42	.55	.84
End point score	3.81 (0.30)	3.55 (0.29)	3.50 (0.35)			
Growth	2.46 (0.31)	2.00 (0.30)	1.98 (0.34)	.27	.30	.98
Substance use						
Baseline proportion [†]	0.21 (0.15–0.28)	0.17 (0.11–0.24)	0.12 (0.08–0.19)	.38	.05	.03
End point proportion	0.73 (0.63–0.80)	0.76 (0.67–0.83)	0.60 (0.47–0.72)			
Growth	0.52	0.59	0.48	.26	.86	.37
Recent sexual intercourse						

Measure	HEC	SDC	SCI	Relative Reduction, P Value, Effect Size*		
				SDC-HEC	SCI-HEC	SCI-SDC
Baseline proportion [§]	0.05 (0.02-0.09) [¶]	0.08 (0.05-0.13)	0.09 (0.05-0.15)	.26	.13	.65
End point proportion	0.19 (0.12-0.29)	0.25 (0.18-0.35)	0.18 (0.10-0.30)			
Growth	0.14	0.18	0.09	.80	.22	.28
Condom use						
Baseline proportion [§]	0.18 (0.08-0.36) [#]	0.19 (0.10-0.34)	0.23 (0.13-0.39)	.97	.60	.61
End point proportion	0.86 (0.62-0.96)	0.87 (0.74-0.94)	0.56 (0.36-0.75)			
Growth	0.67	0.68	0.33	.91	.08	.03
Combined model (0-60)**						
Baseline score	13.87 (0.93) [‡]	13.77 (0.88)	13.59 (0.85)	.94	.83	.89
End point score	19.86 (1.53)	19.19 (1.38)	19.14 (1.77)			
Growth	5.99 (1.77)	5.43 (1.61)	5.54 (1.94)	.81	.87	.96

Abbreviations: HEC, health enhancement curriculum; SCI, school/community intervention; SDC, social development curriculum.

* Assessed for baseline and growth in continuous or log odds scale (substance use, recent sexual intercourse, and condom use). Reduction in growth is relative to comparison group (HEC or SDC). For condom use, increase in growth relative to comparison group (HEC or SDC) is shown. P values are from 2-tailed tests. Only the P value is shown for girls, as there were no significant program effects. Effect size is the difference in growth between groups divided by the pooled standard deviation of growth. Effect sizes for substance use, recent sexual intercourse, and condom use are the differences in growth divided by the square root of $\pi^2/3$. Combined model effect size accounts for covariance between behaviors.

[‡] Baseline at beginning of grade 5. End point at end of grade 8.

[‡] Mean (SE).

[§] Baseline at end of grade 6. End point at end of grade 8.

[¶] Proportion and 95% confidence interval of students responding yes to any of the 4 substance use items; generalized estimating equation (GEE) regression models logarithm of cumulative odds, $\ln [p_i > j / (1 - p_i > j)]$, where $p_i > j$ is proportion, with j equal to possible response 0 to 4.

[¶] Proportion and 95% confidence interval of students reporting recent sexual intercourse; GEE regression models logarithm of odds, $\ln [p / (1 - p)]$, where p is proportion.

[#] Proportion and 95% confidence interval of students reporting condom use "all the time"; GEE regression models logarithm of cumulative odds, $\ln [p_i > j / (1 - p_i > j)]$, where $p_i > j$ is proportion, with j equal to possible response 0 to 4.

** Baseline for each behavior in the combined model is the same as in models of each behavior. Condom use is reverse coded in the combined model.