ARTICLE

Effects of Social Development Intervention in Childhood 15 Years Later

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Objective: To examine the long-term effects of a universal intervention in elementary schools in promoting positive functioning in school, work, and community, and preventing mental health problems, risky sexual behavior, substance misuse, and crime at ages 24 and 27 years.

Design: Nonrandomized controlled trial.

Setting: Fifteen public elementary schools serving diverse neighborhoods including high-crime neighborhoods in Seattle, Washington.

Participants: Sex-balanced and multiracial/multiethnic sample of 598 participants at ages 24 and 27 years (93% of the original sample in these conditions).

Interventions: Teacher training in classroom instruction and management, child social and emotional skill development, and parent workshops.

Main Outcome Measures: Self-reports of functioning in school, work, and community and of mental health, sexual behavior, substance use, and crime, and court records.

Results: A significant multivariate intervention effect across all 16 primary outcome indices was found. Specific effects included significantly better educational and economic attainment, mental health, and sexual health by age 27 years (all $P < .05$). Hypothesized effects on substance use and crime were not found at ages 24 or 27 years.

Conclusions: A universal intervention for urban elementary schoolchildren, which focused on classroom management and instruction, children's social competence, and parenting practices, positively affected mental health, sexual health, and educational and economic achievement 15 years after the intervention ended.

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POVERTY, UNEMPLOYMENT, AND neighborhood disorganization are persistent problems in US cities.[1,2] Crime, drug use, teen pregnancy, mental health problems, and high rates of school dropout plague many urban children and families.[3-7] Public schools, available to all children in the United States beginning at age 5 or 6 years, are a potentially powerful setting for preventive intervention. We examined the effects of a 3-component preventive intervention provided in public schools during the elementary grades on outcomes at ages 24 and 27 years, 15 years after the intervention ended. The objective of the intervention was to improve the skills of teachers, parents, and children to increase positive functioning in school and decrease problems related to mental health, risky sexual behavior, substance use, and criminal behavior.

The mid-20s are important years for the adoption of adult roles. Engagement in education or occupational roles is an important predictor of future adult functioning.[8-10] Civic engagement is also likely to increase during this period.[11,12] However, the mid-20s are also years of relatively high vulnerability to mental health problems,[13,14] sexual risk-taking,[15,16] and continued risk of substance use and crime.[17-22]

Little is known about the long-term effects of universal intervention in public elementary schools on these outcomes. Kellam et al[23] observed students from schools serving predominantly African American children from poor to lower middle-class families who had been exposed to a classroom-based behavior management program in the first and second grades. By ages 19 to 21, male subjects, particularly those who had demonstrated more aggressive or disruptive behavior in the first grade, reported significantly reduced rates of regular cigarette smoking, fewer drug and alcohol abuse or dependence disorders, and less antisocial personality disorder.[23] We

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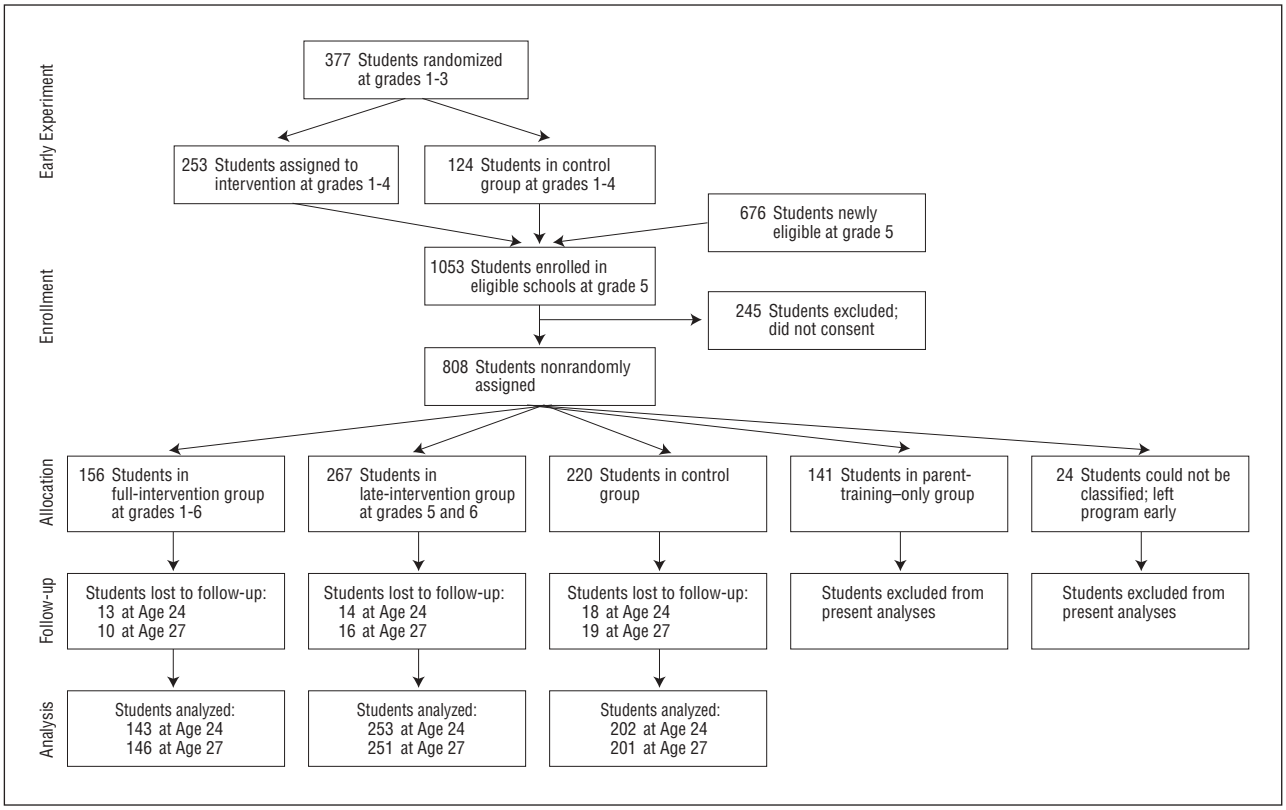

Figure. Study flowchart.

are aware of no other studies of universal interventions in the elementary grades that have investigated long-term effects on indicators of adult functioning.

The Seattle Social Development Project (SSDP) intervention was guided theoretically by the social development model.[24,25] We sought to identify and develop methods of management and instruction that could be used by public school teachers and adult caretakers to set children on a positive developmental course by promoting opportunities for children's active involvement in classroom and family, developing children's skills for participation, and encouraging reinforcement from parents and teachers for children's effort and accomplishment. Two intervention conditions were examined: a full-intervention condition implemented throughout grades 1 through 6 and a late-intervention condition implemented only in grades 5 and 6.[26]

Studies of the SSDP intervention have found significant effects in childhood and adolescence across outcomes.[27-32] By age 21 years, the full-intervention group, compared with the control group, exhibited significantly better outcomes for education, employment, and mental health, as well as reduced crime, sexual risk behavior and disease, and early pregnancy.[33,34] Some effects were found to be moderated by sex, race/ethnicity, or childhood poverty.[30,31,33,34] Herein we examined the effects of the SSDP intervention at ages 24 and 27 years, 12 to 15 years after the intervention ended. The sex-balanced and racially/ethnically diverse sample enabled investigation of possible moderators of intervention effects.

METHOD

SAMPLE AND DESIGN

The **Figure** shows the overall design of the study. Beginning in fall 1981, the intervention was initiated among first-grade students in classrooms randomly assigned to condition in 8 public schools serving high-crime areas in Seattle, Washington. Three hundred seventy-seven students who remained in or entered the 8 schools during grades 1 through 3 were observed prospectively to fifth grade. The study was then expanded to include 676 fifth-grade students in 10 additional schools, and all parents were asked for consent for their child to participate in the longitudinal follow-up study. Of the population of 1053 fifth-grade students in the 18 schools, parents of 808 children (77%) consented.

Schools were assigned nonrandomly to the intervention or control condition in fall 1985. Thereafter, all fifth-grade students in each school received the intervention according to their school's intervention assignment. This resulted in a nonrandomized controlled trial with 4 conditions. The full-intervention group consisted of those who received at least 1 semester of intervention in grades 1 through 4 and at least 1 semester of intervention in grades 5 and 6, with a mean of 4.13 years of intervention exposure. The late-intervention group consisted of those who received the intervention during grades 5 and 6 only, with a mean of 1.65 years of exposure. The control group received no intervention. A fourth group was offered parent training only during grades 5 and 6 and is not discussed in this article. Twenty-four participants could not be classified into any of these groups because they left participating schools before attending for at least 1 semester. After excluding these 24 participants, all analyses were based on intervention assignment. All phases of the study were

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approved by the Human Subjects Review Committee at the University of Washington, Seattle. Participants were informed about the nature of the interviews and provided consent before participation in the study at ages 24 and 27 years.

BACKGROUND OF ANALYSIS SAMPLE

Retention for analysis of the full-intervention, late-intervention, and control groups averaged 93% at both ages 24 and 27 years (Figure). There were equal numbers of female and male participants at each age. Racial/ethnic identification was 46% European American, 26% African American, 22% Asian American, and 6% Native American. As children, 56% of participants were eligible for the federal school lunch or breakfast program at some point in the fifth, sixth, or seventh grade, indicating low income status.

ATTRITION AND INTERNAL VALIDITY

At both ages 24 and 27 years, the overall distribution of participants in the intervention conditions did not differ significantly for those lost to attrition vs the analysis sample (χ^2_2=2.16, P=.34 at age 24 years; and χ^2_2=1.41, P=.50 at age 27 years); in addition, among those retained in the analysis sample, at both ages 24 and 27 years, the distribution of participants in the intervention conditions did not differ for sex (χ^2_2=0.38, P=.83; and χ^2_2=0.59, P=.74, respectively), race/ethnicity (white vs other: χ^2_2=0.13, P=.94; and χ^2_2=0.02, P=.99, respectively), or childhood poverty (χ^2_2=0.23, P=.89; and χ^2_2=0.33, P=.85, respectively).

Given the requirement that students who received the full intervention attended project schools at some point in grades 1 through 4 and in grades 5 and 6, whereas some students in the control group were added to the study at grade 5, it is important to rule out differences in residential stability, a potential threat to internal validity. Analyses comparing the full-intervention and control groups found no significant differences in mean number of years living in Seattle by grade 6 (F=0.61, P=.44 at age 24 years; and F=1.83, P=.18 at age 27 years), mean number of residences lived in from age 5 to 14 years (F=1.57, P=.21; and F=1.56, P=.21, respectively), percentage of single-parent homes during grade 5 (χ^2=0.11, P=.74; and χ^2=0.02, P=.89, respectively), or living in a disorganized neighborhood at age 16 years (eg, high crime or rundown housing: χ^2=0.47, P=.49; and χ^2=0.13, P=.72, respectively). Differential school or teacher receptivity to intervention is also an unlikely threat to internal validity. Teachers in 6 of 8 participating schools during grades 1 through 4 were randomly assigned to either intervention or control classrooms. At fifth grade, newly eligible schools were matched demographically to early experimental schools, and each agreed to serve as a control or late-intervention school depending on assignment. In addition, during the course of the intervention, the Seattle school district used mandatory busing to achieve racial/ethnic equality in schools, which substantially reduced the risk that outcomes observed reflected contextual or neighborhood differences, school demographic differences, or parent school-selection effects in the populations attending different schools.

An exception to the pattern of condition equivalence was the percentage of surveyed participants who reported at age 24 years that their mothers were aged 19 years or younger when they were born. Nine percent of the full-intervention condition compared with 21% of the control condition reported that their mothers were teenagers when they were born (χ^2=8.56, P<.01). Having a teenaged mother was included as a covariate in all outcome analyses in this study.

INTERVENTION

The intervention is described elsewhere.[32-35] Each year during grades 1 through 6, teachers in the intervention conditions received 5 days of in-service training in instructional methods.[27,36-40] In addition, first-grade teachers received instruction in the use of a cognitive and social skills training curriculum,[41,42] and during grade 6, a study consultant provided students with training in refusal skills.[43] When children were in grades 1 through 3, parents were offered a 7-session curriculum in child behavior management skills[35] and a 4-session curriculum in skills for supporting their children's academic development.[44] During grades 5 and 6, parents of participants in intervention conditions were offered a 5-session curriculum designed to strengthen skills to reduce their children's risk of problem behaviors.[45] Forty-three percent of parents of children eligible for the full intervention attended at least 1 parenting class during grades 1 through 3,[35] and 29% of parents of children in eligible intervention conditions attended at least 1 class during grades 5 or 6, which indicates that the parent-training component had less reach than the teacher training and child social skills training components.

MAIN OUTCOME MEASURES

Primary outcome indices of success in each life domain were analyzed. The indices provide a limited set of comparisons for multivariate statistical tests of intervention effects. Analyses of primary outcome indices were followed up, where warranted, by analyses of specific behaviors, attitudes, and events to provide descriptive detail to the findings and to enable comparison with previous reports.[33,34] Measures were participant self-reports of events in the last year at ages 24 and 27 years unless otherwise noted, and court records from age 10 to 24 years. Extreme values for open-ended numeric responses were limited to an appropriate maximum to limit the effects of outliers.

For school and work functioning, a median socioeconomic status (SES) attainment index was assessed by creating a dichotomous measure of those scoring at or above the median in completed education (attaining at least a high school diploma by age 24 or 27 years) or household income (at least $44 000 at age 24 years and at least $45 000 at age 27 years).[40] Specific SES measures included cumulative education completed[46] and income (divided by 1000 for analysis). Other measures included the degree to which students were integrated at school (eg, time in class and participation, coded 0 [poorly integrated] to 4 [well integrated]; mean reliability coefficient α at ages 24 and 27 years, α=0.37)[33] and the degree of responsibility on the job for those who were employed (2 items coded 0 [low responsibility] to 4 [high responsibility]; mean r=.36).[33] (For purposes of comparison, measures at age 21 years were replicated as closely as possible. As a result, some reliability coefficients for measures corresponding to those examined at age 21 years are low.) Constructive engagement summed the average number of hours per week engaged in school or work (divided by 10 for analysis),[33,47] and constructive self-efficacy concerned perceived opportunities for attaining a good education and a good job (coded 0 [low engagement] to 4 [high engagement]; α=.78).[33] Two additional descriptive measures, for which we did not expect intervention effects, were student status in the last year and employment status in the last month, ranging from nonstudent or unemployed (coded 0) to full-time student or employed (coded 4).[33] To assess community involvement, a civic engagement index summed the mean number of hours per month of involvement in community groups and volunteer activities.[47]

Mental health problems were assessed with the Diagnostic Interview Schedule[46,48-52] to measure *Diagnostic and Statistical Manual of Mental Disorders* (Fourth Edition) (*DSM-IV*) criteria.[53] A disorder criterion index (coded 0-37; α=.95) summed across the total number of *DSM-IV* criteria met in the last year for a generalized anxiety disorder (GAD) criterion count (coded 0-6; α=.88), a social phobia criterion count (coded 0-5; α=.92), a posttraumatic stress disorder criterion count (coded 0-17; α=.98), and a major depressive episode criterion count (coded

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0-9; α = .98). Specific criterion count measures for each of these disorders were also analyzed, including a separate measure of suicidal thoughts (coded 0-3; α = .67).[33] In addition, a dichotomous disorder diagnosis index was computed to indicate those meeting criteria for *DSM-IV* diagnosis for any of the measured disorders (GAD, social phobia, posttraumatic stress disorder, or major depressive episode).[33]

The lifetime sexually transmitted disease (STD) index was a dichotomous measure based on reports of having ever been diagnosed as having an STD.[34] Specific measures of sexual risk behavior included the number of lifetime sex partners and, among those not in an exclusive relationship, the number of past-year sex partners and condom use in the last year (coded as percentage of time).[34] We also report descriptive measures of having ever been or gotten someone pregnant and ever having or fathering a baby, for which we did not expect intervention effects. Lifetime measures were constructed accounting for affirmative responses in previous-year surveys.

A substance abuse and dependence criterion index was computed as the sum of *DSM-IV* criteria met for alcohol and illicit drug abuse and dependence disorders (coded 0-22; α = .86), and a substance abuse and dependence diagnosis index indicated those meeting criteria for an abuse or dependence diagnosis.[46] Specific behaviors related to problem substance use included high variety of substance use (identifying those above the 90th percentile in number of different substances used in the last year) and the extent of substance use interference with life (coded 0 for no use to 4 for "very much").[33] Any past-year substance use (tobacco, alcohol, or illicit drugs) is reported for descriptive purposes.[33]

A past-year crime index was computed from self-reports of criminal acts other than driving violations or illicit drug use.[33] Specific crime measures included high variety of crime, identifying those above the 90th percentile in number of different types of crimes committed, and measures of having sold drugs and having been arrested. In addition, official state and federal crime files were matched to SSDP participants (including survey nonrespondents) to assess the presence of a past-year court charge or a lifetime court charge for any noncriminal, misdemeanor, or felony charge through age 24 years.[33]

DATA ANALYSIS

Because of the study design, the unit of intervention assignment consisted of the series of classrooms to which some students were assigned in grades 1 through 4 and the condition assignments of schools attended by all participants in grades 5 and 6. Of the 643 participants assigned to the control, late-intervention, and full-intervention conditions, more than 169 different classroom or school sequences were identified, consistent with the unit of intervention assignment. On average, only 3.80 participants experienced the same units of intervention within conditions. For this reason and to be consistent with previous reports, analyses were conducted at the individual level.

RESULTS

A multivariate analysis of covariance was conducted to assess overall intervention effects across multiple dependent variables, controlling for teenaged mother at birth. All 16 primary outcome indices (8 each at ages 24 and 27 years) were included in this analysis. Results showed a significant overall difference between the full-intervention and control groups with listwise deletion (Wilks Λ, $F_{[16,\ 276]}$, 1.98; $P = .01$). This multivariate analysis of covariance was replicated across 5 data sets for which imputation procedures were used to account for missing data on some outcomes.[54] Each analysis confirmed an overall group difference (Wilks Λ, $F_{[16,\ 319]}$, 1.84-1.94; $P = .03$-$.02$). These results indicate a significant multivariate effect and provide overall control for type I error rate in the significant univariate findings.[55] Multivariate analyses of covariance comparing the late-intervention group with the control group across the 16 outcomes were not significant (Wilks Λ, $F_{[16,\ 423]}$, 0.69-0.75; $P = .81$-$.74$).

SCHOOL, WORK, AND COMMUNITY

Participants in the full-intervention group were significantly more likely than those in the control group to be at or above the median in SES (educational attainment or household income) by age 27 years (93% vs 84% in the control group) (**Table**). The differences in SES attainment were similar at age 24 years, though not significant. Specific comparisons in this domain found that those in the full-intervention groups were marginally more likely to have continued their education beyond high school, with 34% having completed an associate degree by age 27 years compared with 22% in the control group ($P < .06$). Nonsignificant trends in completion of a bachelor's degree and in household and earned income also favored the full-intervention group.

The civic engagement index indicated marginally more community involvement and volunteerism in the full-intervention group at ages 24 and 27 years compared with the control group. Both intervention groups reported significantly more participation in community groups at age 24 years compared with the control group.

Across outcomes related to school, work, and community at ages 24 and 27 years for which we had directional hypotheses, 27 of 28 outcomes analyzed showed directional patterns between the full-intervention and control conditions consistent with prediction, and both primary outcome indices showed positive full-intervention effects significant beyond $P < .08$ by age 27 years. Twenty-two of these 28 outcomes demonstrated a pattern consistent with a dose effect, with the late-treatment group falling between the full-treatment and control groups.

MENTAL HEALTH

Analyses found significantly fewer symptoms of mental health disorders on the disorder criterion index in the full-treatment condition compared with the control group at both ages 24 and 27 years. Analyses also found significantly lower prevalence of those meeting criteria for at least 1 of 4 *DSM-IV* diagnoses on the disorder diagnosis index in the full-treatment group compared with the control group at age 27 years and a nonsignificant trend toward lower prevalence at age 24 years. Measures of specific disorder criterion counts indicated at least marginally significant ($P < .10$) reductions in the number of GAD, social phobia, and posttraumatic stress disorder criteria met at age 24 years and of GAD, posttraumatic stress disorder, and major depressive episode criteria met, as well as significantly fewer suicidal thoughts, at age 27 years. Across all 22 mental health outcomes examined, reported problems were lower in magnitude in the full-intervention group compared with the control group. Participants in the

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Table. Comparison of Control, Late-, and Full-Intervention Groups Across Adult Outcomes at Ages 24 and 27 Years

Outcome	Age 24 Years						Age 27 Years					
		Mean or Prevalence (SD)			*P* Value[a]			Mean or Prevalence (SD)			*P* Value[a]	
	No. of Subjects	Control (C) Group	Late-Intervention (L) Group	Full-Intervention (F) Group	C vs L	C vs F	No. of Subjects	C Group	L Group	F Group	C vs L	C vs F
School, work, and community												
Median SES attainment index[b]	566	0.86 (0.35)	0.90 (0.31)	0.93 (0.26)	.37	.13	595	0.84 (0.37)	0.86 (0.34)	0.93 (0.25)	.45	.02[c]
Civic engagement index	598	9.22 (13.22)	10.93 (14.58)	12.01 (14.91)	.19	.06[d]	598	9.85 (12.77)	9.55 (13.60)	12.37 (14.59)	.84	.07[d]
Specific SES measures												
Completed GED[b]	596	0.90 (0.30)	0.92 (0.27)	0.92 (0.28)	.51	.85	597	0.91 (0.29)	0.92 (0.26)	0.92 (0.28)	.51	.91
Completed high school[b]	596	0.75 (0.44)	0.79 (0.41)	0.81 (0.39)	.37	.27	597	0.77 (0.42)	0.81 (0.39)	0.83 (0.38)	.24	.29
Completed associate's degree[b]	596	0.22 (0.41)	0.30 (0.46)	0.34 (0.47)	.07[d]	.06[d]	596	0.22 (0.42)	0.31 (0.46)	0.34 (0.48)	.07[d]	.05[d]
Completed bachelor's degree[b]	596	0.13 (0.34)	0.19 (0.39)	0.20 (0.40)	.17	.26	596	0.14 (0.35)	0.19 (0.40)	0.20 (0.40)	.20	.31
Household income, $ (in thousands)	521	49.92 (39.61)	50.44 (36.97)	55.20 (36.83)	.99	.35	577	54.12 (43.50)	58.02 (47.45)	61.14 (42.27)	.42	.29
Earned income, $ (in thousands)	563	19.65 (13.21)	21.28 (17.75)	23.16 (18.66)	.36	.11	590	25.93 (22.24)	27.02 (20.56)	29.05 (20.09)	.68	.33
Specific behaviors and attitudes												
Integrated at school	165	1.58 (0.59)	1.65 (0.67)	1.69 (0.74)	.48	.34	135	1.49 (0.59)	1.56 (0.64)	1.70 (0.59)	.46	.06[d]
Responsibility on job	561	2.43 (1.06)	2.51 (1.16)	2.64 (1.09)	.49	.10	546	2.48 (1.08)	2.55 (1.16)	2.72 (1.17)	.62	.09[d]
Constructive engagement	594	2.74 (1.55)	2.89 (1.46)	2.86 (1.46)	.29	.61	595	3.16 (1.26)	3.10 (1.33)	3.26 (1.09)	.57	.55
Constructive self-efficacy	597	3.19 (0.64)	3.25 (0.69)	3.32 (0.58)	.35	.10[d]	598	3.07 (0.67)	3.11 (0.68)	3.06 (0.73)	.61	.79
Community groups, h/mo	598	5.96 (9.97)	8.21 (12.76)	8.86 (13.10)	.045[c]	.02[c]	596	7.07 (11.11)	7.15 (11.80)	8.92 (12.69)	.91	.12
Volunteer activities, h/mo	597	4.49 (9.62)	5.52 (11.07)	6.44 (12.08)	.29	.08[d]	596	3.99 (8.79)	4.50 (9.77)	5.43 (10.04)	.54	.13
Descriptive measures												
Student status	594	0.79 (1.23)	0.70 (1.18)	0.77 (1.28)	.41	.74	598	0.61 (1.14)	0.51 (1.09)	0.49 (1.04)	.36	.37
Employment status	597	3.53 (1.03)	3.40 (1.20)	3.57 (1.03)	.18	.81	593	3.45 (1.16)	3.43 (1.19)	3.52 (1.06)	.77	.74
Mental health												
Disorder criterion index	596	4.45 (7.89)	3.36 (6.85)	2.47 (5.56)	.12	.02[c]	598	6.48 (7.97)	5.45 (6.92)	4.23 (5.20)	.14	.008[c]
Disorder diagnosis index[b]	596	0.27 (0.45)	0.21 (0.41)	0.18 (0.39)	.16	.07[d]	598	0.26 (0.44)	0.22 (0.41)	0.15 (0.36)	.31	.03[c]
Specific disorders												
GAD criterion count	595	0.76 (1.87)	0.67 (1.71)	0.34 (1.26)	.62	.03[c]	598	2.20 (2.04)	2.03 (1.95)	1.77 (1.81)	.40	.07[d]
Social phobia criterion count	596	0.27 (1.07)	0.29 (1.08)	0.07 (.59)	.90	.06[d]	598	1.24 (1.73)	0.98 (1.58)	0.95 (1.54)	.10	.15
PTSD criterion count	594	2.05 (4.52)	1.26 (3.70)	1.19 (3.54)	.046[c]	.09[d]	598	1.22 (3.95)	0.78 (3.17)	0.38 (2.08)	.17	.04[c]
MDE criterion count	595	1.39 (3.11)	1.14 (2.79)	0.89 (2.54)	.41	.18	598	1.82 (3.33)	1.65 (3.00)	1.12 (2.59)	.61	.06[d]
Suicidal thoughts	595	0.21 (0.65)	0.19 (0.68)	0.12 (0.51)	.79	.24	597	0.17 (0.47)	0.12 (0.43)	0.07 (0.28)	.27	.04[c]
GAD diagnosis[b]	595	0.11 (0.31)	0.07 (0.25)	0.06 (0.23)	.12	.10	597	0.07 (0.26)	0.07 (0.26)	0.03 (0.18)	.96	.16
Social phobia diagnosis[b]	596	0.03 (0.17)	0.02 (0.15)	0.01 (0.12)	.68	.33	598	0.08 (0.27)	0.04 (0.21)	0.04 (0.20)	.13	.22
PTSD diagnosis[b]	594	0.12 (0.33)	0.07 (0.26)	0.08 (0.27)	.09[d]	.30	598	0.08 (0.28)	0.04 (0.20)	0.03 (0.18)	.06[d]	.11
MDE diagnosis[b]	595	0.16 (0.37)	0.14 (0.35)	0.11 (0.31)	.51	.21	598	0.15 (0.36)	0.16 (0.36)	0.11 (0.31)	.78	.43

(continued)

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Table. Comparison of Control, Late-, and Full-Intervention Groups Across Adult Outcomes at Ages 24 and 27 Years (cont)

Outcome	Age 24 Years: No. of Subjects	Age 24 Years: Mean or Prevalence (SD): Control (C) Group	Age 24 Years: Mean or Prevalence (SD): Late-Intervention (L) Group	Age 24 Years: Mean or Prevalence (SD): Full-Intervention (F) Group	Age 24 Years: *P* Value[a]: C vs L	Age 24 Years: *P* Value[a]: C vs F	Age 27 Years: No. of Subjects	Age 27 Years: Mean or Prevalence (SD): C Group	Age 27 Years: Mean or Prevalence (SD): L Group	Age 27 Years: Mean or Prevalence (SD): F Group	Age 27 Years: *P* Value[a]: C vs L	Age 27 Years: *P* Value[a]: C vs F
Sexual behavior and parenthood												
Lifetime STD index[b]	565	0.31 (0.46)	0.31 (0.46)	0.19 (0.39)	.99	.02[c]	549	0.35 (0.48)	0.37 (0.48)	0.23 (0.42)	.69	.03[c]
Specific behaviors												
Lifetime sex partners	539	9.81 (9.45)	10.86 (11.06)	8.99 (9.23)	.24	.65	520	12.40 (10.35)	13.46 (11.88)	11.63 (10.45)	.27	.70
Sex partners in last year, single	329	2.18 (2.60)	1.87 (2.15)	1.93 (1.87)	.30	.57	313	2.52 (2.81)	2.22 (2.77)	2.50 (3.09)	.43	.89
Condom use, % time, single	252	0.51 (0.34)	0.57 (0.34)	0.51 (0.34)	.20	.94	247	0.47 (0.35)	0.55 (0.37)	0.46 (0.39)	.13	.84
Descriptive measures												
Ever been or gotten someone pregnant[b]	597	0.68 (0.47)	0.66 (0.47)	0.59 (0.49)	.74	.19	615	0.72 (0.45)	0.70 (0.46)	0.64 (0.48)	.57	.19
Ever having or fathering a baby[b]	606	0.48 (0.50)	0.44 (0.50)	0.43 (0.50)	.47	.65	610	0.55 (0.50)	0.51 (0.50)	0.51 (0.50)	.50	.80
Substance use and crime												
Substance abuse/dependence criterion index	598	1.53 (2.50)	1.59 (2.74)	1.59 (2.52)	.79	.76	598	1.36 (2.49)	1.42 (2.89)	1.45 (3.21)	.82	.74
Substance abuse/dependence diagnosis index[b]	598	0.24 (0.43)	0.25 (0.43)	0.27 (0.45)	.96	.56	598	0.26 (0.44)	0.28 (0.45)	0.23 (0.42)	.71	.54
Last-year crime index[b]	598	0.20 (0.40)	0.18 (0.39)	0.20 (0.40)	.61	.97	598	0.16 (0.37)	0.21 (0.41)	0.23 (0.42)	.17	.08[d]
Specific behaviors and events												
High variety of substance use[b]	598	0.11 (0.32)	0.09 (0.29)	0.10 (0.31)	.42	.79	598	0.21 (0.41)	0.21 (0.41)	0.21 (0.41)	.97	.94
Substance use interference with life	593	0.66 (0.79)	0.62 (0.68)	0.64 (0.87)	.57	.76	598	0.80 (0.83)	0.77 (0.79)	0.78 (0.89)	.77	.80
High variety of crime[b]	598	0.09 (0.29)	0.11 (0.31)	0.09 (0.29)	.62	.97	598	0.07 (0.26)	0.09 (0.29)	0.05 (0.23)	.34	.79
Sold drugs[b]	597	0.06 (0.24)	0.06 (0.23)	0.07 (0.26)	.82	.79	598	0.03 (0.18)	0.05 (0.21)	0.08 (0.26)	.50	.11
Arrested[b]	598	0.06 (0.24)	0.06 (0.24)	0.07 (0.26)	.83	.59	598	0.06 (0.25)	0.08 (0.27)	0.07 (0.25)	.59	.68
Court charge in the last year[b]	643	0.07 (0.26)	0.04 (0.21)	0.06 (0.25)	.21	.84	NA	NA	NA	NA	NA	NA
Lifetime court charge[b]	618	0.58 (0.50)	0.57 (0.50)	0.49 (0.50)	.91	.23	NA	NA	NA	NA	NA	NA
Descriptive measures												
Any substance use in the last year[b]	598	0.90 (0.30)	0.87 (0.34)	0.84 (0.37)	.32	.12	598	0.90 (0.30)	0.88 (0.32)	0.86 (0.35)	.57	.25

Abbreviations: GAD, generalized anxiety disorder; GED, general equivalency diploma; MDE, major depressive episode; NA, data not available; PTSD, posttraumatic stress disorder; SES, socioeconomic status; STD, sexually transmitted disease.

[a] To compare groups, linear or logistic regressions were used with dummy variables for C vs L and C vs F, controlling for teenaged mother at birth. *P* values are based on 2-tailed significance tests.

[b] For consistency in presentation, prevalence rates are indicated using a 0 to 1.00 scale, where 1.00=100%.

[c] $P<.05$.

[d] $P<.10$.

late-intervention group reported levels between or equal to those of the other groups for all but 3 of the 22 mental health outcomes, consistent with a dose effect.

SEXUAL BEHAVIOR AND PARENTHOOD

The lifetime STD index showed significantly lower prevalence of having ever been diagnosed with an STD at ages 24 and 27 years for the full-intervention group compared with the control group. No intervention effects on specific sexual behaviors were found.

SUBSTANCE USE AND CRIME

No intervention effects on either of the substance abuse and dependence indices were found in young adulthood, and no significant effects were observed for the specific measures of high variety of substance use or substance use interference with life. A marginally significant trend ($P<.09$),

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counter to hypotheses, for the last-year crime index at age 27 years indicated a higher prevalence of having committed a crime among participants in the full-intervention group compared with the control group. This difference stemmed primarily from nonsignificant but higher rates in the full-intervention group of minor theft (having taken anything worth less than $50; 9% vs 4% in the control group) and drug selling (8% vs 3%, respectively) at age 27 years. This was the only finding counter to hypotheses that approached significance across all of the outcomes examined in the Table. No significant intervention effects were found for any specific measures related to crime.

INTERACTIONS WITH SEX, POVERTY, AND RACE/ETHNICITY

Adding interaction terms to the regression models revealed 2 significant effects of the full intervention specific to male subjects. Male subjects in the full-treatment group were significantly more likely to meet median education or income criteria at age 24 years as assessed using the SES attainment index compared with their counterparts in the control group (97% [SD, 0.17] vs 85% [SD, 0.36], respectively; $P=.03$). In addition, male subjects in the full-treatment group were significantly more constructively engaged at age 24 years compared with male subjects in the control group (mean [SD] 29.9 [13.9] h/wk of engagement in school or work vs 24.4 [16.4] h/wk, respectively; $P=.02$). Neither of these outcomes showed significant intervention differences for female subjects.

Two significant intervention effects were also found specific to participants from a background of childhood poverty. Those in the full-treatment group from a background of childhood poverty reported a mean (SD) of almost 9.5 (13.2) hours per month of involvement in community groups at age 27 years compared with 4.9 (9.2) hours per month for those in the control group ($P=.004$). Participants from childhood poverty in the full-intervention group were also significantly less likely to meet sufficient criteria for a diagnosis of GAD at age 24 years compared with those in the control group (3% [SD, 0.16] vs 14% [SD, 0.35], respectively; $P=.02$).

After controlling for childhood poverty, race/ethnicity also significantly interacted with the intervention for some outcomes. Responsibility on the job at age 24 years was significantly higher among white participants in the full-treatment group compared with whites in the control group (mean=2.78 [SD, 1.10] and mean=2.34 [SD, 1.06], respectively; $P=.02$). African Americans in the full-intervention condition compared with their control counterparts reported significantly higher household income at age 27 years (mean=$55 594 [SD, $45 966] and mean=$35 288 [SD=$35 410], respectively; $P=.046$), fewer GAD criteria met at age 27 years (mean=0.94 [SD, 1.39] and mean=2.51 [SD, 1.99], respectively; $P<.001$), fewer past-year sex partners at age 27 years (mean=1.39 [SD, 1.65] and mean=2.89 [SD, 2.78], respectively; $P=.03$), and reduced prevalence of lifetime STD diagnosis at age 24 years (12% [SD, 0.33] in the full-intervention condition and 55% [SD, 0.50] in the control condition; $P=.001$) and at age 27 years (16% [SD, 0.37] in the full-intervention condition and 61% [SD, 0.49] in the control condition; $P=.001$). These results suggest that the significant main effects of the full intervention on STD diagnoses at ages 24 and 27 years were primarily because of the reductions in STD diagnoses among African Americans in the full-intervention group.

COMMENT

The SSDP intervention in the elementary grades showed a significant overall effect of the full intervention in a multivariate analysis of 16 outcome indices at ages 24 and 27 years, 12 and 15 years after the intervention ended. Summary indices revealed significantly better SES, mental health, and sexual health by age 27 years in those assigned to the SSDP full-intervention condition compared with those in the control group. In contrast, effects of the intervention on crime and substance use were not found at ages 24 and 27 years.

In line with previous analyses,[32,33] the rank of means and prevalence rates for the late-intervention group compared with the full-intervention and control groups suggests a dose effect for the domains most influenced by the intervention. That is, although differences were not significant, the late-intervention group reported better outcomes than the control group across the preponderance of measures for which there were directional hypotheses related to school, work, mental health, or community, but worse outcomes compared with the full-intervention group across these same measures.

Our findings indicate that a theory-based intervention that improved parenting practices, children's social competence, and classroom management and instruction during the elementary grades influenced some, though not all, indices of adult functioning in individuals in their mid- to late 20s. The elementary grade intervention was associated with greater accomplishment and engagement in school, work, and community and fewer mental health problems by ages 24 and 27 years. Effects of the SSDP intervention on mental health outcomes are particularly noteworthy at this stage of young adulthood, given the potentially debilitating consequences of depression and anxiety.[56-59]

Findings should be considered in the context of the design and analysis approach, which was based on condition assignment rather than attendance or implementation, using controlled 2-tailed statistical tests and an omnibus test of multiple outcomes. Strengths of this study include the ability to detect relatively small effect sizes, comprehensive assessment capturing multiple outcome domains, delivery of the intervention package universally to all students in intervention classrooms, and the ability to investigate possible moderating effects of sex, race/ethnicity, and childhood poverty. As in previous reports,[33] there was little evidence of serious threats to internal validity. In addition, procedures for assigning classrooms (in the early experiment) and schools to conditions likely guarded against possible effects of differential school or teacher receptivity to intervention, and mandatory busing provided further protection against confounding neighborhood or school demographic differences or parent school-selection effects. An exception to the general pattern of group equivalence at the start of the longitu-

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dinal study was a significantly higher percentage of participants in the control group who reported having had a teenaged mother at birth. This difference was controlled for statistically throughout all analyses.

Limitations should be noted. The study was quasi-experimental and geographically limited. It relied heavily on self-reported data from study participants. Effects of the intervention on school, work, and mental health were observed, but no significant effects on substance use or crime were observed at these ages.

Intervention effects reported herein indicate that universal intervention during the elementary grades to improve the management and instructional skills of urban public elementary schoolteachers, strengthen parenting practices in multiracial/multiethnic urban families, and ensure that children have the skills to participate in the social and academic life of elementary school can positively affect attainment, functioning, and mental health in young adulthood.

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Author Contributions: Dr Hawkins had full access to all of the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis. *Study concept and design:* Hawkins, Kosterman, Catalano, and Hill. *Acquisition of data:* Hawkins and Hill. *Analysis and interpretation of data:* Kosterman, Catalano, Hill, and Abbott. *Drafting of the manuscript:* Kosterman. *Critical revision of the manuscript for important intellectual content:* Hawkins, Kosterman, Catalano, Hill, and Abbott. *Statistical analysis:* Kosterman and Abbott. *Obtained funding:* Hawkins, Kosterman, Catalano, and Hill. *Administrative, technical, and material support:* Hill. *Study supervision:* Hawkins.
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Additional Information: *Supporting School Success* and *Guiding Good Choices* were tested in the study that produced the data set used in this article.

REFERENCES

1. Black MM, Krishnakumar A. Children in low-income, urban settings: interventions to promote mental health and well-being. *Am Psychol*. 1998;53(6):635-646.
2. Kiser LJ. Protecting children from the dangers of urban poverty. *Clin Psychol Rev*. 2007;27(2):211-225.
3. Bazargan M, Calderon JL, Heslin KC, et al. A profile of chronic mental and physical conditions among African-American and Latino children in urban public housing. *Ethn Dis*. 2005;15(4)(suppl 5):S3-S9.
4. Blanchett WJ, Mumford V, Beachum F. Urban school failure and disproportionality in a post-Brown era: benign neglect of the constitutional rights of students of color. *Remedial Special Educ*. 2005;26(2):70-81.
5. Gallup-Black A, Weitzman BC. Teen pregnancy and urban youth: competing truths, complacency, and perceptions of the problem. *J Adolesc Health*. 2004;34(5):366-375.
6. Oh JH. Social disorganizations and crime rates in US central cities: toward an explanation of urban economic change. *Soc Sci J*. 2005;42(4):569-582.
7. Schwartz AC, Bradley RL, Sexton M, Sherry A, Ressler KJ. Posttraumatic stress disorder among African Americans in an inner city mental health clinic. *Psychiatr Serv*. 2005;56(2):212-215.
8. Galaif ER, Newcomb MD, Carmona JV. Prospective relationships between drug problems and work adjustment in a community sample of adults. *J Appl Psychol*. 2001;86(2):337-350.
9. Kerkhoff AC. From student to worker. In: Mortimer JT, Shanahan MJ, eds. *Handbook of the Life Course*. New York, NY: Kluwer Academic/Plenum; 2003:251-267.
10. Rindfuss RR, Cooksey EC, Sutterlin RL. Young adult occupational achievement: early expectations versus behavioral reality. *Work Occupations*. 1999;26(2):220-263.
11. Settersten RA Jr. Social policy and the transition to adulthood: toward strong institutions and individual capacities. In: Settersten RA Jr, Furstenberg FF Jr, Rumbaut RG, eds. *On the Frontier of Adulthood: Theory, Research, and Public Policy*. Chicago, IL: University of Chicago Press; 2005:256-291.
12. Verba S, Schlozman KL, Brady HE. *Voice and Equality: Civic Volunteerism in American Politics*. Cambridge, MA: Harvard University Press; 1995.
13. Kessler RC, McGonagle KA, Zhao S, et al. Lifetime and 12-month prevalence of *DSM-III-R* psychiatric disorders in the United States. *Arch Gen Psychiatry*. 1994;51(1):8-19.
14. Eaton WW, Anthony JC, Gallo J, et al. Natural history of Diagnostic Interview Schedule/*DSM-IV* major depression: the Baltimore Epidemiologic Catchment Area follow-up. *Arch Gen Psychiatry*. 1997;54(11):993-999.
15. Binson D, Dolcini MM, Pollack LM, Catania JA. Data from the National AIDS Behavioral Surveys: IV, multiple sexual partners among young adults in high-risk cities. *Fam Plann Perspect*. 1993;25(6):268-272.
16. Centers for Disease Control and Prevention. *Tracking the Hidden Epidemics: Trends in STDs in the United States 2000*. Atlanta, GA: Dept of Health and Human Services, Centers for Disease Control and Prevention; 2000.
17. Bachman JG, O'Malley PM, Schulenberg JE, Johnston LD, Bryant AL, Merline AC. *The Decline of Substance Use in Young Adulthood: Changes in Social Activities, Roles, and Beliefs*. Mahwah, NJ: Lawrence Erlbaum Associates; 2002.
18. Schulenberg JE, O'Malley PM, Bachman JG, Johnston LD. Early adult transitions and their relation to well-being and substance use. In: Settersten RA Jr, Furstenberg FF Jr, Rumbaut RG, eds. *On the Frontier of Adulthood: Theory, Research, and Public Policy*. Chicago, IL: University of Chicago Press; 2005:417-453.
19. Elliott DS. Serious violent offenders: onset, developmental course, and termination: American Society of Criminology 1993 Presidential Address. *Criminology*. 1994;32(1):1-22.
20. Farrington DP. Age, period, cohort, and offending. In: Gottfredson DM, Clarke RV, eds. *Policy and Theory in Criminal Justice*. Andershot, England: Avebury; 1990:51-75.
21. Sampson RJ, Laub JH. *Crime in the Making: Pathways and Turning Points Through Life*. Cambridge, MA: Harvard University Press; 1993.
22. Sampson RJ, Laub JH. Life-course desisters? trajectories of crime among delinquent boys followed to age 70. *Criminology*. 2003;41(3):555-592.
23. Kellam SG, Brown CH, Poduska J, et al. Effects of a universal classroom behavior management program in first and second grades on young adult behavioral, psychiatric, and social outcomes. *Drug Alcohol Depend*. 2008;95(suppl 1):S5-S28.
24. Catalano RF, Hawkins JD. The social development model: a theory of antisocial behavior. In: Hawkins JD, ed. *Delinquency and Crime: Current Theories*. New York, NY: Cambridge University Press; 1996:149-197.
25. Hawkins JD, Weis JG. The social development model: an integrated approach to delinquency prevention. *J Primary Prev*. 1985;6(2):73-97.
26. Hawkins JD, Catalano RF. Doing prevention science: a response to Dennis M. Gorman and a brief history of the quasi-experimental study nested within the Seattle Social Development Project. *J Exp Criminology*. 2005;1(1):79-86.
27. Abbott RD, O'Donnell J, Hawkins JD, Hill KG, Kosterman R, Catalano RF. Changing teaching practices to promote achievement and bonding to school. *Am J Orthopsychiatry*. 1998;68(4):542-552.
28. Hawkins JD, Catalano RF, Morrison DM, O'Donnell J, Abbott RD, Day LE. The Seattle Social Development Project: effects of the first four years on protective factors and problem behaviors. In: McCord J, Tremblay RE, eds. *Preventing Antisocial Behavior: Interventions From Birth Through Adolescence*. New York, NY: Guilford Press; 1992:139-161.
29. Hawkins JD, Guo J, Hill KG, Battin-Pearson S, Abbott RD. Long-term effects of the Seattle Social Development intervention on school bonding trajectories. *Appl Dev Sci*. 2001;5(4):225-236.
30. Hawkins JD, Von Cleve E, Catalano RF Jr. Reducing early childhood aggression: results of a primary prevention program. *J Am Acad Child Adolesc Psychiatry*. 1991;30(2):208-217.

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31. O'Donnell J, Hawkins JD, Catalano RF, Abbott RD, Day LE. Preventing school failure, drug use, and delinquency among low-income children: long-term intervention in elementary schools. *Am J Orthopsychiatry*. 1995;65(1):87-100.
32. Hawkins JD, Catalano RF, Kosterman R, Abbott R, Hill KG. Preventing adolescent health-risk behaviors by strengthening protection during childhood. *Arch Pediatr Adolesc Med*. 1999;153(3):226-234.
33. Hawkins JD, Kosterman R, Catalano RF, Hill KG, Abbott RD. Promoting positive adult functioning through social development intervention in childhood: long-term effects from the Seattle Social Development Project. *Arch Pediatr Adolesc Med*. 2005;159(1):25-31.
34. Lonczak HS, Abbott RD, Hawkins JD, Kosterman R, Catalano RF. Effects of the Seattle Social Development Project on sexual behavior, pregnancy, birth, and STD outcomes by age 21. *Arch Pediatr Adolesc Med*. 2002;156(5):438-447.
35. Hawkins JD, Catalano RF, Jones G, Fine DN. Delinquency prevention through parent training: results and issues from work in progress. In: Wilson JQ, Loury GC, eds. *From Children to Citizens: Families, Schools, and Delinquency Prevention*. New York, NY: Springer-Verlag; 1987:186-204.
36. Cummings C, Barber C, Cuervo AG. *School Enhancement Research and Demonstration Project. Methods of Instruction. Teacher's Manual (Secondary)*. Washington, DC: Office of Juvenile Justice and Delinquency Prevention, US Dept of Justice; 1982.
37. Cummings C. *Managing to Teach*. Edmonds, WA: Teaching Inc; 1983.
38. Hawkins JD, Doueck HJ, Lishner DM. Changing teaching practices in mainstream classrooms to improve bonding and behavior of low achievers. *Am Educ Res J*. 1988;25(1):31-50.
39. Slavin RE. Synthesis of research on cooperative learning. *Educ Leadersh*. 1991; 48:71-82.
40. Hawkins JD, Arthur MW, Catalano RF. *Six State Consortium for Prevention Needs Assessment Studies: Final Report*. Seattle: University of Washington, Social Development Research Group; 1997.
41. Shure MB, Spivack G. Interpersonal problem solving as a mediator of behavioral adjustment in preschool and kindergarten children. *J Appl Dev Psychol*. 1980; 1(1):29-44.
42. Shure MB, Spivack G. *Interpersonal Problem Solving (ICPS): A Training Program for the Intermediate Elementary Grades*. Philadelphia, PA: Hahnemann University, Dept of Mental Health Sciences; 1982.
43. Comprehensive Health Educational Foundation. *Here's Looking at You 2000*. Seattle, WA: Comprehensive Health Educational Foundation; 1999.
44. Hawkins JD, Catalano RF. *Preparing for School Success*. South Dearfield, MA: Channing Bete Co; 2003.
45. Hawkins JD, Catalano RF. *Guiding Good Choices*. South Dearfield, MA: Channing Bete Co; 2003.
46. Robins LN, Helzer JE, Croughan J, Williams JBW, Spitzer RL. *NIMH Diagnostic Interview Schedule: Version III (May 1981)*. Rockville, MD: National Institute of Mental Health; 1981.
47. Kosterman R, Hawkins JD, Abbott RD, Hill KG, Herrenkohl TI, Catalano RF. Measures of positive adult behavior and their relationship to crime and substance use. *Prev Sci*. 2005;6(1):21-33.
48. McGee R, Feehan M, Williams S, Partridge F, Silva PA, Kelly J. *DSM-III* disorders in a large sample of adolescents. *J Am Acad Child Adolesc Psychiatry*. 1990; 29(4):611-619.
49. Jaffee SR, Moffitt TE, Caspi A, Fombonne E, Poulton R, Martin J. Differences in early childhood risk factors for juvenile-onset and adult-onset depression. *Arch Gen Psychiatry*. 2002;59(3):215-222.
50. Leaf PJ, Myers JK, McEvoy LT. Procedures used in the Epidemiological Catchment Area study. In: Reiger DA, ed. *Psychiatric Disorders in America*. New York, NY: Free Press; 1991:11-32.
51. Newman DL, Moffitt TE, Caspi A, Magdol L, Silva PA, Stanton WR. Psychiatric disorder in a birth cohort of young adults: prevalence, comorbidity, clinical significance, and new case incidence from ages 11 to 21. *J Consult Clin Psychol*. 1996;64(3):552-562.
52. Reinherz HZ, Giaconia RM, Hauf AMC, Wasserman MS, Paradis AD. General and specific childhood risk factors for depression and drug disorders by early adulthood. *J Am Acad Child Adolesc Psychiatry*. 2000;39(2):223-231.
53. American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders*. 4th ed. Washington, DC: American Psychiatric Association; 1994.
54. Schafer JL. *Analysis of Incomplete Multivariate Data*. London, England: Chapman & Hall; 1997.
55. Stevens J. *Applied Multivariate Statistics for the Social Sciences*. New York, NY: Lawrence Erlbaum Associates; 2002.
56. Eaton WW. *The Sociology of Mental Disorders*. 3rd ed. Westport, CT: Praeger; 2001.
57. Wells JC, Tien AY, Garrison R, Eaton WW. Risk factors for the incidence of social phobia as determined by the Diagnostic Interview Schedule according to *DSM-III* in a population-based study. *Acta Psychiatr Scand*. 1994;90(2):84-90.
58. Booth BM, Zhang M, Rost KM, Clardy JA, Smith LG, Smith GR. Measuring outcomes and costs for major depression. *Psychopharmacol Bull*. 1997;33(4): 653-658.
59. Davila J, Beck JG. Is social anxiety associated with impairment in close relationships? a preliminary investigation. *Behav Ther*. 2002;33(3):427-447.

Announcement

Submissions. The Editors welcome contributions to Picture of the Month. Submissions should describe common problems presenting uncommonly, rather than total zebras. Cases should be of interest to practicing pediatricians, highlighting problems that they are likely to at least occasionally encounter in the office or hospital setting. High-quality clinical images (in either 35-mm slide or electronic format) along with parent or patient permission to use these images must accompany the submission. The entire discussion should comprise no more than 750 words. Articles and photographs accepted for publication will bear the contributor's name. There is no charge for reproduction and printing of color illustrations. For details regarding electronic submission, please see: http://archpedi.ama-assn.org.

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