

Preventing substance use, violent behaviors, and sexual activity among elementary students: Effects of the *Positive Action* program Hawai'i

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Abstract

Objectives: Report effectiveness of 5-year trial of a comprehensive elementary school-based prevention program on substance use, violent behaviors, and sexual activity of 5th graders.

Methods: Using a matched-pair, cluster randomized, controlled design, with 10 intervention and 10 control schools, fifth graders self-reported (N = 1714) on lifetime substance use, violence, and voluntary sexual activity, and teachers reported on student (N = 1225) substance use and violence.

Results: Random effects 2-level count models (students nested within schools) indicated student reported substance use (rate ratio [RR] 0.41, 90% confidence interval [CI] 0.25 to 0.66) and violence (RR 0.42, CI 0.24 to 0.73) were significantly lower for students attending intervention schools. A two-level random effects binary model indicated sexual activity was lower (odds ratio 0.24, CI 0.08 to 0.66) for intervention students. Teacher reports substantiated effects. Dose-response analyses indicated students exposed to the program for ≥ 3 years had significantly lower rates of all negative behaviors.

Conclusions: The reduction of negative behaviors by almost half provides evidence that a comprehensive school-based program can have a substantial impact on reducing risk-related behaviors of young adolescents.

Introduction

Substance use, violent behaviors, and early initiation of sexual activity among American youth occur at problematic levels.¹⁻⁴ Early initiation of substance use and engaging in violent behaviors during childhood place children at a greater risk of psychopathology, aggressive behaviors, and continuation of substance use during adolescence and on into adulthood.⁵⁻¹⁰ National estimates indicate approximately 43.3% of high school students consumed alcohol, 35.9% had been in a physical fight, and 46.8% engaged in sexual intercourse over the past 12 months.⁵ Hence, prevention programs that can successfully reduce the incidence of such behaviors should provide clear public health benefits.

While negative behaviors can be prevented or reduced using appropriately designed and implemented school-based prevention programs,^{2, 11, 12} not all have undergone efficacy and effectiveness evaluations,^{9, 13} criteria deemed crucial in determining whether a program is ready for wide-spread adoption by schools.^{14, 15} Although studies indicate positive treatment effects for school-based prevention programs, the magnitude of effects is often modest,^{16, 17} with an average effect size of .20,¹⁸ comparable to a success rate of 9.5%, suggesting that there is considerable room for improvement in the impact of prevention programs on reducing negative behaviors. Further, accumulating evidence indicates that negative behaviors do not exist in isolation from one another^{2, 19} and, hence, programs addressing multiple co-occurring negative behaviors are likely to be of greater overall benefit.^{20, 21}

The purpose of the current study was to evaluate the preventive benefits of a comprehensive school-wide social and character development (SACD) program, the

Positive Action program (*PA*). *PA* was hypothesized to result in lower rates of student self-reported and teacher reports of student substance use, violence, and voluntary sexual activity. Previous quasi-experimental studies^{22,23} reported beneficial school-level effects, on student achievement and serious problem behaviors (e.g., suspensions and violence rates). The current study builds on prior research by reporting on a matched-pair, cluster randomized, controlled trial.²⁴ These features are important when examining the scientific credibility of intervention findings.

Methods

Design

The Hawai`i randomized trial of *PA* took place in 20 public elementary (K-5th or K-6th) schools on three Hawai`ian islands. The study followed two cohorts of students, who began the program as 1st or 2nd graders and received up to 4 years of program exposure. The sample analyzed herein consisted of students who entered the intervention and control schools from 1st/2nd grades (baseline; Cohort 1, 2005 and Cohort 2, 2006) up through 5th grade and who received active parental consent at 5th grade to complete the self-report on substance abuse, violent behaviors, and voluntary sexual activity questionnaire (see below). Hence, the sample consisted of those students who were in grades 1 or 2 at baseline and stayed in the study schools for the duration of the study plus those students in grade 5 at the end of the study who entered the schools at any year during the course of the study. Students who left study schools during the study were not followed, and students who joined the schools were added to the study. All assessments

and procedures were approved by the Institutional Review Boards of the University of Illinois at Chicago and Oregon State University.

Baseline equivalency. Schools for the study were selected based on multiple eligibility criteria: a) at least 25% of students receiving free or reduced price lunch; b) in the lower 3 quartiles of standardized test scores; c) on O`ahu, Maui, and Moloka`i; d) K-5 or K-6 community schools (not academy, charter, or special education); and e) annual student stability rates over 80% (mobility less than 20%). Using the 2000 School Report Card data,²⁵ the 111 eligible schools were stratified based on an index that included % free/reduced lunch students, school size, % student stability, and student ethnic distribution; additional characteristics of the school (student/teacher ratio, expenditures per student); characteristics of student populations (proportions of gifted, special education, and ESL students), and indicators of student behavioral and school performance outcomes (disciplinary referrals, suspension rates, and standardized achievement scores).²⁶ Schools were matched based on their total index score, with one of the pair randomized to the intervention condition while the control schools were asked to continue “business as usual” without making any substantial SACD reforms. At baseline no significant differences ($P \geq .05$) existed between intervention and control schools on any of the above mentioned indicators. After school-level randomization, random effects models (students nested within schools) compared student-reported negative behaviors and teacher reports of student negative behaviors (i.e., gets into fights, threatens others, physically hurts others, and hits others) at baseline. No significant differences ($P \geq .05$) between control and treatment reports were observed, indicating baseline equivalency.

Intervention. The *Positive Action* program (www.positiveaction.net) is a multicomponent, SACD school-based program designed to improve academics, student behaviors and character. It is grounded in a broad theory of self-concept,²⁷ is consistent with comprehensive theories of health behavior like the Theory of Triadic Influence,²⁸ and is described in detail elsewhere.^{22, 23} Briefly, the full *PA* program consists of K-12 classroom curricula (only the elementary curriculum was used in the current evaluation trial), school-wide climate changes undertaken by the principal and a *PA* coordinator/committee, and family and community involvement components. The sequenced elementary curriculum consists of 140 lessons per grade, per academic year, offered in 15-20 minute periods. The total time students are exposed to the program during a 35 week academic year is approximately 35 hours. Lessons cover six major units on topics related to self-concept, mind and body positive actions (e.g., nutrition, physical activity, decision-making skills, motivation to learn), social/emotional actions for managing oneself responsibly (e.g., emotional regulation, time management), getting along with others (e.g., empathy, respect, treating others as one would like to be treated), being honest with yourself and others, and self-improvement (e.g., goal setting, courage to try new things, persistence). The program utilizes an interactive approach, whereby interaction between teacher and student is encouraged through the use of structured discussions and activities, and interaction between students is encouraged through structured or semi-structured small group activities, including games, role plays and practice of skills. The school-climate kit encourages and reinforces the six units of *PA* school-wide. For each of the participating schools, principals received a kit providing

directions for a school-wide climate program to promote the core elements of the classroom curriculum and reinforcement of positive actions in the entire school.²⁹

The intervention was delivered by classroom teachers.³⁰ Prior to the beginning of each academic year, teachers, administrators, and support staff (e.g., counselors) attended *PA* training sessions conducted by the program developer (Dr. Carol Allred). The training sessions lasted approximately 3-4 hours for the initial year, and 1-2 hours for each successive year. Booster sessions, conducted by the Hawai`i-based project coordinator, were provided at least once during the academic year for each school. These lasted approximately 30-50 minutes. Additionally, mini-conferences were held in February of each year to bring together 5-6 leaders and staff (e.g., principals, counselors, teachers) from each of the 10 participating schools in order to share ideas and experiences as well as to get answers to any concerns regarding implementing the program.

Sample

When students reached 5th grade (10-11 yrs) they were asked to obtain active parental consent and to provide verbal assent in order to respond to 11 items asking about substance use (5 items), violent behavior (5 items), and sexual activity (1 item). This resulted in 976 intervention (50% girls) and 738 control (50% girls) students, a response rate of 86%. Differential selection bias was assessed by comparing students whose parents provided active consent with those students who did not receive active parental consent on reports on a separate negative behaviors scale completed by all students in the study (i.e., blame others for mistakes; copy someone else's work; hit others; tell lies; say things to hurt others feelings; take something that doesn't belong to you; bully other kids; not feel good about who you are; get into fights; feel unhappy) at 5th grade. No significant

($P \geq .05$) differences were observed. Additionally, analyses were performed on descriptive characteristics (e.g., gender, ethnicity) and responses to behavior and attitudinal scales at baseline that reflect demographic characteristics and known correlates of early violence and substance use to examine whether students who dropped out of the study vs. those that remained were different at baseline within each condition, separately, and between conditions comparing the students that left after baseline. Secondly, at year 5, control students were compared on a negative behavior scale (see above) to examine whether the control students who were surveyed all 5 years were significantly different than control students who entered the study after baseline. The results of the above analyses (analyses not presented here) indicated no significant differences for any of the contrasts. The final sample of students self-identified ethnicity as primarily Hawai`ian or part Hawai`ian (26.1%) or reported multiple ethnic backgrounds (22.6%). The remaining students self-identified as White non-Hispanic (8.6%), African American (1.6%), Native American (1.7%), other Pacific Islander (4.7%), Japanese (4.6%), other Asian (20.6%), other (7.8%) and unknown (1.6%).

Lifetime prevalence rates

Student self-report. At 5th grade, students answered experimenter-developed survey questions regarding their lifetime use of substances (e.g., tobacco, alcohol, 5 items), involvement in violent behaviors (e.g., carried a knife, threatened someone, 5 items) and voluntary sexual activity (see Table 1). Response options were 0 “No, never”, 1 “Yes, once”, and 2 “Yes, more than once”. Due to the low prevalence rates of the latter two responses, each variable was dichotomized (0/1) to represent “No, never” vs. “ever”. For both the substance use and violent behavior categories, items were then summed to

create a count variable (0 to 5) indicating how many of the five behaviors the student had ever done. Prior studies³¹⁻³⁵ indicate that self-reported substance use and violent behaviors generally provide valid measures of student behaviors.

Teacher report of student behavior. Teachers were asked to report on how well each item in a behavioral checklist (items only related to substance use and violent behaviors were used in the current study) described each child in their class on a scale of 1 = Not at all, 2 = moderately well, 3 = very well. To coincide with student reports of negative behaviors, at years 4 and 5 of the study, items related to serious violent behaviors and substance use were included in the teacher survey for 5th grade students. Four of these items focused on violent behavior (e.g., physically hurts others), and three related to use or potential usage of substances (e.g., smokes, see Table 1). As with the student items, the affirmative ratings of “very well” and “moderately well” were collapsed and treated as dichotomies (0/1) and the items were summed to construct a count of observed violent behavior (0 to 4) and a count scale for substance use (0 to 3).

--- Insert Table 1 ---

Analyses

Initially, for both student and teacher reports of student behavior, 2-level logistic models with students nested within schools, using the dichotomized single items (see Table 1), were calculated to examine the difference in prevalence rates between treatment and control students. As is typical for students in this age range, frequency distributions for the negative behavior count scales were skewed, with the majority of students (range 86% to 98%) reporting zero (i.e., “No, never”) negative behaviors. Hence, the variance of the outcome scales were much larger than the mean; therefore, preliminary analyses

testing for overdispersion were conducted.³⁶ Overdispersion was taken into account in the Poisson models by including a random effect at the student level, which adds a parameter that reflects unobserved heterogeneity among observations (often due to unobserved covariates that vary among the units of observation).³⁷ Using the likelihood ratio test (LRT), nested models, a 2-level Poisson model and a 2-level Poisson with an overdispersion parameter (see complete model descriptions below), were compared. The result for the substance use count scale for student self-report was $LR \chi^2 = 347.0, p < .001$ and teacher report $LR \chi^2 = 114.72, p < .001$ and $LR \chi^2 = 293.66, p < .001$ for student self-report and $LR \chi^2 = 174.85, p < .001$ for teacher reports for the violent behaviors count scale, indicating the overdispersion model fit the data better for all scales and, therefore, was used in all subsequent analyses.

For the primary analyses, program effects (student self-report and teacher report of student behavior) were modeled using 2-level overdispersion random effects Poisson models for the substance use and violent behaviors count scales. Predictors were included to test the treatment effects ($PA = 1$), variations in effects for boys vs. girls, and whether a differential treatment effect existed between boys and girls (treatment-x-gender interaction). For sexual activity (student self-report only), a 2-level logistic regression model was estimated with the same predictors. The treatment effect test of significance was evaluated on a t distribution with 18 degrees of freedom to account for the unit of randomization (i.e., school). Additionally, due to the small number of pairs ($N = 10$), the random effects models were conducted as unmatched.^{38,39}

Secondary analyses (2-level overdispersion random effects Poisson models) were conducted to examine the dose-response of program exposure (measured in years) on

negative behaviors. Dummy variables were created that corresponded with 1-2 years and 3-4 years of exposure to the program vs. no exposure (i.e., control). These categories were created due to the low number of youth exposed to only 1 year of the program ($n = 73$) and because girls in the treatment group exposed to 3 years of the program reported no voluntary sexual activity.

All analyses were conducted using *gllamm*³⁷ in Stata (v9.2, College Station, TX). Prior reports from the PA program^{22, 23} provided empirical support for the expectation of beneficial effects (fewer negative behaviors) from exposure to the program.⁴⁰ Hence, all tests of significance are presented as directional (1-tailed, with 90% confidence intervals reported) given our *a priori* hypothesis (see above) and that the practical consequences of finding that the treatment results in more negative behaviors would be the same as finding no difference, essentially suggesting that schools should not use the program.⁴¹ Further, because of the matched-pair design, and the possibility of bias in the analyses resulting from matched schools,⁴² conservative follow-up paired analyses were conducted to substantiate the estimates from the 2-level unmatched analyses. For that analysis, prevalence rates were collapsed at the school level to calculate the average rate per student per school. Then, paired sample *t*-tests (10 pairs) were calculated to examine treatment effects.⁴² Polychoric correlations, comparing student and teacher reports, were calculated on the count scales for substance use and violent behaviors. Effect sizes (ES) for dichotomous outcomes (Cox Index)⁴³ were calculated on student-level data. The Cox Index ESs were calculated as the following: the difference in the natural log of the odds of the event occurring in the treatment and control conditions divided by 1.65, where the

odds is defined as the proportion of the students having performed the behavior across all students within the treatment and control conditions, separately.

Results

Prevalence Rates. Prevalence rates from student and teacher reports of student behaviors for boys and girls, the combined rates for treatment and control students, the 2-level logistic odds ratios, and effect sizes are presented in Table 1. Comparisons of the individual items indicated that, overall, prevalence rates were lower for the treatment than control students with estimates ranging from 48% to 86% lower probability of performing the behavior. Corresponding effect sizes from student reports ranged from 0.41 to 1.10 with an average effect size of 0.73 (median 0.75). Effect sizes from teacher reports ranged from 0.04 to 0.69 with an average effect size of 0.34 (median 0.31). Correlations between student and teacher reports were .18 and .27 for substance use and violent behaviors, respectively.

Primary analyses. The estimates for the treatment effect on substance use and violent behaviors (2-level Poisson models) and sexual activity (2-level binary model) are presented in Table 2. The intraclass correlation coefficient for the unconditional models of student self-reports were .06, .05, and .28 for violent behaviors, substance use, and sexual activity, respectively and .04 and .14 for teacher reports of student violent behaviors and substance use.^{44,45} For substance use, student self-reported lifetime prevalence rates were significantly lower (rate ratio [RR] = 0.41, 90% confidence interval [CI] 0.25 to 0.66) for students who received *PA*. Teacher report of student substance use was non-significant (RR 0.66, CI 0.30 to 1.45), with an interaction effect for boys receiving *PA* (RR 0.59, CI 0.34 to 1.00). For violent behaviors, student self-report was

significantly lower (RR = 0.42, CI 0.24 to 0.73), with teacher reports confirming this effect (RR = 0.54, CI 0.30 to 0.77). The 2-level random effects binary model indicated lifetime sexual activity was lower for students attending *PA* schools (odds ratio 0.24, CI 0.08 to 0.66).

School level analyses. In support of the 2 level models (see Table 3), the paired sample *t*-tests indicated a significant treatment effect for student self-report of substance use ($P = .004$) and violent behaviors ($P = .010$), although the finding for sexual activity was non-significant ($P = .073$). Teacher reports of student behaviors indicated a non-significant effect for substance use ($P = .058$) and a significant effect for violent behaviors ($P = .035$).

Dose-response analyses. For both student and teacher reports of student behaviors, a dose-response trend was observed with students receiving 3-4 years of the program having significantly lower reports of substance use (student self-report RR = 0.36, CI 0.25 to 0.50; teacher report RR = 0.48 CI 0.24 to 0.97), violent behavior (student self report RR 0.26 CI 0.18 to 0.37; teacher report RR 0.59 CI 0.44 to 0.78), and engaging in voluntary sexual activity (student self report RR 0.11 CI 0.05 to 0.26; see Table 4).

--- Insert Table 2 and 3 ---

Discussion

The current cluster-randomized study extends previous positive findings from quasi-experimental studies of *PA*^{22, 23} by examining effects on student and teacher reports of student involvement in negative behaviors. Specifically, students who received *PA* were significantly less likely to engage in substance use, violent behaviors, and sexual

activity (see Table 1, 2, and 3). The effects sizes averaged 0.73 and 0.34 for student and teacher reports, respectively (see Table 1), corresponding to a reduction of having ever done the behavior ranging from 48% to 86% (see Table 1) in comparison to the students who did not receive *PA*.

The observed effects were consistent with, and at times, exceeded effects reported in recent systematic reviews and meta-analyses of school-based programs targeting negative behaviors (see Table 1) in which the average effect size for school-based substance use programs with interactive components is approximately .30,¹⁶ and ranged between 0.20 to 0.35 for programs targeting aggressive and disruptive behaviors,¹⁷ with these resulting in an average reduction of approximately 17.5% (range 2.3-45.3%).⁴⁶ Hence, the effect sizes (based on student reports) observed herein fall on the upper end of the effect size continuum,¹⁶ suggesting that substantial gains can be made towards reducing the prevalence of these negative behaviors during early adolescence from the introduction of a comprehensive school-wide SACD program.^{2,19} Locally, the reduction of students using substances and performing violent behaviors by approximately 58% and reducing the odds of having voluntary sex by 76%, provides clear public health benefits for the Hawai`i school district when combating the adoption of health-compromising behaviors of students; particularly when faced with the high prevalence rates of middle school- and high school-aged youth involved in such behaviors.³

The large effects observed here were likely the result of several important features of the current study. First, the *PA* program is “interactive” in delivery, using methods that integrate teacher/student contact and communication opportunities for the exchange of ideas, and utilize feedback and constructive criticism in a non-threatening atmosphere.

Interactive methods produce stronger beneficial program outcomes than non-interactive delivery methods (i.e., didactic in nature).¹⁶ Second, *PA* is a comprehensive approach to prevention that involves providing the curriculum to all grades in the school at once, involving all teachers and staff in the school, and involving parents. Third, *PA* is a holistic approach to social and emotional development that addresses the self, emotional regulation, moral development, decision making, skills development in these areas, and clear identification of what behaviors are positive, rather than focusing solely on the negative aspects of engaging in substance use and violence. Fourth, the large effects observed may also have been a result of the intensive nature of the program, with students receiving approximately 1 hour of exposure during a typical week. While there were differences in the magnitude of the ES from the student and teacher reports, this was most likely due to teachers' inability to always observe students' behaviors – leading to underestimation of how well the item described the student.

Based on the dose-response analyses (see Table 4), the findings clearly demonstrate that more exposure to the program decreases the number of reported negative behaviors. Those students who received 3 or more years of *PA* reported 41% to 73% fewer experiences with substance use and violence behaviors and an 89% lower rate of engaging in voluntary sexual activity. For those students exposed for 1 or 2 years, reductions, albeit not all significant, were still observed, suggesting a beneficial effect even with short exposure. It appears that exposing youth to the program for an additional 1-2 years results in reducing the negative behaviors by half. Hence, these findings suggest that an adequate test of the intervention's potential effectiveness could only be conducted after the students had been exposed to the program for 3 or more years. This

finding suggests that multi-year trials are necessary in order to realize the full effect of a comprehensive prevention program.

There are some limitations to this study that require attention. First, the reports of negative behaviors were collected only during 5th grade and only for the two cohorts followed in the study, and therefore, may not be reflective of the behavior of the entire student body. This limitation was an outcome of the study design and restrictions placed by the Institutional Review Board who prevented the use of sensitive questions with younger (i.e., 4th grade and lower) students. Second, only students who provided active parental consent and verbal assent responded to the negative behavior items. For the student self-report data, it is possible that some kind of selection effect led to a sample that was not typical of all the students in the schools studied. Our empirical tests for this, however, found no such difference in the area of negative behaviors. In support, the rates reported herein are consistent with youth of similar age across the Hawai'i school district,³ and therefore, are likely representative of actual behavioral involvement. The use of a single item to assess voluntary sexual activity is unlikely to capture all the types of sexual activity engaged in by youth. Moreover, the low prevalence of the behaviors makes it difficult to determine whether the program would have such an effect on older youth (e.g., middle school) when these behaviors become more prevalent. Finally, no adjustment for type I error rates in the analyses, due to multiple tests, were made and, therefore, may be considered when interpreting the significance levels of the findings.

Overall, the results indicate that the *PA* program can be effective in reducing multiple problem behaviors simultaneously.^{22, 23} Programs such as *Positive Action* can reduce the burden on school administrators, teachers, and limited resources²¹ by reducing

the rate of multiple problem behaviors. The authors' are unaware of prior studies reporting the effects of prevention programs in the magnitude presented herein. Thus, the study provides evidence that a comprehensive and school-wide SACD program can have a substantial impact on reducing problem behaviors of public health importance. In conclusion, although numerous school-based prevention programs exist, the *Positive Action* program is one of few that has demonstrated substantial effects on multiple negative behaviors.

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Table 1. Student self-reported and teacher reports of student (lifetime prevalence %) substance use, violent behaviors, and voluntary sexual activity for 5th graders

Source	Item ^a	Boys				Girls				Boys and Girls				ES [£]
		Control	PA	OR [†]	CI	Control	PA	OR [†]	CI	Control	PA	OR [†]	CI	
Student Self-report	Sample size (<i>n</i>)	366	491			372	485			738	976			
	Substance Use													
	Smoked a cigarette (or used some other form of tobacco)	8.5	5.3	0.66	(0.30, 1.44)	6.7	2.7	0.38	(0.19, 0.76)	7.6	4.0	0.52	(0.31, 0.88)	0.41
	Drank alcohol (beer, wine or liquor)	22.5	12.2	0.48	(0.35, 0.65)	15.2	7.9	0.47	(0.28, 0.79)	18.8	10.1	0.48	(0.34, 0.68)	0.44
	Got drunk on alcohol	6.6	1.6	0.24	(0.11, 0.49)	4.0	1.7	0.40	(0.16, 0.98)	5.3	1.6	0.30	(0.15, 0.57)	0.75
	Used an illegal drug like marijuana or cocaine	5.5	1.8	0.34	(0.15, 0.78)	2.7	0.4	0.15	(0.04, 0.54)	4.1	1.1	0.28	(0.14, 0.54)	0.82
	Got high on drugs	5.5	1.0	0.18	(0.07, 0.45)	1.6	0.4	0.25	(0.07, 0.97)	3.5	0.7	0.20	(0.09, 0.44)	0.99
	Violent Behaviors													
	Carried a knife or razor to use to hurt someone	9.0	2.7	0.27	(0.16, 0.47)	3.2	1.7	0.51	(0.22, 1.17)	6.1	2.2	0.32	(0.18, 0.57)	0.64
	Threatened to cut or stab someone	10.1	3.3	0.30	(0.17, 0.51)	4.6	2.3	0.48	(0.25, 0.92)	7.4	2.8	0.36	(0.24, 0.53)	0.62
	Cut or stabbed someone on purpose to hurt them	6.0	1.8	0.29	(0.15, 0.56)	1.6	0.4	0.25	(0.06, 1.06)	3.8	1.1	0.29	(0.16, 0.52)	0.77
	Carried a gun	18.1	7.0	0.33	(0.21, 0.54)	3.5	2.1	0.58	(0.29, 1.18)	10.7	4.5	0.40	(0.26, 0.62)	0.57
	Shot at someone	8.5	2.3	0.25	(0.13, 0.49)	2.4	0.4	0.17	(0.05, 0.61)	5.4	1.3	0.24	(0.14, 0.40)	0.89
	Sexual Activity													
	Voluntary sex with someone of the opposite sex	9.3	1.4	0.14	(0.06, 0.31)	4.6	1.0	0.22	(0.09, 0.56)	6.9	1.2	0.18	(0.09, 0.36)	1.10
Teacher report of student behavior	Substance Use													
	Sample size (<i>n</i>)	205	379			209	365			422	760			
	Smokes (or may smoke) cigarettes (or other form of tobacco)	14.9	7.3	0.42	(0.18, 0.94)	10.7	8.6	0.78	(0.41, 1.50)	12.8	7.9	0.54	(0.28, 1.02)	0.33
	Drinks or may drink alcohol	15.6	12.1	0.66	(0.26, 1.67)	10.5	12.5	1.16	(0.63, 2.16)	13.0	12.3	0.81	(0.41, 1.58)	0.04
	Uses drugs like marijuana or cocaine	19.7	5.4	0.21	(0.08, 0.53)	15.5	7.5	0.42	(0.10, 1.68)	17.6	6.4	0.27	(0.10, 0.72)	0.69
	Violent Behaviors													
	Sample Size (<i>n</i>)	219	393			228	385			447	778			
	Gets into a lot of fights	39.3	30.7	0.68	(0.50, 0.91)	26.8	15.3	0.52	(0.34, 0.80)	32.9	23.1	0.63	(0.47, 0.84)	0.30
	Physically hurts others	29.7	25.6	0.84	(0.52, 1.35)	23.7	9.9	0.37	(0.19, 0.72)	26.6	17.8	0.61	(0.38, 0.97)	0.31
	Threatens others	29.7	21.5	0.64	(0.46, 0.88)	22.4	15.1	0.67	(0.42, 1.07)	26.0	18.3	0.64	(0.47, 0.88)	0.27
	Destroys things belonging to others	34.7	21.0	0.47	(0.33, 0.69)	19.3	10.1	0.53	(0.27, 1.05)	26.8	15.6	0.48	(0.31, 0.74)	0.41

Abbreviation: PA = *Positive Action*; OR = Odds Ratio; CI = 90% confidence interval; ES = Cox Index Effect Size

Note: [†] Odds ratio based on a 2-level logistic model (students nested within school) with treatment condition, solely, as a predictor;

^a Student self-report item stem "Have you ever..."; teacher report of student behavior item stem "How well does this item describe this child?"

[£] Cox Index Effect Size calculated as: ES = $[(\ln(\text{Odds}_{\text{Treat}})) - (\ln(\text{Odds}_{\text{Control}}))] / 1.65$

Table 2. Two level (students nested within schools) overdispersion random effects Poisson estimates[†] for violent behavior, substance use, and two level binary random effects estimates[‡] for sexual activity

Source	Predictors	Substance Use [†]			Violent Behaviors [†]			Sexual Activity [‡]		
		RR	CI	<i>P</i> [£]	RR	CI	<i>P</i> [£]	OR	CI	<i>P</i> [£]
Student Self-report	Condition [¶]	0.41	(0.25, 0.66)	.007	0.42	(0.24, 0.73)	.002	0.24	(0.08, 0.66)	.013
	Gender	1.69	(1.20, 2.39)	.006	4.44	(2.89, 6.81)	<.001	2.21	(1.33, 3.69)	.006
	Condition x Gender	1.07	(0.65, 1.80)	.402	0.67	(0.35, 1.28)	.158	0.61	(0.20, 1.84)	.233
Teacher report of student behavior	Condition [¶]	0.66	(0.30, 1.45)	.187	0.54	(0.30, 0.77)	.004			
	Gender	1.54	(1.04, 2.30)	.037	1.55	(1.21, 1.98)	.002			
	Condition x Gender	0.59	(0.34, 1.00)	.052	1.24	(0.90, 1.72)	.137			

Abbreviations: RR = rate ratio; CI = 90% confidence interval; OR = odds ratio; Condition: Positive Action = 1, Control = 0; Gender: Boys = 1, Girls = 0

[¶] *P* value evaluated on 18 degrees of freedom

[£] 1-tail *P* value

Table 3. Average rate per student per school -- school-level matched paired *t*-tests for the average counts per school (N = 20) for substance use, violent behaviors, and sexual activity

Source	Outcomes	Condition	M	SD	<i>P</i> [†]
Student Self Report	Substance Use	Control (<i>n</i> = 10)	.407	.146	.004
		<i>Positive Action</i> (<i>n</i> = 10)	.227	.196	
	Violent Behaviors	Control	.351	.082	.010
		<i>Positive Action</i>	.169	.180	
	Sexual Activity	Control	.065	.052	.073
		<i>Positive Action</i>	.024	.043	
Teacher report of student behavior	Substance Use	Control	.472	.352	.058
		<i>Positive Action</i>	.247	.271	
	Violent Behaviors	Control	1.247	.602	.035
		<i>Positive Action</i>	.819	.335	

[†] 1-tail paired sample *t*-test with 9 degrees of freedom

Table 4. Two level (students nested within schools) overdispersion random effects Poisson estimates[†] assessing dose-response (number of years exposed to *Positive Action*) for violent behavior, substance use, and two level binary random effects estimates[‡] for sexual activity

Source	Predictors	Substance Use [†]			Violent Behaviors [†]			Sexual Activity [‡]		
		RR	CI	<i>P</i> [¶]	RR	CI	<i>P</i> [¶]	OR	CI	<i>P</i> [¶]
Student Self-report	Gender	1.74	(1.36, 2.26)	<.001	3.64	(2.69, 5.16)	<.001	2.00	(1.27, 3.14)	.006
	1-2 years	0.73	(0.47, 1.14)	.122	0.58	(0.36, 0.92)	.028	0.42	(0.18, 0.98)	.047
	3-4 years	0.36	(0.25, 0.50)	<.001	0.26	(0.18, 0.37)	<.001	0.11	(0.05, 0.26)	<.001
Teacher report of student behavior	Gender	1.15	(0.88, 1.50)	.199	1.74	(1.48, 2.05)	<.001			
	1-2 years	0.57	(0.27, 1.22)	.111	0.72	(0.51, 1.01)	.054			
	3-4 years	0.48	(0.24, 0.97)	.043	0.59	(0.44, 0.78)	.001			

Abbreviations: RR = rate ratio; CI = 90% confidence interval; OR = odds ratio

[¶] 1-tail *P* value