

# Problem Behavior and Urban, Low-Income Youth

## A Randomized Controlled Trial of Positive Action in Chicago

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**Background:** Youth problem behaviors remain a public health issue. Youth in low-income, urban areas are particularly at risk for engaging in aggressive, violent, and disruptive behaviors.

**Purpose:** To evaluate the effects of a school-based social-emotional learning and health promotion program on problem behaviors and related attitudes among low-income, urban youth.

**Design:** A matched-pair, cluster RCT.

**Setting/participants:** Participants were drawn from 14 Chicago Public Schools over a 6-year period of program delivery with outcomes assessed for a cohort of youth followed from Grades 3 to 8. Data were collected from Fall 2004 to Spring 2010, and analyzed in Spring 2012.

**Intervention:** The Positive Action program includes a scoped and sequenced K–12 classroom curriculum with six components: self-concept, social and emotional positive actions for managing oneself responsibly, and positive actions directed toward physical and mental health, honesty, getting along with others, and continually improving oneself. The program also includes teacher, counselor, family, and community training as well as activities directed toward schoolwide climate development.

**Main outcome measures:** Youth reported on their normative beliefs in support of aggression and on their bullying, disruptive, and violent behaviors; parents rated youths' bullying behaviors and conduct problems; schoolwide data on disciplinary referrals and suspensions were obtained from school records.

**Results:** Multilevel growth-curve modeling analyses conducted on completion of the trial indicated that Positive Action mitigated increases over time in (1) youth reports of normative beliefs supporting aggressive behaviors and of engaging in disruptive behavior and bullying (girls only) and (2) parent reports of youth bullying behaviors (boys only). At study end-point, students in Positive Action schools also reported a lower rate of violence-related behavior than students in control schools. Schoolwide findings indicated positive program effects on both disciplinary referrals and suspensions. Program effect sizes ranged from  $-0.26$  to  $-0.68$ .

**Conclusions:** These results extend evidence of the effectiveness of the Positive Action program to low-income, minority, urban school settings, and to middle school-aged youth.

**Trial registration:** This study is registered at ClinicalTrials.gov NCT01025674.  
(Am J Prev Med 2013;44(6):622–630) © 2013 American Journal of Preventive Medicine

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0749-3797/\$36.00

<http://dx.doi.org/10.1016/j.amepre.2013.01.030>

## Introduction

Youth violence remains a major public health issue.<sup>1</sup> The U.S. has witnessed high rates of problem behaviors among youth in the past 3 decades, most notably those involving bullying and violence.<sup>2–4</sup> Youth who initiate such behaviors early in development are at greater risk for psychopathology, substance use, and criminal behaviors during adolescence and adulthood.<sup>5–10</sup>

Interventions implemented in schools show promise for reducing rates of violent behavior as well as related disruptive behaviors (e.g., bullying<sup>11</sup>) among youth.<sup>12–14</sup> Yet, the magnitude of beneficial program effects typically has been moderate, thus suggesting a need for ongoing refinement and improvement of programs.<sup>14–16</sup> Findings among schools serving low-income, minority, urban youth have been mixed,<sup>17</sup> highlighting a need for further investigation of program effectiveness in these settings in particular.

Among school-based violence prevention interventions, those focused on social-emotional learning and health promotion have gained increasing popularity in recent years.<sup>18</sup> Such programs show evidence of positive effects on attitudes toward self and others, social behaviors, emotional outcomes, and certain problem behaviors.<sup>18–20</sup> Positive Action<sup>21</sup> is one example of a promising school-based program of this type. In order to study the effects of Positive Action in an urban, low-income, minority setting, the trial was conducted in Chicago.

The Positive Action program is grounded in theories of self-concept,<sup>22,23</sup> particularly self-esteem enhancement theory,<sup>24</sup> and it is also consistent with integrative and social-ecologic theories of health behaviors.<sup>25,26</sup> The theory assumes that individuals will use a wide range of cognitive, affective, and behavioral strategies to help acquire and sustain feelings of worth. Positive outcomes follow to the extent that people are adequately prepared and supported in satisfying their motivation for self-esteem through adaptive beliefs, values, and actions.

In line with this theory, Positive Action includes a classroom-based curriculum in which the desire to feel good about oneself is highlighted, while teaching students the skills needed to act appropriately on this motivation such as self-control, positive interactions with peers, and self-honesty. Ecologic supports (e.g., school-wide systems for recognizing positive behaviors, family classes) provide social reinforcement for positive behaviors in both school and nonschool settings. More information regarding Positive Action is available on the program website: [www.postiveaction.net](http://www.postiveaction.net).

A cluster RCT of the Positive Action program in both rural and suburban schools in Hawaii found beneficial

effects on violence-related behavior and substance abuse<sup>27</sup> and on disciplinary referrals up to Grade 5.<sup>28</sup> Additionally, earlier reported findings<sup>29</sup> from the current trial also indicated program effects on violence and substance use up to Grade 5. The current trial builds on previous research by further examining Positive Action's effectiveness in disadvantaged, inner-city schools and in doing so extending follow-up to the middle school grades, the peak period of onset for many problem behaviors.<sup>30</sup> It was hypothesized that findings would indicate favorable effects of Positive Action on (1) student-reported levels of normative beliefs supporting aggression and rates of violence-related, bullying, and other disruptive behaviors; (2) parent-reported levels of youth conduct problems and aggressive behaviors; and (3) school records of disciplinary referrals and suspensions.

## Methods

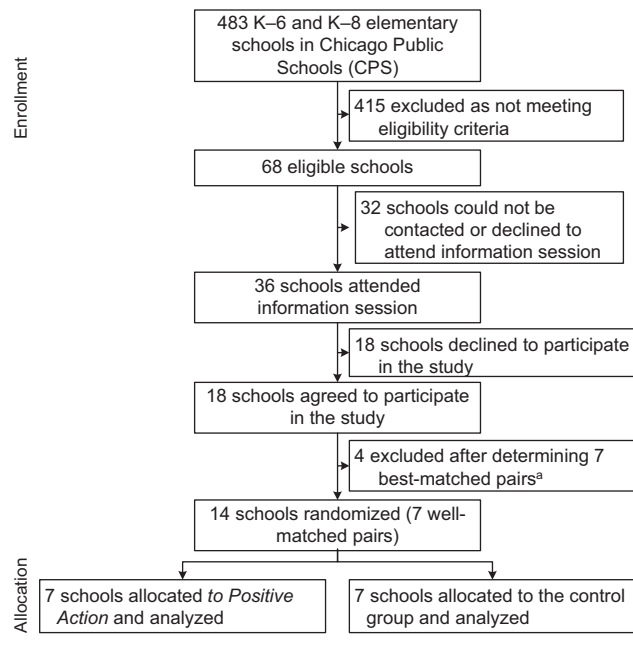
### Intervention

The Positive Action program<sup>21</sup> includes a scoped and sequenced K–12 classroom curriculum. Each grade-level includes 140 lessons (15–20 minutes each; Grades K–6) or 70 lessons (20 minutes each; Grades 7 and higher). The program also includes teacher, counselor, family, and community training as well as activities directed toward schoolwide climate development. Resources available with the grant were not sufficient to support the use of the community component. The core curriculum consists of six components: self-concept, social and emotional positive actions for managing oneself responsibly, and positive actions directed toward a healthy body and mind, being honest with oneself and others, getting along with others, and continually improving oneself. During the current trial, schools received training and technical assistance to help ensure a high level of implementation.

### Design and Sample

The evaluation design was longitudinal (i.e., 6 years and eight waves; maximum allowed by funding) at the school level and used a place-focused intent-to-treat design with a dynamic grade cohort (continuously changing because of student mobility).<sup>31</sup> Participating schools were drawn from the 483 Grades K–6 and Grades K–8 Chicago Public Schools (CPS), with 68 schools meeting eligibility criteria (Figure 1).<sup>32</sup> Of the 68 schools, 18 agreed to participate and the seven best-matched pairs (the N that funding would support) were selected for participation.<sup>32,33</sup>

The following variables from the 2003–2004 CPS data were used as matching variables: percentage of white, African-American, Hispanic, Asian students; percentage of students who met/exceeded criteria on state achievement tests; attendance rate; truancy rate; percentage of students receiving free/reduced-price lunch; percentage of students transferring in or out during the school year (mobility); number of students per grade; percentage of parents involved with school activities; and percentage of teachers who met minimal teaching standards. Information about the crime rate in each school's neighborhood also was utilized.<sup>34</sup> Using these variables and a requirement that each school in a pair



**Figure 1.** Flow diagram of schools

<sup>a</sup>Funding sufficient for only seven pairs

be located in the same region of the city, the 18 schools were matched successfully into nine pairs using an SAS program designed for matched pairs (Mathematica Policy Research). A random-number-generation function (Microsoft Excel) was used to randomize the schools within each pair to the control and treatment conditions.

Funding allowed for 14 schools; thus, the seven best-matched pairs were invited to participate. Because of the nature of the intervention, schools, students, those delivering the intervention, and the outcome assessors could not be blinded to condition. A series of *t*-tests revealed that the 14 participating schools did not differ from the remainder of the 68 eligible schools. In addition, the Positive Action and control schools did not differ from each other on any of the matching variables (Table 1).<sup>32,33</sup> All schools were retained for the 6 years of the study.

In each school, all students in Grade 3 at the start of the study were recruited for participation. The study began at Grade 3, both because it was required by the grant funder and because the surveys were designed for students in Grade 3 or higher. Parental consent for study participation was obtained for 79% of students at baseline. Cohort students who entered the schools during later waves consented to be in the study at the time of school entry. The consent rate for these latter students ranged from 60% to 78% across waves. The expiration of the initial study consent form at the end of the first phase of funding required that all students provide consent again at Wave 6 (beginning at Grade 7); the consent rate was 58%. The percentages of parents who provided reports on their children, which were requested at Waves 1, 2, 4, 5, and 8, were 72.3%, 58.9%, 52.2%, 50.5%, and 72.9%, respectively. Throughout the study, data were collected only from students who provided consent. Appendix A, available online at [www.ajpmonline.org](http://www.ajpmonline.org), provides a diagram of student participation.

Surveys were administered to students beginning in Grade 3 (Fall 2004) and at seven additional times (waves) over the 6 years of the study: spring and fall 2005, spring 2006, spring 2007, fall

2008, spring 2009, and spring 2010 (end of Grade 8). The total number of students that enrolled over the 6 years of the study was 1170, of whom approximately 53% were female and approximately 48% were African-American, 27% Hispanic, and 19% other (i.e., white or other minority). The original cohort (Wave 1) included 624 students; by Wave 8, only 363 students (including 131, or 21%, of the original cohort students) remained in the study, reflecting changes in school sizes, consent rates, and the high mobility rate of this population. All study procedures were approved by the IRBs of the University of Illinois at Chicago and the Oregon State University.

## Youth Report Measures

Except where noted, all youth report outcomes were assessed at each of the eight waves of the study.

**Normative beliefs supporting aggression.** Students answered questions adapted from The Normative Beliefs About Aggression Scale, with established reliability and validity for school-aged children.<sup>35</sup> Items asked about beliefs toward aggression (eight items; e.g., *Is it ok or wrong to hit, shove, yell, fight other people?*) and were rated on a 4-point scale (*really wrong* to *perfectly ok*). An average of these items created a composite score, with higher scores reflecting the belief that aggression is more acceptable ( $\alpha$  range=0.81–0.93). Given a skewed distribution of responses, the scale score was split for analysis using a median split across all waves.

**Bullying.** Students answered a modified set of questions from Orpinas and Frankowski's<sup>36</sup> Aggression Scale, previously demonstrated to be reliable among early adolescents. Scale items asked about the frequency of performing bullying behaviors (six items; e.g., teased, shoved, excluding others, making up things about others) in the past 2 weeks. Response options ranged from 0 to 3 (*never* to *many times*;  $\alpha$  range=0.83–0.90). Responses to scale items were first converted to a dichotomous variable (0=*never* and 1=*ever*) and converted to a count of the number of items to which a student responded *ever*.

**Disruptive behaviors.** An abbreviated set of modified questions from child problem-behavior scales that previously have been examined for validity with youth<sup>37</sup> was used to assess the frequency of various disruptive behaviors (six items; e.g., made disruptive noises, took something without permission, performed bad behavior) in the past 2 weeks. Items were rated on a 4-point scale (*never* to *many times*;  $\alpha$  range=0.77–0.81). A count was created to indicate the number of items to which a student responded *ever*.

**Violence.** Students answered questions, adapted from the Risk Behavior Survey,<sup>38</sup> about their involvement in violence-related behaviors (six items; e.g., carried a knife, threatened someone, stabbed someone). Students were asked if they had ever engaged in each behavior, with response options on a scale of 1 to 4 (*never* to *yes, more than 5 times*;  $\alpha$  range=0.74–0.82). Each item was dichotomized (0=*Never* and 1=*any other response*), with scores then summed to create a count of the number of the behaviors the student had ever performed. This outcome was assessed at Waves 5–8.

**Table 1.** Baseline and follow-up equivalence on school demographics, % unless otherwise noted

Student characteristics	Year 2001			Year 2004			Year 2007			Year 2010		
	Control schools (n = 7)	Positive Action schools (n = 7)	t	Control schools (n = 7)	Positive Action schools (n = 7)	t	Control schools (n = 7)	Positive Action schools (n = 7)	t	Control schools (n = 7)	Positive Action schools (n = 7)	t
Male	52.70 (1.98)	52.00 (0.98)	0.84	52.64 (2.89)	52.47 (2.11)	0.13	52.03 (2.35)	50.90 (2.17)	0.93	52.09 (2.42)	52.10 (2.22)	0.00
White	10.51 (16.75)	9.58 (13.07)	0.12	9.38 (14.80)	9.07 (12.68)	0.04	7.93 (13.18)	7.00 (10.62)	0.15	8.57 (13.81)	7.49 (11.53)	0.16
African-American	55.21 (43.91)	52.07 (48.01)	0.13	56.49 (43.35)	53.64 (47.35)	0.12	56.73 (42.67)	55.31 (47.10)	0.06	56.20 (41.64)	55.57 (47.79)	0.03
Hispanic	27.27 (32.10)	32.23 (34.23)	-0.28	31 (35.16)	32.79 (36.28)	-0.09	31.04 (33.76)	31.33 (35.71)	-0.02	31.8 (34.07)	32.63 (38.94)	-0.40
Asian-American	4.03 (6.17)	4.69 (7.05)	-0.19	2.91 (4.30)	4.21 (6.57)	-0.44	2.74 (4.45)	3.91 (7.00)	-0.37	3.36 (5.94)	4.17 (7.61)	-0.22
“Other”	3.91 (4.60)	4.64 (4.92)	-0.29	4.46 (5.03)	4.72 (5.21)	-0.10	4.63 (5.05)	4.45 (5.19)	.063	0.04 (0.03)	0.02 (0.05)	-0.40
Have an LEP	14.27 (16.13)	17.50 (16.94)	-0.37	11.41 (14.10)	17.04 (17.20)	-0.67	12.50 (13.82)	14.61 (16.32)	-0.26	10.87 (11.92)	12.87 (14.78)	-0.28
Have an IEP	13.00 (6.37)	8.70 (2.31)	1.67	12.84 (5.33)	9.46 (2.36)	1.53	14.08 (6.46)	9.86 (3.23)	1.55	14.76 (6.01)	12.06 (3.73)	1.01
Receive a free lunch	83.59 (3.39)	83.09 (6.85)	0.17	81.46 (3.81)	85.51 (4.56)	-1.81	85.86 (7.86)	84.97 (7.36)	0.22	94.60 (3.92)	92.70 (6.30)	0.68
School attendance rate	93.01 (1.17)	93.38 (1.28)	-0.57	93.54 (1.09)	93.74 (1.79)	-0.25	92.87 (2.09)	93.71 (1.78)	-0.84	93.27 (1.87)	95.03 (1.52)	-2.01

Note: Values are M (SD) or t-statistic. 2001 data were used for the matching before randomization, 2004 was the first year of the trial, 2007 was when cohort students ended Grade 5, and 2010 was the last year of the study. Other= percentages for those with race classified as Native American, multirace, Mexican, Puerto Rican, Cuban, other Hispanic, and multi-Hispanic. At 2010, only information for % Native Americans was available. None of the above t tests were significant at the  $p < 0.05$  level;  $df = 12$  for all t-tests, except for school attendance rate,  $df = 13$ .

Adapted from Lewis KM, Bavarian N, Snyder FJ, et al. Direct and mediated effects of a social-emotional and character development program on adolescent substance use. *Int J Emotional Educ* 2012;4:56-78; reprinted with permission

IEP, individualized education plan; LEP, limited English proficiency

## Parent-Report Measures

Parents were asked to report on their children's bullying behaviors and conduct problems observed in any context using items from modified versions of the Aggression and Conduct Problem Subscales of the Behavior and Assessment System for Children (BASC).<sup>39</sup> Parents responded to six items ( $\alpha$  range=0.73–0.83) regarding bullying (e.g., hits others, teases, threatens to hurt others) and seven items ( $\alpha$  range=0.74–0.81) regarding conduct problems (e.g., truancy, cheating, stealing), rated on a 4-point scale (*never* to *almost always*) to indicate the frequency of the observed behaviors in the past 30 days. Both bullying and conduct problem items were first dichotomized and then converted to a count (0=*never* and 1=*any other response*). These outcomes were assessed at Waves 1–5 and Wave 8.

## School-Level Archival Data on Disciplinary Actions

School-level aggregated data on disciplinary referrals and suspensions reported on the school district's website were accessed for school years 2002/2003 to 2009/2010. Disciplinary referrals and suspensions were based on a range of disruptive, bullying, and illegal student behaviors, the latter of which included (but were not limited to) vandalism, assault, theft, and possession of drugs or dangerous weapons. An average was used of the 2002/2003 and 2003/2004 data (the school years prior to program implementation) to create a reliable baseline measure. Data were not standardized; all schools did, however, follow the same district guidelines for identifying and responding to disciplinary concerns. Analyses on school-level data were adjusted for school size by including it as an exposure variable in the model.

## Data Analysis

Data analyses for this paper occurred during Spring 2012. All analyses were conducted using multilevel models in Stata, version 12.1. Student-report outcomes were analyzed as three-level models: waves of measurement within students within schools. School-level outcomes were analyzed as two-level models: waves of measurement within schools. Primary analyses consisted of random-intercept models for each of the outcome variables, including condition (i.e., Positive Action or control); time (years since study baseline for survey measures and academic years for school-level measures); condition  $\times$  time; and quadratic terms for time and the condition  $\times$  time<sup>2</sup> interaction. Expressions involving the time<sup>2</sup> term lacking significance were dropped from the final model.

Random-coefficient models, allowing time slope to vary across students, also were estimated, and a likelihood-ratio test was performed to determine whether the random-coefficient model was a better fit for the data. For outcomes with significant quadratic interaction terms, results were graphed (not shown) to facilitate interpretation of growth trajectories. For the binary measure, multilevel logistic regression growth curves were estimated with Stata's "xtmelogit" command. For count outcomes, data were estimated with Poisson regression models with the "xtmepoisson" command.

Data on violence were collected starting at Grade 5 (Wave 5). Grade 5 results were presented in a previous paper<sup>29</sup>; the present study focuses on endpoint effects. The baseline covariate of

problem behaviors (a combination of the 12 items that make up bullying and disruptive behaviors) was utilized, similar to the previous study.<sup>29</sup> Missing data were handled using full maximum likelihood estimation.<sup>40</sup>

Tests also were conducted for evidence of differential attrition by comparing scores on outcome measures at Wave 1 baseline across students in program and control schools who had missing data (dropouts) at each subsequent time of assessment (excluding violence, which was not assessed at baseline). No evidence of differential attrition was found in these analyses. A similar analysis was conducted to test for program–control differences for students who were new to the study at each wave subsequent to baseline (joiners) using their scores on outcome measures at the wave of study entry.

These analyses showed that youth in Positive Action schools joining at Waves 5 and 8 had lower normative beliefs supporting aggression that did control school students joining at these waves. Such differences are expected given that these assessments occurred in the spring of the school year when youth who were new to the schools with the program (most likely since the fall) would already have had substantial exposure to the intervention and the school environment that it fostered. Parents of students in the program joining at Wave 4 reported lower bullying and conduct problems than did parents of control students. Effect sizes (ES) in the metric of standardized mean differences were calculated for count outcomes using predicted (model) means and observed SDs<sup>41</sup>; for the binary outcome, the Cox transformation was used.<sup>42</sup>

Sensitivity analyses included re-estimating all models with matched-pairs introduced as an additional, highest level in each model. To provide a more conservative test of program effects, the test statistics provided by Stata, which assume a large sample size and thus were referenced to a standard normal distribution in primary analyses, also were compared to the critical value of 2.18 for a *t*-distribution with 12 df<sup>43</sup> (based on the number of schools). Additional analyses used multiple imputation for missing data.<sup>44</sup> Results of sensitivity analyses are reported only where they differ from those of primary analyses.

Finally, possible moderating effects of gender and student mobility pattern were tested for all student- and parent-reported outcomes. Moderating effects of mobility patterns were examined using results from a latent class analysis in which a five-class solution was found to be the most appropriate fit for the data: (1) those who stayed in the program (average study duration of 5.72 years,  $n=158$ ); (2) temporary participants (1.30 years, only in Grades 4 or 5;  $n=196$ ); (3) late joiners (1.38 years;  $n=308$ ); (4) early leavers (0.94 years;  $n=263$ ); and (5) late leavers (3.23 years;  $n=287$ ; KML, unpublished observations, 2011). These analyses tested whether the inclusion of all possible interactions of condition  $\times$  time  $\times$  class added significantly to model fit. Results of moderator analyses are reported only where significant.

Data also were collected from teachers on bullying and conduct problems. No evidence of program effects were found on these outcomes (results available from the first author on request). A possible reason for the absence of an effect is a lack of precision introduced by the necessity of having multiple teachers provide ratings of each student over the course of the study.

**Table 2.** Multilevel growth curve model estimates for problem behaviors (N=1170 students; 14 schools)

	Intercept	Condition (1=positive action)	Time	Condition × time	Time <sup>2</sup>	Condition × time <sup>2</sup>
<b>OR (95% CI)</b>						
<b>Student self-report</b>						
Normative beliefs in support of aggression <sup>a</sup>	0.26 (0.17, 0.42)	1.09 (0.59, 2.01)	2.21*** (1.78, 2.74)	<b>0.83**</b> <b>(0.72, 0.95)</b>	0.93*** (0.90, 0.97)	—
<b>IRR (95% CI)</b>						
Bullying behaviors	0.92 (0.77, 1.12)	1.18 (0.92, 1.53)	1.86*** (1.72, 2.02)	<b>0.85**</b> <b>(0.76, 0.95)</b>	0.93*** (0.92, 0.95)	<b>1.02*</b> <b>(1.00, 1.04)</b>
Frequency of disruptive behaviors <sup>a</sup>	0.84 (0.44, 0.66)	1.26 (0.96, 1.95)	1.50*** (1.39, 1.63)	<b>0.92***</b> <b>(0.87, 0.96)</b>	0.97*** (0.96, 0.99)	—
Violence-related behaviors <sup>b,c</sup>	1.15 (0.67, 1.96)	<b>0.38*</b> <b>(0.18, 0.81)</b>	—	—	—	—
<b>Parent report of youth behaviors</b>						
Bullying	1.48 (1.18, 1.68)	1.07 (0.78, 1.46)	1.01 (0.98, 1.05)	<b>0.93*</b> <b>(0.89, 0.97)</b>	—	—
Conduct problems	2.08 (1.77, 2.44)	1.01 (0.81, 1.25)	0.97 (0.91, 1.04)	0.97 (0.94, 1.01)	1.01** (1.00, 1.02)	—
<b>School-level archival data<sup>d</sup></b>						
Disciplinary referrals	0.09 (0.04, 0.23)	0.58 (0.16, 2.09)	1.23*** (1.17, 1.29)	<b>1.14**</b> <b>(1.05, 1.24)</b>	0.98*** (0.97, 0.99)	<b>0.98***</b> <b>(0.96, 0.99)</b>
Suspensions	0.08*** (0.03, 0.20)	0.58 (0.15, 2.26)	1.21*** (1.15, 1.28)	<b>1.16**</b> <b>(1.06, 1.27)</b>	0.98*** (0.97, 0.99)	<b>0.98**</b> <b>(0.96, 0.99)</b>

Note: Boldface indicates significance. Model type is random intercept, except as noted.

<sup>a</sup>Random coefficient model

<sup>b</sup>Intercept set at Wave 8 to allow for a test of the program effect at study end-point

<sup>c</sup>The condition effect in the random intercept model was significant (IRR=0.58,  $p < 0.05$ ). The likelihood ratio test, however, indicated that the random coefficient model was a better fit for the data. For this model,  $p = 0.051$ .

<sup>d</sup>For school-level measures, the time variable represented academic year rather than time since beginning implementation of the Positive Action intervention. These condition × time effects model differences in the time slope at baseline only, because of the inclusion of a quadratic effect.

\* $p < 0.05$ ; \*\* $p < 0.01$ ; \*\*\* $p < 0.001$

IRR, incidence risk ratio

Data on implementation are being examined currently for a separate paper. In general, there was wide variability between schools in implementation indices (e.g., teacher description of amount and quality of program activities in the classroom, perceived effectiveness of the activities, student reports of exposure to and attitudes toward the program), especially in early years, with improvements over time. By the end of Year 6, one school was implementing at only a moderate level, three at moderate to high levels, and three at high levels. Students in Positive Action schools also reported at each wave on their overall satisfaction with the program (NO! No, Yes, YES!). The mean rating ranged from 2.88 to 3.56 (minimum=1, maximum=4) across the waves of the trial.

## Results

For student-report outcomes analyzed as counts, the variation in incidence rate across schools, as indexed by the median incidence risk ratio (MIRR), ranged from 1.21 to 2.54. For the binary outcome (norms about

aggression), the median OR<sup>45</sup> was 3.81, suggesting wide variation among schools in norms about aggression.

## Student Self-Report Outcomes

A program (condition × time) effect for the program intervention was found for students' normative beliefs supporting aggression (OR=0.83, 95% CI=0.72, 0.95, effect size [ES]=−0.68; Table 2). Students in intervention schools also were less likely to report engaging in bullying (condition × time incidence risk ratio [IRR]=0.85, 95% CI=0.76, 0.95, and condition × time<sup>2</sup> IRR=1.02, 95% CI=1.00, 1.04, ES=−0.39); disruptive and violence-related behaviors (IRR=0.92, 95% CI=0.87, 0.96, ES=−0.50, and IRR=0.38, 95% CI=0.18, 0.81, ES=−0.54, respectively) compared to students in control schools. Table 3 shows model probabilities and means at baseline and endpoint and the ESs for all outcomes. There was



**Table 3.** Predicted probabilities, predicted counts, and effect sizes for impact of the Positive Action Program

Outcome	Wave 1		Wave 8		Effect size
	Positive Action	Control	Positive Action	Control	
Student-report					
Normative beliefs supporting aggression <sup>a</sup>	0.31	0.27	0.48	0.60	−0.68
Bullying <sup>b</sup>	1.56	1.33	3.14	3.59	−0.39
Disruptive behaviors <sup>b</sup>	0.99	0.78	2.09	2.44	−0.50
Violence <sup>b</sup>	—	—	0.78	1.34	−0.54
Parent-report					
Bullying <sup>b</sup>	1.92	2.03	1.41	1.78	−0.31
Conduct <sup>b</sup>	2.30	2.36	2.76	2.61	−0.26
School-level archival data					
Disciplinary referrals <sup>c</sup>	42.57	73.05	73.22	137.44	−0.58
Suspensions <sup>c</sup>	40.95	65.25	65.81	105.48	−0.27

Note: Effect sizes were calculated using the Cox transformation for binary outcomes and predicted means for count outcomes.

<sup>a</sup>Measure is dichotomous; predicted probabilities shown.

<sup>b</sup>Measure is a count of the number of behaviors endorsed.

<sup>c</sup>Measure is a count of disciplinary actions adjusted for school size.

moderation of the program effect on bullying by gender (condition  $\times$  time  $\times$  gender IRR=1.28, 95% CI=1.04, 1.60, and condition  $\times$  time<sup>2</sup>  $\times$  gender IRR=0.96, CI=0.93, 1.00), such that there was evidence of a larger program effect for girls (ES=−0.51) than for boys (ES=−0.23).

### Parent-Report Outcomes

Findings also indicated positive effects of Positive Action on both parent-report outcomes. For each year in the study, parents of students in schools with the program reported fewer bullying behaviors by their children (IRR=0.93, 95% CI=0.89, 0.97, ES=−0.31) and marginally fewer conduct problems (IRR=0.97, 95% CI=0.94, 1.01, ES=−0.25) as compared to parents from control schools. These effects were significant for bullying, and marginal ( $p=0.096$ ) for conduct problems in the pair-level models, and only bullying was still significant with the adjusted df test. Similar to the student reports, there was a difference in gender for parent reports of bullying condition  $\times$  time  $\times$  gender IRR=0.89, 95% CI=0.80, 0.98), such that there was evidence of a larger program effect for boys (ES=−0.63) than for girls (ES=−0.42).

### Disciplinary Referrals and Suspensions

The school-level models of disciplinary referrals and suspensions each had linear and quadratic interactions of condition  $\times$  time. The net result of these trends was

evidence of favorable program effects on both disciplinary referrals (ES=−0.58) and suspensions (ES=−0.27) by the end of the study (Table 3).

### Discussion

This cluster RCT extends evidence of the effectiveness of the Positive Action program by examining program effects on outcomes relating to violence prevention among students attending low-income, mostly minority urban schools and by extending follow-up into middle-school grades. Students in schools that implemented the program were less likely to report holding normative beliefs supporting aggressive behaviors and engaging in violence-related, bullying, and other disruptive behaviors. This evidence of the program's beneficial effects on reducing student problem behaviors was corroborated largely by ratings from parents and school-level disciplinary referrals and suspensions and is consistent with findings of prior evaluations of the program with other populations and age groups.<sup>27–29</sup>

Present findings suggest program effects on student-reported bullying behavior only for girls, but on parent-reported bullying behavior only for boys. It may be that parents are more likely to be aware of and thus able to report accurately on the relatively more overt (rather than relational) forms of bullying behaviors that boys engage in<sup>46</sup> because of the greater likelihood of such

behaviors resulting in disciplinary and other consequences. Likewise, other findings from the trial suggest that girls have higher levels of self-honesty compared to boys,<sup>47</sup> which could serve to increase the sensitivity of student self-report data to program effects for bullying behavior.

## Limitations

Several study limitations should be considered in interpreting the current findings. First, self-reports of behavior have potential reporting bias.<sup>48</sup> Further, high mobility rates among students resulted in a high turnover of students in the study, a common phenomenon among low-income, urban schools.<sup>49</sup> However, the use of analytic methods that utilized all available data from all cohort students present at any time during the study is consistent with recent recommendations for analysis of data in clustered trials in the context of high mobility.<sup>31,50</sup>

Sensitivity analyses using multiple imputation produced the same pattern of results as that reported here; differences across program and control schools for those leaving or joining the study were limited, and there was no evidence of differential program effects across student mobility groupings. With respect to construct validity, blinding was not possible with the trial design, which could have influenced student or parent reports of behavior. Finally, with regard to external validity, study findings can be generalized only to similar schools in low-income, inner-city neighborhoods that would self-select to participate in a study of this nature. The small number of eligible schools that agreed to participate in the trial (18 of 68) may have been more likely to have school-level factors in place (e.g., climate) to facilitate engagement in a study of this nature.

## Conclusion

In addition to future research to address the preceding concerns, additional investigation is needed to clarify mediators and moderators of the effects of the *Positive Action* program (and other school-based prevention programs) on youth problem behaviors. Such data will be essential for further refining program content and delivery and thus effectiveness for reducing rates of violent and other disruptive behaviors among youth in the U.S.

The authors thank Robert Duncan for assistance with analyses. The findings reported here are based on research funded by grants from the Institute of Education Sciences, the U.S. Department of Education (R305L030072, R305L030004, and R305A080253) to the University of Illinois at Chicago (2003–2005) and Oregon State University (2005–2012). The SACD research program includes multiprogram evaluation data

collected by MPR and complementary research study data collected by each grantee. The findings reported here are based only on the Chicago portion of the multiprogram data and the complementary research data collected by the University of Illinois and Oregon State University (Brian Flay, Principal Investigator) under the SACD program.

The research described herein was done using the program, the training, and technical support of Positive Action, Inc., in which Dr. Flay's spouse holds a substantial financial interest. Issues regarding conflict of interest were reported to the relevant institutions and appropriately managed following the institutional guidelines.

No other financial disclosures were reported by the authors of this paper.

## References

- Williams K, Rivera L, Neighbours R, Reznik V. Youth violence prevention comes of age: research, training and future directions. *Annu Rev Public Health* 2007;28:195–211.
- Cook PJ, Laub JH. After the epidemic: recent trends in youth violence in the U.S. Cambridge MA: National Bureau of Economic Research, 2001. NBER Working Paper No. 8571.
- Dahlberg LL. Youth violence in the U.S.: major trends, risk factors, and prevention approaches. *Am J Prev Med* 1998;14:259–72.
- Nansel TR, Overpeck M, Pilla RS, Ruan W, Simons-Morton B, Scheidt P. Bullying behaviors among U.S. youth. *JAMA* 2001;285:2094–100.
- Gustavson C, Ståhlberg O, Sjödin AK, Forsman A, Nilsson T, Anckarsäter H. Age at onset of substance abuse: a crucial covariate of psychopathic traits and aggression in adult offenders. *Psychiatry Res* 2007;153:195–8.
- Merline AC, O'Malley PM, Schulenberg JE, Bachman JG, Johnston LD. Substance use among adults 35 years of age: prevalence, adulthood predictors, and impact of adolescent substance use. *Am J Public Health* 2004;94:96–102.
- DuRant RH, Smith JA, Kreiter SR, Krowchuk DP. The relationship between early age of onset of initial substance use and engaging in multiple health risk behaviors among young adolescents. *Arch Pediatr Adolesc Med* 1999;153:286–91.
- Ikeda RM, Simon TR, Swahn M. The prevention of youth violence: the rationale for and characteristics of four evaluation projects. *Am J Prev Med* 2001;20:15–21.
- Hallfors DD, Waller MW, Bauer D, Ford CA, Halpern CT. Which comes first in adolescence—sex and drugs or depression? *Am J Prev Med* 2005;29:163–70.
- Eaton DK, Kann L, Kinchen S, et al. Youth risk behavior surveillance—U.S., 2005. *J Sch Health* 2006;76:353–72.
- Afshar P, Kenny MC. Violence in schools, cross-national and cross-cultural perspectives. *J Psychol Trauma* 2008;6:87–9.
- Flay BR. Positive youth development requires comprehensive health promotion programs. *Am J Health Behav* 2002;26:407–24.
- Flay BR, Graumlich S, Segawa E, Burns JL, Holliday MY. Effects of 2 prevention programs on high-risk behaviors among African American youth: a randomized trial. *Arch Pediatr Adolesc Med* 2004;158:377–84.
- Wilson SJ, Lipsey MW. School-based interventions for aggressive and disruptive behavior: update of a meta-analysis. *Am J Prev Med* 2007;33(2S):S130–S143.
- Tobler NS, Stratton HH. Effectiveness of school-based drug prevention programs: a meta-analysis of the research. *J Primary Prev* 1997;18:71–128.



16. Wilson DB, Gottfredson DC, Najaka SS. School-based prevention of problem behaviors: a meta-analysis. *J Quant Criminol* 2001;17: 247–72.
17. Farahmand FK, Grant KE, Polo AJ, Duffy SN, DuBois DL. School-based mental health and behavioral programs for low-income, urban youth: a systematic and meta-analytic review. *Clin Psychol Sci Pract* 2011;18:372–90.
18. Durlak JA, Weissberg RP, Dymnicki AB, Taylor RD, Schellinger KB. The impact of enhancing students social and emotional learning: a meta analysis of school based universal interventions. *Child Dev* 2011;82:405–32.
19. Berkowitz MW, Bier MC. What works in character education: a research-driven guide for educators. Washington DC: Character Education Partnership, 2005: 1–43
20. Berkowitz MW, Bier MC. Research-based character education. *Ann Am Acad Pol Soc Sci* 2004;591:72–85.
21. Flay BR, Allred CG. The Positive Action program: improving academics, behavior, and character by teaching comprehensive skills for successful learning and living. Lovat T, Toomey R, Clement N, eds. *International Research Handbook on Values Education and Student Wellbeing*. Dordrecht: Springer, 2010:471–501.
22. Purkey WW, Novak JM. Inviting school success: a self-concept approach to teaching, learning, and democratic practice. Florence KY: Wadsworth, 1996.
23. Purkey WW. Self concept and school achievement. Englewood-Cliffs NJ: Prentice Hall, Inc., 1970.
24. DuBois DL, Flay BR, Fagen MC. Self-esteem Enhancement Theory: An emerging framework for promoting health across the life-span. DiClemente RJ, Kegler MC, Crosby RA, eds. *Theories in health promotion practice and research*, 2nd ed. San Francisco CA: Jossey-Bass, 2009:93–130.
25. Flay BR, Snyder F, Petraitis J. The theory of triadic influence. DiClemente RJ, Kegler MC, Crosby RA, eds. *Emerging theories in health promotion practice and research*, 2nd ed. San Francisco CA: Jossey-Bass, 2009:451–510.
26. Flay BR, Petraitis J. The theory of triadic influence: a new theory of health behavior with implications for preventive interventions. *Adv Med Soc* 1994;4:19–44.
27. Beets MW, Flay BR, Vuchinich S, et al. Use of a social and character development program to prevent substance use, violent behaviors, and sexual activity among elementary-school students in Hawaii. *Am J Public Health* 2009;99:1438–45.
28. Snyder F, Flay B, Vuchinich S, et al. Impact of a social-emotional and character development program on school-level indicators of academic achievement, absenteeism, and disciplinary outcomes: a matched-pair, cluster randomized, controlled trial. *J Res Educ Effect* 2010;3:26–55.
29. Li K-K, Washburn I, DuBois DL, et al. Effects of the Positive Action programme on problem behaviors in elementary school students: a matched-pair, randomized control trial in Chicago. *Psychol Health* 2011;26:187–204.
30. Jessor R. Problem behavior and development transition in adolescence. *J Sch Health* 1982;52:295–300.
31. Vuchinich S, Flay BR, Aber JL, Bickman L. Person mobility in the design and analysis of cluster-randomized cohort prevention trials. *Prev Sci* 2012;13:300–13.
32. Ji P, DuBois DL, Flay BR, Brechling V. Congratulations, you have been randomized into the control group!: issues to consider when recruiting schools for matched pair randomized control trials of prevention programs. *J Sch Health* 2008;78:131–9.
33. Flay BR. Randomized trial of the Positive Action program in Chicago schools and extension to Grade 8. [clinicaltrials.gov/show/NCT01025674](http://clinicaltrials.gov/show/NCT01025674).
34. Chicago Police Department. Chicago Police Department clear map crime incidents. [gis.chicagopolice.org/CLEARMap/startPage.htm](http://gis.chicagopolice.org/CLEARMap/startPage.htm).
35. Huesmann LR, Guerra NG. Children's normative beliefs about aggression and aggressive behavior. *J Pers Soc Psychol* 1997;72: 408–19.
36. Orpinas P, Frankowski R. The aggression scale: a self-report measure of aggressive behavior for young adolescents. *J Early Adolesc* 2001;21:50–67.
37. Loeber R, Dishion T. Early predictors of male delinquency: a review. *Psychol Bull* 1983;94:68–99.
38. CDC. Methodology of the Youth Risk Behavior Surveillance System. RR-12. 2004. [www.cdc.gov/HealthyYouth/yrbs/index.htm](http://www.cdc.gov/HealthyYouth/yrbs/index.htm).
39. Kamphaus R, Reynolds CR, Hatcher NM. Treatment planning and evaluation with the BASC: the Behavior Assessment System for Children. 1999:563–97.
40. Kenward MG, Molenberghs G. Likelihood based frequentist inference when data are missing at random. *Stat Sci* 1998;13:236–47.
41. Lipsey MW, Wilson DB. *Practical meta-analysis*. Thousand Oaks CA: Sage, 2001.
42. Sánchez-Meca J, Marín-Martínez F, Chacón-Moscoso S. Effect-size indices for dichotomized outcomes in meta-analysis. *Psychol Methods* 2003;8:448–67.
43. Raudenbush SW, Bryk AS. *Hierarchical linear models: applications and data analysis methods*, Vol 1. Thousand Oaks CA: Sage, 2002.
44. Acock A. Working with missing values. *J Marriage Fam* 2005;67: 1012–28.
45. Merlo J, Chaix B, Ohlsson H, et al. A brief conceptual tutorial of multilevel analysis in social epidemiology: using measures of clustering in multilevel logistic regression to investigate contextual phenomena. *J Epidemiol Commun Health* 2006;60:290–7.
46. Crick NR, Grotpeter JK. Relational aggression, gender, and social-psychological adjustment. *Child Dev* 1995;66:710–22.
47. Lewis KM, Acock A, Bavarian N, et al. Effects of the Positive Action program on social-emotional outcomes in Chicago Public Schools. In: *Society for Research in Adolescence*. Vancouver, British Columbia, Canada, 2012, March.
48. Podsakoff PM, MacKenzie SB, Lee JY, Podsakoff NP. Common method biases in behavioral research: a critical review of the literature and recommended remedies. *J Appl Psychol* 2003;88: 879–903.
49. Tobler AL, Komro KA. Contemporary options for longitudinal follow-up: lessons learned from a cohort of urban adolescents. *Eval Prog Plann* 2010;34(2):87–96.
50. Brown CH, Wang W, Kellam SG, et al. Models for testing and evaluating impact in randomized field trials: intent-to-treat analyses for integrating the perspectives of person, place, and time. *Drug Alcohol Depend* 2008;95(S1):S74–S104.

## Appendix

### Supplementary data

Supplementary data associated with this article can be found in the online version at <http://dx.doi.org/10.1016/j.amepre.2013.01.030>.