Evaluating the impact of conflict resolution on urban children's violence-related attitudes and behaviors in New Haven, Connecticut, through a community–academic partnership

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Received on May 11, 2009; accepted on April 2, 2010

Abstract

Numerous schools are implementing youth violence prevention interventions aimed at enhancing conflict resolution skills without evaluating their effectiveness. Consequently, we formed a community–academic partnership between a New Haven community-based organization and Yale's School of Public Health and Prevention Research Center to examine the impact of an ongoing conflict resolution curriculum in New Haven elementary schools, which had yet to be evaluated. Throughout the 2007–08 school year, 191 children in three schools participated in a universal conflict resolution intervention. We used a quasi-experimental design to examine the impact of the intervention on participants' likelihood of violence, conflict self-efficacy, hopelessness and hostility. Univariate and multivariable analyses were utilized to evaluate the intervention. The evaluation indicates that the intervention had little positive impact on participants' violence-related attitudes and behavior. The intervention reduced hostility scores significantly in School 1 ($P < 0.01$; Cohen's $d = 0.39$) and hopelessness scores in School 3 ($P = 0.05$, Cohen's $d = 0.52$); however, the intervention de-

creased the conflict self-efficacy score in School 2 ($P = 0.04$; Cohen's $d = 0.23$) and was unable to significantly change many outcome measures. The intervention's inability to significantly change many outcome measures might be remedied by increasing the duration of the intervention, adding additional facets to the intervention and targeting high-risk children.

Introduction

Violence among adolescents and children remains a major public health problem in the United States [1]. In 2007, youth under the age of 18 years were involved in 1 in 8 violent crime arrests, 1 in 10 murder arrests and 1 in 4 arrests for property crimes and weapons violations [2]. Acts of violence caused >750 000 Americans aged 10–24 years to seek emergency room care [3]. School violence is common: 628 200 violent crimes were reported in 2005 with 28% reporting having been bullied at school during the past 6 months and 24% injured from being bullied [4]. Nationwide, 30% of students reported that their property was stolen on school grounds in the past 12 months, and 19% of students in grades 9–12 carried a weapon [4, 5]. This high

prevalence of youth violence and its impact on population health has prompted a paradigm shift from the perception of violent behavior as a criminal justice problem to a preventable public health concern [6, 7]. *Healthy People 2010*'s objectives for injury and violence prevention reflects this shift, with an emphasis on reducing physical fighting and weapon carrying among youth to limit injuries and homicides [8].

Throughout the United States, numerous programs have targeted youth violence by tailoring interventions at the socio-ecological and individual levels to risk factors in school and community settings [9, 10]. Interventions at the socio-ecological level have aimed to enhance family, peer, mentoring and neighborhood resources to prevent youth violence [10, 11]. These interventions have been based on evidence indicating that the presence of mentors and prosocial peers coupled with neighborhood resources (e.g. services, collective efficacy) has been found to decrease high levels of aggression among youth [11]. Additionally, many primary prevention interventions at the individual level have aimed to enhance personal protective assets against high-risk behaviors. Conflict resolution skills, i.e. interpersonal skills pertaining to anger management and ability to resolve conflicts constructively, are regarded as one of these protective assets [12, 13]. Acquisition of this asset is intended to modify impaired cognitive and problem-solving skills, enhance self-efficacy and self-esteem and decrease a sense of hopelessness, which, in turn, have been suggested to impact trajectories of aggressive and violent behavior among youth [14–16].

School-based studies assessing the impact of interventions focusing on enhancing conflict resolution skills vis-à-vis violent behavior in children and youths [3, 17, 18] have found mixed results. Aber *et al.* [19, 20] ascertained that a violence prevention intervention increased second to sixth grade students' competence in conflict resolution skills and decreased aggression. A randomized controlled trial with 626 African American sixth grade students determined that a school-based violence prevention program significantly increased the ability to resolve conflict in schools. This study also found

the intervention to be effective in reducing suspension rates and fight-related injuries [21]. In contrast, Orpinas *et al.* [22] found that a violence prevention curriculum, which included training sixth grade students and teachers in conflict resolution skills, did not reduce violence-related behaviors. A recent study, the Multisite Violence Prevention Project [23], found that a universal school-based intervention, based on the social cognitive problem-solving model, actually lead to higher levels of reported aggression after the 1-year intervention.

According to the Community Guide to Preventive Services and systematic reviews [3, 10, 24], few studies have examined the impact of ongoing conflict resolution programs on violent behavior among children or youth. Most studies to date have evaluated investigator-initiated violence prevention interventions rather than school- or community-driven programs. Although school districts and communities understand the need for these existing programs, they often do not have the resources or scientific training to evaluate their effectiveness [25, 26]. This underscores the need to begin examining the impact of existing programs in order to provide schools and communities with the means of identifying effective programs. The present study attempts to address this gap in the literature by evaluating the impact of an existing ongoing school-based violence prevention program utilizing a conflict resolution intervention. Thus, the specific aims of the study are 2-fold: (i) to assess the impact of this program on urban children's likelihood of violence, their ability to resolve conflict and their feelings of hopelessness and hostility and (ii) to identify individual and socio-ecological factors predictive of the primary outcome measures.

Methods

Study design, participants and population

We formed a community-academic partnership between Community Mediation Inc., a community-based mediation organization (CBO), the New Haven Public Schools, the Yale School of Public Health and the Yale-Griffin Prevention

Research Center. This collaboration capitalized on the strengths of both community and academic partners in program implementation and research methodology, respectively, and enabled designing an evaluation of the CBO's existing conflict resolution program. This program has been ongoing in New Haven (Connecticut) elementary schools for approximately a decade, with the support of the superintendent of schools; however, the effectiveness of the program had yet to be examined. Thus, the initiation of the program evaluation was responsive to the CBO's needs and goals for providing an evidence base for their existing violence prevention program within public elementary schools.

A quasi-experimental (pre-post) design was chosen as a compromise between the *academics'* interest to achieve the highest level of evidence through a randomized controlled trial and the CBO's interest in retaining their existing curriculum without interruption during the school year. A total of 191 students participated in the conflict resolution workshops. Of these, 165 completed both pre-intervention (prior to the first workshop) and post-intervention (following the last workshop) questionnaires (83.7% response rate). The conflict resolution program was universal, i.e. was delivered to all students in the entire grade rather than targeting high-risk students [27]. The intervention and subsequent evaluation were implemented and delivered (during various hours of the school day) to all fourth and fifth grade students in two elementary schools and to the fifth grade only in the third school (due to logistical difficulties) during the second semester of the 2007–08 school year.

The students' socio-demographic and individual characteristics from the three public elementary schools in the study varied yet fell within the range of the other 22 New Haven elementary schools, as derived from State of Connecticut resources (see Table I). The race/ethnicity varied significantly between the three schools ($P < 0.01$) yet was consistent with the district average (85.3–99.7% African American or Hispanic in participating school versus 86.3%—district average) [28]. Students' scores on the Connecticut Mastery Test varied depending on the school, grade and subject. Additionally, the per-

centage of students eligible for free/reduced lunches in participating schools was high (61.7–84.9%) and varied significantly between schools ($P < 0.01$) yet was consistent with the district average of 70.5%. The children's household income (as determined by the proxy of qualifying for free/reduced lunches) reflects the community in which they reside because students attend a school located in their neighborhood based on their home address (i.e. zone requirements) [1]. Additionally, based on US census data, the median household income in New Haven is low (\$29 604), with 20.5% of families below the poverty line [29]. Furthermore, crime levels in New Haven are high with 9167 incidences of violence in 2006 (based on Uniform Crime Report police data) [30].

Conflict resolution intervention

The conflict resolution intervention focused on teaching how to resolve disputes or conflicts using non-violent options and how to inhibit verbal or physical conflict before it starts. The intervention, devised by the CBO, is based on the social cognitive theory problem-solving model [31]. The intervention aimed to modify psychosocial processes (e.g. interpersonal skills and self-efficacy) found to be proximal causes of violent behavior at the individual level among children [32]. This intervention is consistent with other conflict resolution curriculums for elementary school children [13, 23, 24]. A student curriculum of five workshops (45–50 min per session) was implemented by experienced mediators, who participated in ≥ 32 hours of mediation training prior to implementation. To ensure the intervention was delivered equally across sites, mediators adhered to the same curriculum and protocol of implementation and participated in coordination meetings with the associate director of the CBO. The conflict resolution curriculum, a combination of didactic lessons and role playing in small groups, consisted of the following five workshops: (i) introduction to the various conflict management styles, (ii) reinforcing participants' understanding of the various conflict styles and providing participants with the opportunity to analyze conflict situations and the consequences of

Table 1. *Characteristics of the three elementary schools, New Haven, Connecticut^a*

Variables	School 1	School 2	School 3	<i>P</i> value
Total number of students, <i>N</i>	410	635	433	N/A
Students eligible for free/reduced meals, <i>n</i> (%)	348 (84.9)	392 (61.7)	337 (77.8)	0.00*
Connecticut mastery test—meeting state goals ^b (%)				
New Haven district (mean)				
Grade 4				
Reading 28.2%	36.2	20.7	2.5	0.03*
Writing 37.2%	55.4	37.8	20.0	0.07
Math 36.6%	33.9	35.8	18.6	0.50
Grade 5				
Reading 29.9%	53.2	21.1	9.8	0.04*
Writing 27.3%	51.1	18.3	14.0	0.01*
Math 36.7%	55.3	29.2	10.9	0.02*
Race/ethnicity, <i>n</i> (%)				0.00*
Asian	3 (0.7)	17 (2.7)	0 (0.0)	
African American	169 (41.2)	285 (44.9)	105 (24.2)	
Hispanic	181 (44.1)	265 (41.7)	327 (75.5)	
Caucasian	56 (13.7)	65 (10.2)	1 (0.2)	
Other	1 (0.2)	3 (0.5)	0 (0.0)	
Students in the conflict resolution program, <i>n</i> ^c	77	78	36	N/A
Actual participants in study, <i>n</i> ^d	68	69	28	N/A

N/A denotes not applicable. Asian, Caucasian and 'Other' categories were condensed into one category to enable comparison due to the low number of participants in each of these categories.

^aSchool data were derived from State of Connecticut resources: <http://www.csde.state.ct.us/public/der/ssp/SCH0708/dist061.htm>; <http://www.ct.gov/ctportal/taxonomy/taxonomy.asp?DLN=27190&ctportalNav=|27190|>.

^bSchool percentage of meeting mastery state goals are compared with District and State scores.

^cStudents who participated in the conflict resolution program regardless of participating in the evaluation study.

^dStudents who participated in both the conflict resolution program and evaluation study (i.e. completed pre- and post-questionnaires evaluating the conflict resolution program). *Statistically significant at 0.05 level.

different approaches, (iii) discussion of feelings associated with conflict, especially anger and ways of dealing with anger, (iv) providing participants with the opportunity to practice listening skills and understanding the importance of listening in resolving conflicts and (v) helping participants communicate clearly with others and take ownership of their feelings.

Ethical approval process

Prior to the initiation of the study, information sheets, with a detailed explanation of the study, were sent to all students' parents informing them of the study and asking permission for their children to participate. The information sheet indicated that their child is participating in an existing violence prevention program and that the present study adds

an evaluation component to this program. Parents were asked to contact the researchers or school principal if they did not permit their child to participate in the study. Parents were not required to sign an informed consent. None of the parents declined their child's participation in the study. Additionally, each student provided assent prior to participation. The study protocol was deemed to be of minimal risk to children by the Pediatric Protocol Review Committee. Ethical approval was received from the Yale University School of Medicine Human Investigation Committee and the Griffin Hospital Institutional Review Board.

Measures

Primary outcome measures were derived from the psychosocial and cognitive assessment section of

the Centers for Disease Control and Prevention's compendium of assessment tools for measuring violence-related attitudes and behaviors [33]. The outcome measures selected (i.e. hostility, hopelessness, conflict self-efficacy and likelihood of violence) were chosen to reflect the proximal causes of violent behavior, targeted by the conflict resolution intervention [32]. A modified version of the following validated tools was utilized: Hopelessness Scale for Children, Teen Conflict Survey (i.e. Conflict Self-Efficacy), SCL-90 Hostility and Likelihood of Violence and Delinquency Scale [33]. Each item in the questionnaires contained a scale ranging from 1 to 3. Scoring was based on the compendium, with point values assigned to each response, values summed and divided by the number of items [33]. This scoring resulted in continuous variables, with higher scores indicating higher severity for the hostility, hopelessness and likelihood of violence scores. Conversely, higher conflict self-efficacy scores were indicative of a positive outcome. Potential predictors consisted of each student's grade (fourth or fifth), school, gender, race/ethnicity (Caucasian and Asian combined, Hispanic and African American), number of parents/caregivers present when arriving home from school, number of siblings and the presence of role models. Caucasians and Asians were combined since the number of Asians was small and the two groups tend to have a relatively lower risk for violence [6]. Additionally, perceived neighborhood safety, social cohesion and sense of community (dichotomized) were measured using validated tools [34, 35].

Data analysis

We generated descriptive statistics of our study population. To assess normality of the distribution, a quantile-by-quantile (Q-Q) plot was computed for each continuous outcome variable [36]. Distributions were normal and parametric statistics were used for all analysis. Bivariate analysis (chi-square test or one-way analysis of variance) was used to compare the individual and socio-ecological characteristics between the three schools. Since statistically significant differences were found, we stratified the analysis by school and subsequently

assessed the impact of the intervention on the four outcome measures for each school separately (Aim 1). Paired *t*-tests were used to assess the mean change in each of our four outcome measures. To assess the meaningfulness of the change in outcomes, Cohen's *d* effect size was calculated [37]. Effect sizes were defined as small, $d = 0.2$; medium, $d = 0.5$ and large, $d = 0.8$ [37]. To identify factors predictive of the four outcome measures (Aim 2), we employed a backward stepwise predictive modeling approach. We utilized multiple linear regression to identify factors predictive of each outcome separately, while controlling for baseline values [38]. All factors listed in Table II were included in our initial model. Factors with a $P < 0.10$ were retained in the final model and for these we computed point estimates and 95% confidence intervals (CIs). Analyses were conducted using SPSS version 17 (SPSS, Inc., Chicago, IL, USA).

Results

Students were from three public elementary schools in New Haven, from the fourth and fifth grade (Table II). The fourth and fifth grade students' race/ethnicity varied significantly between the three schools ($P = 0.01$), yet students in all three schools were primarily Hispanic or African American (83.9, 88.4 and 89.3%—in the 3 schools, respectively). Most students perceived their health to be good (79.4, 87.0 and 89.3%), their neighborhood to be safe (61.8, 78.3 and 60.7%), the police to be counted on (75.0, 84.1 and 92.9%) and neighbors willing to help if threatened (79.4, 79.7 and 71.4%), with no significant differences between schools. Most students in the three schools (80.9, 94.2 and 85.7%) stated that they have a role model in their life; these perceptions varied significantly between schools ($P = 0.03$). Additionally, more than two-thirds (69.1, 78.3 and 89.3%) reported attending religious services; the mean number of sibling ranged from 2.0 to 2.6 in the three schools ($SD = 1.1$ – 1.3), and the mean number of parents or caregivers at home ranged from 1.6 to 1.9 ($SD = 0.8$ – 0.9), without statistically significant variation between schools.

Table II. Characteristics of fourth and fifth grade students participating in the study stratified by the three elementary schools—New Haven, Connecticut

Characteristics	School 1 (<i>N</i> = 68), <i>n</i> (%)	School 2 (<i>N</i> = 69), <i>n</i> (%)	School 3 (<i>N</i> = 28), <i>n</i> (%)	<i>P</i> value
Gender				0.43
Male	34 (50.0)	36 (52.2)	18 (64.3)	
Female	34 (50.0)	33 (47.8)	10 (35.7)	
Grade				0.00*
Fourth grade	46 (67.6)	14 (20.3)	0 (0.0)	
Fifth grade	22 (32.4)	55 (79.7)	28 (100.0)	
Race/ethnicity				0.01*
Asian	2 (2.9)	5 (7.2)	1 (3.6)	
African American	25 (36.8)	33 (47.8)	3 (10.7)	
Hispanic	32 (47.1)	28 (40.6)	22 (78.6)	
Caucasian	8 (11.7)	3 (4.3)	1 (3.6)	
Other	1 (1.5)	0 (0.0)	1 (3.6)	
Perceived general health				0.35
Poor	14 (20.6)	9 (13.0)	3 (10.7)	
Good	54 (79.4)	60 (87.0)	25 (89.3)	
Neighborhood safety ^a				0.07
Yes	42 (61.8)	54 (78.3)	17 (60.7)	
No	26 (38.2)	15 (21.7)	11 (39.3)	
Neighborhood resilience ^b				0.64
Yes	54 (79.4)	55 (79.7)	20 (71.4)	
No	14 (20.6)	14 (20.3)	8 (28.6)	
Neighborhood police help ^c				0.10
Yes	51 (75.0)	58 (84.1)	26 (92.9)	
No	17 (25.0)	11 (15.9)	2 (7.1)	
Participation in religious services				0.09
Yes	47 (69.1)	54 (78.3)	25 (89.3)	
No	21 (30.9)	15 (21.7)	3 (10.7)	
Presence of role model				0.03*
Yes	55 (80.9)	65 (94.2)	24 (85.7)	
No	13 (19.1)	4 (5.8)	4 (14.3)	
Mean number of siblings (SD)	2.0 (1.2)	2.1 (1.3)	2.6 (1.1)	0.18
Mean number of parents/caregivers (SD) ^d	1.6 (0.8)	1.8 (0.9)	1.9 (0.8)	0.23

SD, standard deviation.

^aResponse to: Is your neighborhood a good place for you or your family to live?^bResponse to: Would somebody in your neighborhood help if someone is physically threatened or injured?^cResponse to: Can the police be counted on if there is trouble in the neighborhood?^dNumber of parents/caregivers at household when arriving home from school. *Statistically significant at 0.05 level.

Participants in School 1 reduced their hostility scores from a mean score of 1.86 at baseline to 1.74 post-intervention (mean difference = 0.12; 95% CI 0.07, 0.17), with statistical significance ($P < 0.01$), and below medium effect size (Cohen's $d = 0.39$) (Table III). Students in School 1 reduced their sense of hopelessness from a baseline mean score of 1.53 to 1.46 post-intervention (mean difference = 0.06; 95% CI $-0.16, 0.03$) yet without statistical signifi-

cance ($P = 0.16$) and with a small effect size (Cohen's $d = 0.21$). Additionally, no significant changes were observed in School 1 participants' conflict self-efficacy (baseline 2.29; post-intervention 2.33; $P = 0.32$; Cohen's $d = -0.10$) and likelihood of violence score (baseline 1.20; post-intervention 1.22; $P = 0.76$; Cohen's $d = -0.06$). In School 2, the intervention did not significantly decrease students' hostility scores, sense of hopelessness nor

likelihood of violence scores (Table III). Moreover, the intervention reduced School 2 students' conflict self-efficacy (baseline 2.34; post-intervention 2.24) with statistical significance ($P = 0.04$) yet with a small effect size (Cohen's $d = 0.23$). In School 3 participants, the intervention reduced students' sense of hopelessness (baseline 1.55; post-intervention 1.39) with statistical significance ($P = 0.05$) and a medium effect size (Cohen's $d = 0.52$). The intervention, however, did not have a significant impact on School 3 students' hostility, conflict self-efficacy and likelihood of violence scores.

In multivariable analysis, the only factor predictive of reduced hostility scores was the school attended: those attending School 1 had reduced scores compared with School 3 (Model 1, $b = -0.16$, $P < 0.01$); see Table IV. School attended was also a predictor of increased conflict self-efficacy scores, with School 1 having a greater increase than School 3 (Model 3, $b = 1.49$) yet with borderline statistical significance ($P = 0.07$). The number of siblings was predictive of sense of hopelessness scores: an increased number of siblings was predictive of higher hopelessness scores (Model 2, $b = 0.37$, $P = 0.04$). A lower number of parents/caregivers at home was similarly predictive of higher hopelessness scores (Model 2, $b = -0.05$; $P = 0.07$), though with marginal statistical significance. Additionally, participants' perception of neighborhood police was predictive of likelihood of violence scores: participants who did not believe the police could be counted on received higher likelihood of violence scores (Model 4, $b = 0.15$; $P = 0.03$) than those who perceived that police could be counted on.

Discussion

Numerous communities and schools throughout the United States are implementing youth violence prevention programs, yet scant evidence exists pertaining to their effectiveness [26]. Research is needed to examine the effectiveness of these ongoing programs, which often differ from research-based programs in terms of intensity and implementation

[39]. Information stemming from research evaluating these programs will provide schools and communities with the ability to differentiate between effective and ineffective programs and subsequently implement effective programs or modify ineffective ones [26]. In the present study, through a community-academic partnership, we address this need by evaluating the impact of an ongoing school-based conflict resolution program on urban children's violence-related attitudes and behaviors. The results of this evaluation indicate that in the first school the conflict resolution curriculum had a positive impact on only one of the four primary outcome measures. The intervention reduced hostility scores from 1.86 to 1.74 (on a three-point scale) with a statistical significance but had a below medium magnitude of effect (as measured by the Cohen's d effect size). In contrast, in the second school, the intervention negatively impacted students' conflict self-efficacy score. This negative impact had small magnitude of effect (-0.10) but was statistically significant. The intervention did not have a positive or negative effect on any of the three remaining outcome measures in the second school. In the third school, the intervention positively impacted only one of the four outcome measures, i.e. decreased students' sense of hopelessness (-0.16), with a medium effect size and borderline statistical significance.

The study results indicate that the intervention had little positive impact (with a low to medium magnitude of effect) on violence-related attitudes and behavior. These results might be explained by the brief duration of the intervention, which was held over a period of one semester for five academic hours. The impact of a higher dose of the intervention on violence-related outcome measures warrants further examination. An alternate explanation to the intervention's inability to have a more positive and larger magnitude of effect may stem from the fact that this intervention was universal (i.e. students in entire classrooms participated rather than high-risk individuals). Thus, participants' low-risk baseline scores on all outcome measures might have led to the equivocal results found in the study. The impact of the intervention on a high-risk population might

Table III. Change in primary outcome scores (Hostility, Sense of Hopelessness, Conflict Self-efficacy and Likelihood of Violence) from pre- to post-intervention, stratified by the 3 Elementary Schools- New Haven, Connecticut

Outcome measure	Baseline score, mean (SD)	Post-test score, mean (SD)	Mean difference (95% CI)	P value	Cohen's $d \pm$
Hostility score					
School 1	1.86 (0.32)	1.74 (0.28)	0.12 (0.07, 0.17)	0.00*	0.39
School 2	1.74 (0.30)	1.73 (0.34)	0.01 (−0.07, 0.05)	0.74	0.03
School 3	1.85 (0.37)	1.89 (0.39)	0.04 (−0.62, 0.14)	0.42	−0.10
Sense of hopelessness score					
School 1	1.53 (0.33)	1.46 (0.32)	0.06 (−0.16, 0.03)	0.16	0.21
School 2	1.43 (0.31)	1.43 (0.34)	0.00 (−0.09, 0.09)	0.94	0.00
School 3	1.55 (0.34)	1.39 (0.27)	0.16 (−0.331, 0.00)	0.05*	0.52
Conflict self-efficacy score					
School 1	2.29 (0.38)	2.33 (0.38)	0.04 (−0.04, 0.12)	0.32	−0.10
School 2	2.34 (0.39)	2.24 (0.45)	−0.10 (−0.19, −0.00)	0.04*	0.23
School 3	2.22 (0.42)	2.17 (0.31)	−0.05 (−0.12, 0.22)	0.53	0.13
Likelihood of violence score					
School 1	1.20 (0.30)	1.22 (0.36)	0.02 (−0.07, 0.09)	0.76	−0.06
School 2	1.29 (0.34)	1.27 (0.36)	0.02 (−0.09, 0.06)	0.69	0.05
School 3	1.19 (0.30)	1.30 (0.41)	0.11 (−0.10, 0.30)	0.53	−0.30

SD, standard deviation. Cohen's $d \pm$ is calculated from the following formula [25]: Cohen's $d = M1 - M2/\text{pooled SD}$; where $M1$ and $M2$ are the mean at the pre- and post-tests. *Statistically significant at 0.05 level.

lead to more significant and meaningful results. Furthermore, the sole focus of the intervention on a student curriculum, without addressing additional facets and factors at the social and environmental levels (e.g. school and neighborhood), might have been an impediment to success. Some evidence suggests that multifaceted interventions including family, teachers and the community are effective in reducing violence-related attitudes and behaviors [40, 41]. However, other studies, often multifaceted and of a longer duration and dose, have similarly found small effect sizes (ranging from 0.05 to 0.41) with limited to no impact on violence-related outcome measures [21, 22, 42, 43]. For example, a recent study, the Multisite Violence Prevention Project, found that a social cognitive intervention positively impacted only two of eight variables examined and actually increased levels of reported aggression [23]. Our study, in comparison, found that the intervention reduced participants' hostility scores; however, the magnitude of effect was below medium. Additionally, Farrell *et al.* [43] found that a seventh grade violence prevention intervention did not impact most self-reported physical aggres-

sion. In contrast, other studies, such as by DuRant *et al.* [44] and Botvin *et al.* [45], have shown positive effects on a reduction of both perceived and directly observed violence-related attitudes and behaviors.

In the present study, results stemming from the multivariable analysis indicate that students' schools independently predict both hostility and conflict self-efficacy scores. These findings are consistent with a large body of literature indicating that the school characteristics (e.g. organizational characteristics, climate, size and cohesion) have a paramount effect on student's violence-related behaviors [46–49]. While Leung and Ferris [46] found that schools' quality and organizational characteristics can impact the probability of violence, Welsh [49] and Gottfredson [47] established that school climate (transparency of rules and perception of fairness) independently predicted students' misconduct, violence and weapon carrying. Khoury-Kassabri *et al.* [48] ascertained that students' fear of violence and victimization was associated with higher levels of weapon carrying. Limbos and Casteel [50] found that school

Table IV. Multivariable linear regression models for predictors of final primary outcome scores (hostility, sense of hopelessness, conflict self-efficacy and likelihood of violence)^{a,b}

Outcome measure	Hostility (Model 1)			Sense of hopelessness (Model 2)			Conflict self-efficacy (Model 3)			Likelihood of violence (Model 4)		
	b (SE)	95% CI	P value	b (SE)	95% CI	P value	b (SE)	95% CI	P value	b (SE)	95% CI	P value
Race/ethnicity ^c												
African American	—	—	—	—	—	—	—	—	—	−0.13 (0.09)	−0.31, 0.04	0.12
Hispanic	—	—	—	—	—	—	—	—	—	−0.13 (0.08)	−0.30, 0.03	0.10
Number of siblings (continuous)	—	—	—	0.37 (0.18)	0.00, 0.07	0.04*	—	—	—	—	—	—
Number of parents/caregivers (continuous)	—	—	—	−0.05 (0.02)	−0.10, 0.00	0.07	—	—	—	—	—	—
Perceived general health (poor/good)	—	—	—	—	—	—	−1.16 (0.70)	−2.55, 0.22	0.10	—	—	—
Schools ^d												
School 1	−0.16 (0.05)	−0.26, −0.06	0.00*	—	—	—	1.49 (0.82)	−0.14, 3.12	0.07	—	—	—
School 2	−0.07 (0.05)	−0.17, 0.03	0.15	—	—	—	0.09 (0.80)	−1.45, 1.67	0.91	—	—	—
Neighborhood police help (no/yes)	—	—	—	—	—	—	−1.34 (0.73)	−2.57, 0.31	0.12	0.15 (0.07)	0.01, 0.29	0.03*

b, unstandardized coefficient; SE, standard error.

^aMultivariable linear regression models (backward stepwise) were utilized to identify factors predictive of each outcome separately. The post-intervention score was entered as the dependent variable, while adjusting for baseline scores.

^bBlank cells are indicative of independent variables not retained in the final regression models (i.e. $P > 0.10$ in the backward stepwise process).

^cRace/ethnicity categories are compared with the reference category—Asians/White. Asian and Whites were condensed into one category due to the low number of participants in each category.

^dSchools 1 and 2 are compared with the reference category—School 3. *Statistically significant at 0.05 level.

organizational and educational factors were related to school violence. Specifically, they found that higher academic performance and lower student-to-teacher ratios were associated with lower school crime rates. In addition, Limbos and Casteel [50] found neighborhood level factors (neighborhood dilapidation) to be associated with increased crime. In our present study, multivariable results indicated that students who did not trust neighborhood police received higher likelihood of violence scores than students who expressed trust in the police. This finding is consistent with evidence linking hostility toward the police with violence-related outcomes [25]. Additional results from the present study suggest that an increase in the presence of parents at home when arriving from school decreases children's sense of hopelessness; this presence has been regarded as a protective factor for both proximal and distal violence-related outcome measures [25, 51].

Our study has both limitations and strengths. This study is a quasi-experimental pre-post evaluation of a conflict resolution intervention without a control group. Thus, changes observed in outcome measures might be due to a secular trend (i.e. a change with time) rather than the intervention [52]. Additionally, outcome measures are violent-related attitudes and perceptions rather than objective measurements (e.g. direct observation, school or police records) [32, 33]. Furthermore, this convenience sample of students from three primary schools in New Haven is not necessarily representative of all primary schools in the city; however, many of the participating school characteristics are comparable to the district average (i.e. students' grades, race/ethnic make up and percent eligible for free/reduced lunch). The primary strengths of the study include the assessment of an existing ongoing violence program in the New Haven public schools that had yet to be evaluated and the formulation of a community-academic collaboration to conduct this study, which fosters community sustainability, ownership and strengthening of capacity to conduct research [53]. Few studies have utilized community-academic partnerships to evaluate the impact of school-based violence pre-

vention programs. In conclusion, while taking into account the study's limitations, the findings suggest that this ongoing conflict resolution curriculum appears to have little positive impact on violence-related attitudes and behaviors. The intervention's inability to significantly change many of the outcome measures might be remedied by increasing the duration of the intervention, adding additional facets to the intervention (as previously discussed) and targeting high-risk children. As a result of these research findings, the CBO has begun to explore ways to integrate and implement the suggested modifications into their violence prevention efforts in the New Haven school system while receiving feedback from the New Haven school systems' social development specialists and school teachers and administration. Future research should examine how to scale back, modify or discontinue non-evidence-based programs. Moreover, future studies should continue to examine the effectiveness of ongoing violence prevention programs in communities and schools to provide them with the ability to differentiate between effective and ineffective programs.

Funding

National Center for Research Resources (NCRR) (CTSA grant number UL1 RR024139), a component of the National Institutes of Health (NIH); NIH roadmap for Medical Research. The contents of this paper are solely the responsibility of the authors and do not necessarily represent the official view of NCRR or NIH.

Acknowledgements

We wish to thank the students, parents and schools who participated in the study, the New Haven Public Schools generally and their Superintendent specifically. We also wish to thank Survivin' N Da Hood, a peer-training organization, and Community Mediation's youth training partner. We thank Mr Maurice Williams, the Yale-Griffin Prevention Research Center community outreach coordinator, for helping establish this community-academic

partnership. Finally, we wish to thank The Annie E. Casey Foundation, The Community Foundation for Greater New Haven, the City of New Haven's Community Development Block Grant and Youth Service Capacity Building Grant programs, the Daphne Seybolt Culpeper Memorial Foundation and the New Haven Board of Education for their funding support of Community Mediation's various school-based and community-based youth training, peer mediation and violence prevention programs.

Conflict of interest statement

None declared.

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