

The North Carolina Youth Violence Prevention Center: Using a Multifaceted, Ecological Approach to Reduce Youth Violence in Impoverished, Rural Areas

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ABSTRACT *Objective:* Youth violence is best tackled through a multifaceted approach targeting risk and protective factors at multiple ecological levels. The North Carolina Youth Violence Prevention Center (NC-YVPC) is an example of such an approach. This article provides a comprehensive synthesis of NC-YVPC design, implementation, and results. *Method:* NC-YVPC packaged and implemented 3 evidence-based programs to decrease youth violence in a rural North Carolina community where violence was prevalent. Positive Action, a universal school-based program, was administered in 13 middle schools for 3 years. Parenting Wisely, an online program to improve parenting skills, was provided to 300 parents. Teen Court, a community-based restorative justice alternative to the traditional juvenile-justice system, was provided to 400 adolescents. In addition, county-level data were collected to examine if and how the NC-YVPC programs changed county levels of youth violence. *Results:* Positive Action participation was associated with increased self-esteem and decreased school hassles; Parenting Wisely participants were more confident and had less conflict with their children; Teen Court participants reported improved mental and behavioral health. Some county-level indicators of violence decreased. *Conclusions:* This summary of NC-YVPC findings highlights the utility of implementing a multifaceted approach to decrease and prevent youth violence and the importance of fostering a strong partnership between academic institutions and the community.

KEYWORDS: youth violence, intervention research, rural, adolescents

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Youth violence poses a significant public health burden and undermines community safety. In 2014, about 1 million youths under age 18 were arrested for violent crimes (e.g., murder, aggravated assault), property crimes (e.g., burglary, arson), and nonindex crimes (e.g., substance use, disorderly conduct; Office of Juvenile Justice and Delinquency Prevention, 2015), accounting for 11.7% of all arrests (FBI Unified Crime Report, 2014). Indeed, individuals under 18 commit a disproportionate number of violent crimes, and from 2004 to 2013, they committed 22% of all violent crimes. Yet, this group comprised only 10% of the U.S. population over age 12 (Oudekerk & Morgan, 2016).

Involvement in youth violence puts both victims and perpetrators at risk for a host of negative outcomes. For example, victims often suffer from poor mental health, including high rates of depression, anger, aggression (Turner, Finkelhor, & Ormrod, 2006), and post-traumatic stress disorder (U.S. Department of Veterans Affairs, 2015). Perpetrators commonly report decreased academic performance (Bierman et al., 2013), increased parent–adolescent conflict, negative peer relationships (Smokowski, Cotter, Robertson, & Guo, 2013), weapon carrying, attempted suicide, binge drinking, and feeling too unsafe to attend school (Swahn, Bossarte, Palmier, Yao, & Van Dulmen, 2013). Involvement in youth violence—either as a perpetrator or a victim—seriously impedes healthy youth development. Further, youth violence has detrimental consequences at the community level, including a large economic cost—\$16 billion/year (Centers for Disease Control and Prevention [CDC], 2015)—decreased property values, increased insurance premiums, and increased taxes to pay for law enforcement and criminal justice expenses (Shapiro & Hassett, 2012). Given the high rates of youth violence in the United States and the negative individual- and community-level outcomes associated with youth violence, it is incumbent upon social workers to implement effective prevention programs.

One potentially effective way to combat youth violence is through a multifaceted approach, which involves packaging evidence-based programs together to decrease risk factors and enhance protective factors at each ecological level (i.e., individual, family, school, community) in an adolescent's social ecology (Wilkins, Tsao, Hertz, Davis, & Klevens, 2014). This paper discusses the utility of a multifaceted approach for youth violence prevention and provides a synthesis of results from the North Carolina Youth Violence Prevention Center (NC-YVPC). The goal of the NC-YVPC was to decrease youth violence in a disadvantaged rural county through three interdependent evidence-based programs, which came together as a comprehensive county initiative designed to address youth violence risk and protective factors. Along with evaluating each program separately, we also assessed whether NC-YVPC was associated with changes in youth violence rates at the county level. In this article, we provide a synthesis and overview of the most important published and unpublished findings from the NC-YVPC project. Additional details

about separate components of this research projects can be found on the website of the North Carolina Academic Center for Excellence in Youth Violence Prevention (2018) and in prior publications (Cotter, Bacallao, Smokowski, & Robertson, 2013; Cotter, Wu, Evans, & Smokowski, 2017; Evans, Smokowski, Barbee, Bower, & Barefoot, 2016; Guo et al., 2015; Smokowski et al., 2016; Smokowski et al., in press; Smokowski, Cotter, Guo, & Evans, 2017; Smokowski, Rose, et al., 2017; Stalker, Rose, Bacallao, & Smokowski, 2018). This article provides a comprehensive view of these disparate results.

Multifaceted Approach to Youth Violence Prevention: The Need to Package Interventions

Common risk and protective factors for youth violence exist at each level of adolescents' social ecologies: individual factors (e.g., mental health functioning, emotional regulation); family factors (e.g., parent-child interactions, parenting style); school factors (e.g., school climate, school bonding); peer factors (e.g., friend behavior, social status); and community factors (e.g., neighborhood socioeconomic status, level of community disorganization; CDC, 2016; Herrenkohl, Aisenberg, Williams, & Jenson, 2010). Each of these ecological levels and the corresponding risk and protective factors affect healthy youth development and are thus potential points of intervention for violence prevention programs (Krug, Mercy, Dahlberg, & Zwi, 2002). Because a single program could not possibly address risk and protective factors at every ecological level, multifaceted approaches are needed to bring together various evidence-based programs into a comprehensive package that can target risk and protective factors at multiple ecological levels. Indeed, the CDC encourages a multifaceted approach to youth violence prevention (CDC, 2010; Wilkins et al., 2014). To maximize the effectiveness of multifaceted youth violence prevention efforts, community buy-in and relevance are vital (Cherrington et al., 2008); to increase buy-in, it is paramount that researchers match evidence-based programs with the specific risk and protective factors present in the target community.

The NC-YVPC created a package of evidence-based programs to decrease youth violence in a rural community in North Carolina. This multifaceted approach targeted risk and protective factors that were relevant to the needs of the target community and were present across adolescents' ecology. The goal of NC-YVPC was to reduce rates of youth violence in the target county as well as reducing risk factors and promoting protective factors for youths and parents who participated in the three NC-YVPC interventions. We paid close attention to how the programs complemented each other, assuring that high-risk families could benefit from multiple participation pathways.

An Overview of the North Carolina Youth Violence Prevention Center

Robeson County. NC-YVPC focused on decreasing rates of youth violence in rural Robeson County, NC. Robeson County struggles with one of the highest rates of youth violence in the state, exposing its residents to the aforementioned negative consequences associated with violence. According to the North Carolina State Center for Health Statistics (North Carolina Health and Human Services, 2016), Robeson County's youth death rates and age-adjusted homicide rates are significantly higher than norms for North Carolina as a whole (98.5 per 100,000 in the county vs. 57.6 per 100,000 in the state). In addition, Robeson County is one of the most racially/ethnically diverse rural counties in the United States. Between 2010 and 2014, 33% of Robeson County residents lived below poverty, a rate more than twice the national rate of 14% (United States Census Bureau, 2016a). From 2010–2016, Robeson County schools consistently reported the highest rates of corporal punishment use in North Carolina (Public Schools of North Carolina, 2011, 2012, 2013, 2014, 2015, 2016), highlighting the need to spread antiviolence sentiments throughout the school system. (See Table 1 for a comparison of Robeson County, Columbus County, North Carolina, and the United States.)

Despite these challenges, Robeson County residents were strongly bonded to their community. This is the ancestral home of the Native American Indian Lumbee Tribe (40% of residents identify as tribe members), which inspires community members with a rich cultural history and shared values. Given the high rate of youth violence in Robeson County, coupled with the county's other risk factors, the NC-YVPC was established in 2010 in an attempt to decrease rates of youth violence in Robeson County. Because a network of active and devoted church pastors, social-service providers, and community organizations were ready to coalesce to combat the social problems the county faced, NC-YVPC staff members were able to form an advisory council of key county leaders and a Youth Violence Prevention Coalition during the first 6 months of the project.

Columbus County—another low-income, rural county near Robeson—had similar risk factors; its eight middle schools and four high schools served as the no-treatment comparison schools.

NC-YVPC structure. The NC-YVPC is a multidisciplinary, collaborative initiative between the University of North Carolina at Chapel Hill and community partners in Robeson County, including the Robeson County Health Department, the Public Schools of Robeson County, the Robeson County Sheriff's Department, and the Lumbee Tribe of North Carolina. The specific aim of the NC-YVPC was to reduce youth violence in Robeson County by implementing and evaluating a multifaceted, evidence-based youth violence prevention initiative. In Year 1, NC-YVPC engaged in a community-based participatory research planning process with community partners. NC-YVPC staff administered the School Success Profile Plus student self-report survey to 4,000 middle school students to gather data on individual, school,

Table 1*A Comparison of Robeson County, Columbus County, North Carolina, and the United States*

	Robeson County, NC	Columbus County, NC	North Carolina	United States
Population: 2015	134,197	56,694	10,042,802	321,000,000
African American: 2015	24.4%	30.5%	22.1%	13.3%
American Indian: 2015	39.9%	3.5%	1.6%	1.2%
Asian: 2015	0.7%	0.6%	2.8%	5.6%
Caucasian: 2015	32.2%	63.6%	71.2%	77.1%
Hispanic/Latino: 2015	8.3%	5.0%	9.1%	17.6%
Median household income: 2010–2014	\$30,581	\$34,597	\$46,693	\$53,482
Residents living below poverty: 2010–2014	33.1%	24.3%	16.4%	13.5%
Unemployment rate: July 2016	7.2%	12.6%	4.7%	4.9%
Bachelor's degree or higher (age 25+): 2015	12.4%	12.7%	27.8%	29.3%
High school diploma (age 25+): 2015	72.9%	79.6%	85.4%	86.3%
Infant mortality per 1,000 live births: 2014	17.4	16.4	12.2	5.7
Homicide rate per 100,000: 2013	23.9	7.1	4.7	4.5
Juvenile arrest rate per 100,000: 2014	7,045	1,980	3,226	1,385
Youth death rate per 100,000: 2013/ 2010–2014	98.5	82.6	57.6	N/A
Undisciplined and delinquent complaints per 100,000: 2014	3,899	3,245	N/A	N/A
Delinquency rate per 1,000: 2013	28.9	N/A	22.5	N/A

Note. N/A = Data not available. Data are from the North Carolina Department of Justice (2015) and United States Census Bureau (2016a).

and community profiles of risk and protective factors. The results of this initial survey guided the choice of prevention program components. Although the selection of these evidence-based programs was influenced by the community-based participatory research process and the risk and protective factor student profiles, selection was also rooted in ecological systems theory (Bronfenbrenner, 1974). A multifaceted violence prevention initiative was necessary to target risk and protective factors at each ecological level (i.e., individual, school, family, community). In Years 2–4, NC-YVPC implemented this multifaceted youth violence prevention initiative, which included implementing Positive Action in 13 middle schools, providing Parenting Wisely to 300 parents in agencies across the county, and offering community-based Teen Court as an alternative to the juvenile-justice system for 400 adolescent offenders. See Figure 1 for a depiction of the youth violence prevention initiative.

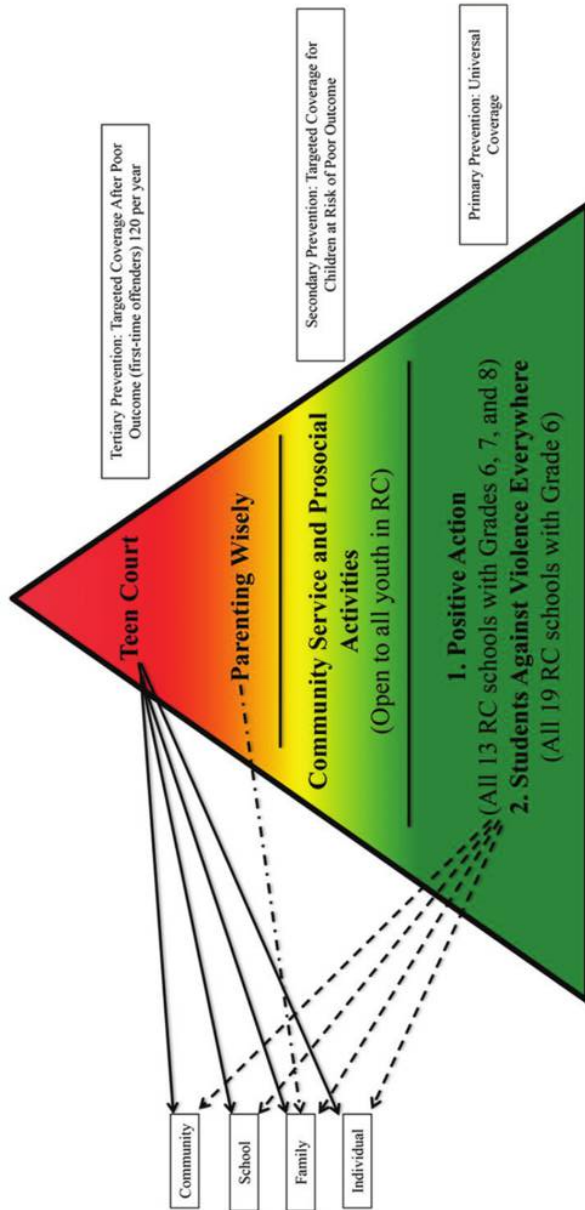


Figure 1. The North Carolina Youth Violence Prevention Center's Youth Violence Prevention Initiative. RC = Robeson County, NC.

Description and Implementation of the Multifaceted, Evidence-Based Strategies

Positive Action: Targeted risk and protective factors. Positive Action (PA) is a school-based intervention that was implemented in the 13 NC-YVPC middle schools in Robeson County for all sixth-, seventh-, and eighth-grade students. In general, the focus of PA is on increasing positive adolescent behaviors with the goal of improving behavioral and developmental outcomes and ultimately improving the school culture and climate. More specifically, this program affects the individual and school community by improving academic achievement, school attendance, problem behaviors (e.g., violence, disruptive behaviors), parent–child bonding, family cohesion, and family conflict (Substance Abuse and Mental Health Services Administration, 2014).

All PA curricula have materials for six units: (a) Self-Concept; (b) Positive Actions for Your Body and Mind (i.e., good hygiene, exercise, and creative thinking skills); (c) Managing Yourself Responsibly (i.e., managing time and resources); (d) Treating Others the Way You Like to Be Treated; (e) Telling Yourself the Truth (i.e., self-honesty); and Improving Yourself Continually (Positive Action, n.d). Optimal PA implementation for middle school consists of 15–20 minute lessons (140 lessons for Grade 6 and 82 lessons for Grades 7–8) taught by teachers two or three days a week.

During each of the three implementation years, NC-YVPC reached approximately 4,700 middle school students in 227 sixth-, seventh-, and eighth-grade classrooms. After training by NC-YVPC staff, 55 teachers taught the program in their 13 middle schools, and the NC-YVPC staff monitored progress for implementation fidelity. Teachers, staff, or community members selected by each school's principal used PA climate kits in hallways, classrooms, offices, and elsewhere to highlight PA program themes (Cotter et al., 2017; Guo et al., 2015; Smokowski et al., 2016).

NC-YVPC staff observed teachers and completed rating forms to document that teachers had attained adequate PA implementation skills. Teachers documented each completed lesson using weekly implementation logs that were collected by NC-YVPC staff and entered into an Excel spreadsheet that allowed NC-YVPC to closely monitor progress within and across the schools. NC-YVPC used the data to create graphs depicting how far each teacher was from the PA lesson goal for that year.

Incentives were given to teachers each month if they delivered the required number of lessons. This close implementation monitoring led to above-average levels of lesson dosage. According to the program developer, the average number of lessons implemented by schools using PA is 26 (C. Allred, personal communication, October 22, 2011). In this project, however, teachers and project staff implemented 73 lessons in Grade 6, 51 lessons in Grade 7, and 44 lessons in Grade 8. This is an excellent implementation record.

Parenting Wisely: Targeted risk and protective factors. Parenting Wisely (PW) is a parent training program that increases parenting knowledge and competence and decreases adolescent problem behaviors through an interactive computer-based pro-

gram (Gordon, 2000). Although PW was designed as a computer-based program for parents to complete individually, it has also been implemented in group formats in which parents work through program vignettes and quizzes together (Gordon & Rolland-Stanar, 2003). PW's 10 video modules are (a) Helping Children to do Housework; (b) Loud Music, Chores Incomplete; (c) Helping Children Do Better in School; (d) Sharing the Computer; (e) Curfew; (f) Sibling Conflict; (g) Step-Parenting; (h) Getting Up on Time; (i) School, Homework and Friends; and (j) Finding Drugs. After viewing each vignette, parents select a response strategy from a list of possible options that represent different levels of parenting effectiveness. Response options tend to reflect authoritarian, authoritative, or permissive parenting styles. The selected response option is then portrayed in a second video vignette and critiqued through interactive questions and answers (Kacir & Gordon, 1999). Parents are taught 15 skills: "I" messages, prompting, praising, contracting, problem-solving, role modeling, active listening, point systems, supervision and monitoring, reframing, planned ignoring, self-talk, clear expectations, logical consequences, and mindfulness.

All Robeson County parents of an adolescent aged 11–15 were eligible to participate in PW. Parents were recruited in churches, schools, community centers within low-income housing, and social-service agencies (e.g., the Department of Social Services). Participants also were recruited through community referrals via recruitment posters and pamphlets. NC-YVPC researchers evaluated the effectiveness of PW at posttest and 6 months after the intervention for the following formats: (a) a parents-only 1- to 2-day workshop, (b) a parents and adolescents 5-week group, (c) a parents-only 5-week group, (d) a self-paced online format for individual parent-adolescent dyads, and (e) the traditional self-paced online format for individual parents. Offering five different program delivery methods provided participants with a variety of ways to experience the program, overcoming recruitment barriers based on parent availability and allowing an evaluation of whether program delivery formats had differential effects. The two key variations were whether or not the adolescent was present with the parent and if the program was provided in a group or individual setting (Cotter et al., 2013; Stalker et al., 2018).

PW content is delivered consistently with high fidelity because of its structured online format (all delivery formats follow this online presentation of material). Attendance in groups and the percentage of PW lessons completed were dosage measures. Attendance was either taken by the group facilitator or tracked on the computer for parents taking the program online. Rates of program completion were very high because PW staff used reminder phone calls, provided transportation to groups, held make-up sessions, had food at group sessions, and gave out a modest monetary incentive at the program's completion.

Teen Court: Targeted risk and protective factors. Teen Court (TC) diverts first-time offenders from formal juvenile court proceedings by holding youths accountable for their offenses through engagement in restorative justice (Stickle, Connell, Wil-

son, & Gottfredson, 2008). The goal of TC is to reduce recidivism and keep first-time offenders connected to prosocial activities and peers; in this regard, TC improves the entire community by decreasing juvenile violence and delinquency. Typically, young offenders are offered TC as a voluntary alternative to the traditional juvenile-justice system, and they must admit their guilt to participate (Butts & Buck, 2000). TC focuses on holding young offenders accountable for their actions by assigning them prosocial sanctions that reintegrate them into the community. Adolescents from the community volunteer to serve as attorneys, bailiff, and jurors, who determine dispositions through a wide array of sentencing options (Godwin, 2000). The most common sanction is community service (M. E. Fisher, n.d.), but some TCs include evidence-based program attendance within their sanctions (Butts & Buck, 2000) to link high-risk youths to mental health and educational programs (e.g., counseling, tutoring, conflict resolution, anger management). This type of sanction can be especially important for rural youths who might be socially isolated or lack necessary mental health services (Radnovich & Wiens, 2012).

For NC-YVPC, juvenile court counselors, school resource officers, district court, and principals referred youths to TC when an adolescent's case was a good fit with the program. TC had previously operated in Robeson County until the 2004–05 fiscal year and had been inactive for six years prior to NC-YVPC. The NC-YVPC version of TC had to reestablish its reputation in the community for running smoothly, and once that happened there was no difficulty receiving referrals. TC was usually a preferable option to the juvenile-justice system, and few adolescents/parents refused. Offenders who went through TC but did not complete their sanctions within 6 months were sent back to their referral source for regular disciplinary action. This was a strong motivator for participants to finish the program and keep their records expunged (Evans et al., 2016; Smokowski, Rose, et al., 2017; Smokowski et al., in press). In addition to assessing the effect of PA, PW, and TC, we also examined county-level rates of youth violence (Smokowski, Cotter, et al., 2017).

Research Methods

Measures

Positive Action and Teen Court measures. The School Success Profile Plus (SSP+; Bowen & Richman, 2008) is a 195-item youth self-report with 22 scales that measure perceptions and attitudes about school, friends, family, neighborhood, self, and health and well-being. The SSP+ has been administered to tens of thousands of students since its creation in 1993 and has well documented reliability and validity (Bowen, Rose, & Bowen, 2005). The SSP+ has been used to assess PA and TC throughout the 6 years of the NC-YVPC study, and all scales have internal consistency reliabilities above 0.70 at each time point. See Table S1 (online) for information on each SSP+ scale.

Parenting Wisely measures. We assessed the effects of PW by administering 12 subscales (see Table S2 online) to participating parents.

County-level measures. Three sources provided data for county-level indicators of youth violence: the North Carolina Department of Public Safety (2015), the North Carolina Department of Public Instruction (2015), and the North Carolina State Bureau of Investigation (2015). The Department of Public Safety categorizes complaints received by the Juvenile Justice Section of the Division of Adult Correction and Juvenile Justice as *undisciplined* (i.e., offenses such as truancy that would not be considered a crime if committed by an adult) and *delinquent* (i.e., offenses that would be considered a crime if committed by an adult).

Covariates: School and neighborhood variables. The North Carolina School Report Cards (2016) provided demographic school information such as rates of school violence, teacher turnover, and school size. The United States Census Bureau (2016a, 2016b) provided neighborhood data such as median household income, percent of residents age 25+ with high school degree, and percent of owner-occupied houses. We used these school and neighborhood variables as control covariates in our statistical models.

NC-YVPC Procedure and Evaluation Design

Analysis examined individual growth trajectories as well as county-level changes in levels of youth violence.

Methods for evaluating Positive Action. Due to the large size of the Robeson County school system, in Year 1 of NC-YVPC, we took a random sample of 40% of students from the 19 Robeson County middle schools. Letters were sent to the randomly selected participants, notifying their parents/caregivers about the project. If parents/caregivers did not want their child to participate, they were instructed to send a letter to the NC-YVPC team to remove the child from the study roster. No such letters were received. Because the Columbus County comparison school system is much smaller, every middle school student from the eight Columbus County middle schools was included in the NC-YVPC sample. Columbus County implemented the SSP+ data collection as part of regular school proceedings; thus, no formal parental consent was needed according to school regulations. All students from both counties were tracked longitudinally as they moved through middle school and into high school; therefore, the seven Robeson County and four Columbus County high schools also participated in the NC-YVPC project. Every year a random sample of 500 sixth-graders was added to the Robeson County sample, and all incoming sixth-graders were added to the Columbus County sample.

More than 4,700 Robeson County middle school students participated in the PA program over 3 years. We completed a quasi-experimental clustered analysis of effects on individual-level change in the SSP+. The analyses included five waves of data collected annually from pretest (2011) through the term of the cooperative-

agreement funding period (2015) to examine trends in individual- and school-level indicators. We made comparisons to Columbus County students who also provided SSP+ data but received no interventions from NC-YVPC. Participants were tracked longitudinally as they moved through middle and high school, allowing an assessment of the long-term effects of PA. Following multiple imputation and propensity score analyses, we ran four two-level hierarchical linear models using self-esteem, school hassles (e.g., being physically harmed, verbally threatened, made fun of), aggression, and internalizing symptoms as dependent variables. We estimated models using inverse probability of treatment weighting average treatment effect, inverse probability of treatment weighting average treatment effect for the treated, and 1-to-1 nearest-neighbor within-caliper matching. We used a similar method to assess the effect that PA dosage (years and number of lessons) had on participant self-esteem, school hassles, aggression, and internalizing symptoms. The PA sample was diverse: 28% of participants identified as White, 27% identified as American Indian, 25% identified as African American, 12% identified as mixed race/other, and 8% identified as Latino/Hispanic. Sample sizes were 1,246–5,894 depending upon the form of propensity score analysis that was used. About half (52%) of participants were female, the mean age was 12.78 years, and 88% of participants received free/reduced lunch.

Methods for evaluating Parenting Wisely. The PW evaluation sample was comprised of 347 low-income, rural parents who chose one of five different formats: parent-only online, parent and adolescent online, brief 1–2 day workshop, parent-only group for 8 weeks, or parent and adolescent group for 8 weeks. The sample was exceptionally racially diverse: 46% of participants identified as American Indian, 36% identified as African American, 6% identified as Hispanic/Latino, 7% identified as White, and 4% identified as mixed race. We estimated individual growth models and difference-in-difference regression models to evaluate the effect of the PW program between pretest, posttest, and 6-month follow-up.

Methods for evaluating Teen Court. The TC evaluation sample was comprised of 392 TC participants, 4,276 non-TC participants from the same county as the TC participants, and 3,584 non-TC participants from Columbus County. The TC sample was quite diverse: 40% of participants identified as American Indian, 34% identified as African American, 11% identified as White, 11% identified as mixed race/other, and 4% identified as Latino/Hispanic. More than half of participants (63%) identified as male, and 83% received free/reduced lunch. Demographics for the two comparison groups were similar to the PA demographic information. Data were collected using the SSP+ prior to participation in TC and 6 months after completion of sanctions. TC caregivers also filled out a survey about familism, parent-adolescent conflict, and adolescent aggression, violence, and delinquency. Following multiple imputation and propensity score analysis, we used an unconditional difference-in-difference method.

Methods for evaluating county-level violence. The NC-YVPC study used an interrupted time series design and linear growth curve modeling to examine changes in county-level indicators of youth violence. We collected annual county-level data from all 100 North Carolina counties; the use of administrative data sources allowed inclusion of extended baseline data going back at least 6 years before the project began. We compared the slopes for longitudinal trajectories of county-level outcomes before and after the introduction of interventions (e.g., 2004–2010 slopes vs. 2011–present slopes). We made comparisons between the target county (Robeson), the comparison county (Columbus), all rural counties other than Robeson and Columbus, and all urban counties.

Results of the NC-YVPC Analysis

Positive Action results (see Table 2). We used three types of propensity score analyses to examine effects with numerous covariates in the models. The PA results for higher self-esteem and lower school hassles in intervention schools were evident in all three types of propensity score analyses models and were significant even after considering the many other covariates in the models (Guo et al., 2015). Results indicated that, relative to the comparison group, PA participants reported significantly higher self-esteem (1.8%, $p < 0.05$) and significantly lower school hassles (3.9%, $p < 0.001$). Results for aggression indicated beneficial effects for PA participants (i.e., less aggressive behavior); however, the finding was not statistically significant. For internalizing symptoms, participants from the intervention county had a higher internalizing score than those from the comparison county, but the results did not reach statistical significance. The PA program did not appear to decrease anxiety and depression (Guo et al., 2015).

In terms of dosage, students who received 3 years of PA had a self-esteem score that was 5.3% higher than those who received zero years. Students who received one year of PA had a school hassles score that was 1.6% lower than those who received zero years (Smokowski et al., 2016). In recent analyses examining mechanisms of change, PA had an indirect effect, lowering externalizing problems, depression, and anxiety through the program's influence on school hassles (Cotter et al., 2017).

In terms of corporal punishment, there were 891 instances of corporal punishment in North Carolina schools in the 2010–11 school year; Robeson County contributed 359 of these incidents (40%). As shown in Figure 2, corporal punishment in Robeson County decreased by 26% from 2010–11 to 2011–12 as NC-YVPC began to plan interventions in the schools. During PA program implementation, the rate of corporal punishment decreased by 47% from 2011–12 to 2012–13 and another 52% from 2012–13 to 2013–14. After PA implementation finished, the corporal punishment rate increased by 26% from 2013–14 to 2014–15 (Public Schools of North Carolina, 2011, 2012, 2013, 2014, 2015, 2016).

Table 2

Summary of NC-YVPC Youth Violence Prevention Initiative Results

Program	Results
Teen Court	<ul style="list-style-type: none"> • Improvements for defendants: Decreases in delinquent friends, aggression, and violent behavior; increases in self-esteem, school satisfaction, and future optimism • Improvements for volunteers: Increases in public speaking, self-esteem, pride, positive relationships • Recidivism rate: 12-month rate = 10% (typical juvenile justice 12-month rate = 26%) • Costs analysis: \$625 for TC vs. \$2,000 for juvenile justice for each adolescent • Robeson County 2010–2014 reductions in adolescent crime <ul style="list-style-type: none"> ◦ Short-term suspensions: –12% ◦ School-based offenses: –10% ◦ Non-school-based offenses: –47% ◦ Undisciplined and delinquent complaints: –31% ◦ Assaults: –18% ◦ Corporal punishment: –81%
Parenting Wisely	<ul style="list-style-type: none"> • Decreases in adolescent aggression, violence, and parent–adolescent conflict • Increases in parenting efficacy and family problem solving • Maintenance at 6 months is encouraging
Positive Action	<ul style="list-style-type: none"> • Increases in self-esteem • Decreases in school hassles • PA mediation by school hassles on alcohol use, aggression, depression, and anxiety
County-level change	<ul style="list-style-type: none"> • 7% decrease in juvenile arrest • 18% decrease in arrest for aggravated assault • 47% decrease in non-school-based offenses • 31% decrease in delinquent complaints • 29% decrease in delinquent complaints

Note. NC-YVPC = North Carolina Youth Violence Prevention Center; PA = Positive Action; TC = Teen Court.

Parenting Wisely results (see Table 2). Compared to the no-treatment group, parents who participated in PW reported increases in confidence in parenting skills (standardized effect $\beta = 0.30, p = 0.004$) and decreases in parent–adolescent conflict ($\beta = -0.30, p = 0.001$), as well as decreases in adolescent aggression ($\beta = -0.27, p = 0.001$) and violent behaviors ($\beta = -0.22, p = 0.008$) between pretest and 6-month follow-up (Stalker et al., 2018).

In-person group delivery with parents and adolescents together was the most effective implementation format. However, our analyses at 6-month follow-up

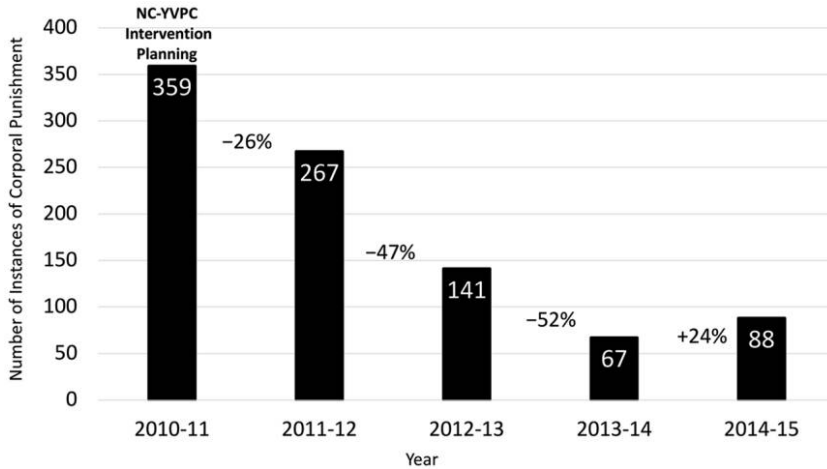


Figure 2. Corporal punishment in Robeson County, NC. There were 359 instances of corporal punishment in 2010–11, which decreased by 81% to 67 instances in 2013–14. NC-YVPC = North Carolina Youth Violence Prevention Center.

showed that PW effects did not significantly vary by delivery format except for the brief workshop format, which was less effective compared to other formats (Cotter et al., 2013; Stalker et al., 2018).

Teen Court results (see Table 2). Relative to participants in both comparison counties (Robeson County youths who received PA and Columbus County youths who received no intervention), participants who successfully completed TC reported significant decreases in internalizing symptoms ($t = -2.67, p = 0.008$, neighboring county; $t = -2.85, p = 0.004$, same county); aggression ($t = -2.93, p = 0.003$, neighboring county; $t = -2.07, p = 0.04$, same county); and parent–adolescent conflict ($t = -2.66, p = 0.008$, neighboring county; $t = -2.77, p = 0.006$, same county); as well as a significant increase in school satisfaction ($t = 3.23, p = 0.001$, neighboring county; $t = 2.31, p = 0.022$, same county). Compared to the Columbus County no-intervention group, TC participants reported significant decreases in delinquent friends, violent behavior, and school hassles, as well as significant increases in self-esteem (Evans et al., 2016; Smokowski et al., 2016). TC caregivers reported significant decreases in parent–adolescent conflict ($t = 7.35, p < 0.001$), adolescent violence ($t = 7.36, p < 0.001$), adolescent aggression ($t = 9.52, p < 0.001$), and adolescent delinquency ($t = 8.03, p < 0.001$) from pretest to posttest, providing further support for adolescent reports (Evans et al., 2016).

County-level results (see Table 2). The intervention county displayed a reduction in some county-level indicators of youth problem behavior during the intervention period. From 2010 to 2014, the number of acts of crime and violence at school increased by 25% in Robeson County, but these acts decreased by 11% to 27% in other

rural and urban counties. Juvenile arrests for all offenses decreased by 7% in Robeson County from 2010 to 2014. At the same time, Robeson County juvenile arrests for aggravated assault decreased by 18%, and juvenile arrests for nonaggravated assaults decreased by 2%. The number of long-term suspensions for school infractions decreased by 9% in Robeson County schools between 2010 and 2014, and the number of short-term suspensions decreased by 12% during that time as well.

Non-school-based offenses decreased by 47% in Robeson County from 2010 to 2014—a much larger reduction compared to all other rural and urban counties in North Carolina. By comparison, non-school-based offenses increased by 20% in Columbus County. In Robeson County, undisciplined/delinquent complaints decreased by 31%, and total delinquent complaints decreased by 29%; these reductions were the largest for all counties in North Carolina. Rates in other counties increased or did not significantly change (Smokowski et al., 2017).

We analyzed the county-level trajectories for all 100 counties in North Carolina using an interrupted time series design and linear growth curve modeling to examine changes in county-level indicators of youth violence. The downward trends of non-school-based offenses, undisciplined/delinquent complaints, and total delinquent complaints were not reinforced by statistically significant differences in trajectories between Robeson and other comparison counties over the extended period from 2004–2014. Results indicated downward trends for the intervention county on several county-level indicators (i.e., undisciplined/delinquent complaints, total delinquent complaints, juvenile arrests–aggravated assaults, and short-term suspensions) throughout the intervention period. However, statistical tests were unable to confirm that intervention-period scores on youth violence indicators were significantly different than expected scores given the relationship between pretest and intervention-period scores in other North Carolina counties. This may be an issue related to statistical power. Despite extended baseline data, sophisticated modeling, and coverage across the entire state, this remains an analysis of one intervention county versus 99 comparison counties, yielding little power to determine statistically significant change (Smokowski et al., 2017).

Discussion

The public health relevance and impact of this study are illustrated by the multiple, diverse effects our prevention initiative had on adolescents, parents, and school climate—including the use of corporal punishment—as well as county youth violence indicators. We improved public health practices in Robeson County's longstanding rural health department by introducing violence prevention programs, implementation processes, and longitudinal evaluation strategies. The collaborating health department had no experience with violence prevention and considered it outside of its family-life education and nutrition purview. We expanded its purview with violence prevention programming and introduced a systematic process (i.e., the Com-

munities That Care model; Hawkins & Catalano, 2005) to bring many stakeholders together to work on Robeson County's violence issues, using evidence and multi-agency relationships.

We enhanced public health practice by "scaling up" our efforts to treat violence as a public health problem with the target for change being multiple ecological levels, including an entire county, schools, families, and individual adolescents. We also strengthened public health practice by integrating implementation science, closely monitoring program fidelity, and testing whether different program delivery styles and dosages were more effective than others (Cotter et al., 2013; Smokowski et al., 2016; Stalker et al., 2018). Our results showed that parenting programs that provided parents and adolescents time to practice skills and work together on relationship problems were optimal. Results also indicated that the PA program took 3 years of high-dosage lesson implementation to garner significant effects.

More specifically, the findings from PA indicated that the program was associated with increases in self-esteem and decreases in school hassles. These findings suggest that improving school climate through PA can benefit student behavioral health. In terms of the use of corporal punishment in schools, North Carolina is one of the few states that still allows corporal punishment as a school disciplinary response, and Robeson County is among the top users of this strategy. NC-YVPC staff strongly advocated for discontinuing corporal punishment practices. Investment in the PA program stressed "treating each other the way that you would like to be treated," and school teachers, staff, and administrators became role models for this PA philosophy. Traditionally, corporal punishment is used in just a few schools. We do not claim that the PA program is fully responsible for the 81% decrease in corporal punishment from 2010 to 2014; however, no other program in the schools was working to decrease disciplinary problems and bolster a positive school climate. PA sought to change the school climate with reduced school hassles, thereby reducing disciplinary problems. When problems occurred, disciplinary cases could be referred to TC instead of using corporal punishment.

In regard to PW, the NC-YVPC study examined longer term effects of PW on family, parenting, and adolescent behavior in a racially diverse, rural sample. Past research on PW has not assessed program maintenance over time. Our findings suggest that although PW offers flexibility in terms of delivery format, practitioners should implement the program with adequate time, activities, and interactions with staff to allow for new skills to develop. Overall, PW has the potential to improve family functioning, which benefits adolescent development and functioning across ecological levels.

We also introduced the TC program into the public health arena. The intervention was not welcomed by CDC project officers, who saw TC as a juvenile-justice intervention with little relevance to public health outcomes. However, TC proved to be our most effective program. Moreover, we developed an evidence-based model

of TC (i.e., a TC model that incorporates evidence-based practices through sanction options), which combined the restorative justice practices that are typically aligned with this program with supplementary evidence-based services that adolescent offenders are referred to as part of their mandatory sanctions (i.e., Botvin's Life Skills Training, Making Good Decisions workshops, anger management training). Our study showed that TC can serve both as an effective juvenile-justice diversion program and as a crucible to link community agencies, forming a cohesive network of public health services for high-risk adolescents and their families. Moreover, in addition to benefitting defendants, TC provides substantial benefits for court volunteers (e.g., increased confidence, improved public speaking ability).

Participation in TC was associated with improvement across adolescents' ecology, including better mental health functioning, more positive school experiences, and improved relationships with parents and peers. Findings highlight the importance of conducting research on how TC improves youths' lives beyond recidivism. The TC recidivism rate at 12-month follow-up was 10.26%, compared to a typical juvenile-justice 12-month recidivism rate of 26%. The cost analysis was roughly 1:3.2—\$625 for TC versus \$2,000 for the juvenile-justice system to serve each defendant. Consequently, TC proved to be effective in enhancing adolescent mental health, social relationships, and school experiences, had lower recidivism, and was more cost effective than juvenile-justice system involvement (Evans et al., 2016; Smokowski, Rose, et al., 2017a; Smokowski et al., in press).

In terms of the county-level findings, we believe that reporting issues explain the rise in acts of crime and violence at Robeson County schools. Before NC-YVPC's community-based TC program, school principals had to refer offenders to juvenile court counselors. This was counted against schools on their report cards, creating a bias to not report. After TC began to receive many referrals from schools diverting offenders away from the juvenile-justice system, this reporting bias was no longer necessary. Consequently, the rate of crime and violence in schools rose in Robeson County even though fewer of those cases were going to juvenile court. This is further corroborated by the fact that the official reports of school-based offenses for Robeson County reported by juvenile-justice counselors decreased by approximately 10%, suggesting that NC-YVPC TC staff helped Robeson County school staff become more sensitive to chronicling incidents of crime and violence and deciding to refer cases to TC rather than to the juvenile courts.

During the study period, the rates of juvenile arrests decreased in Robeson County, Columbus County (our comparison county), and other rural and urban counties. Some decreases in other counties exceeded those in Robeson County, which is difficult to explain because we do not have a full accounting of youth violence prevention strategies implemented throughout North Carolina. However, it is important to note that the base rates for county-level indicators were almost always significantly higher in Robeson County than in other counties. That means

Robeson County had to reduce more cases to achieve the same percentage reduction relative to other counties with lower base rates. For example, Robeson started with 6,000 short-term suspensions in 2010, making it necessary to reduce that number by 600 cases to achieve a 10% decrease. Urban schools in North Carolina started with 2,985 short-term suspensions in 2010, only needing 298 fewer to register a 10% reduction. Consequently, schools with fewer problems had less work to do to achieve an equivalent percentage decrease, and there were many more urban schools across the state to distribute this reduction across relative to the specific targeted schools in Robeson County. Finally, non-school-based offenses decreased in Robeson County from 2010–2014. These reductions are encouraging, and the data highlight school-based changes that can be attributed to the universal PA program and community-based reductions in infractions that can be explained by the NC-YVPC TC program implementation.

Limitations

Despite the strengths of this study, a few limitations should be noted. First, although it would have been ideal to randomly assign participants to PA, PW, and TC, this was not feasible. We used propensity score analysis to combat this limitation. Second, due to limitations of time and space, participants filled out self-report surveys while others were present; it would have been ideal to provide a private area to avoid participants being impacted by the presence of their peers, but NC-YVPC staff closely monitored data collection to ensure privacy. Third, data were primarily self-reported, which is subject to social desirability bias as respondents want to present themselves in the best light possible (R. J. Fisher, 1993). However, use of self-report data allowed us to collect data from a large sample of adolescents on areas that are difficult to assess, such as relational aggression and future optimism, providing a unique window into youths' experiences and perceptions (Eckert, Dunn, Guiney, & Codding, 2000). Finally, given the unique milieu in which data were collected, findings should be generalized cautiously.

Conclusion

Overall, the efforts of this university–community partnership were associated with a 47% reduction in non-school-based offenses, a 31% reduction in undisciplined/delinquent complaints, and an 81% reduction in the use of corporal punishment, along with smaller reductions in school-based offenses, short-term suspensions, and assaults. These positive results show that university–community partnerships can “scale up” to positively affect youth violence on a community level (a large, rural county in this case) using an integrated package of evidence-based programs. Community members and partnering organizations played key roles in sponsoring the evidence-based programs (i.e., the school system implemented PA, community agencies hosted PW, volunteers made TC function) and sustaining the efforts be-

yond the grant period. University staff monitored implementation fidelity, provided continuous quality improvement feedback, and evaluated results. Diverse results at different ecological levels (see Table 2) attest to both the power of prevention and progress that university–community partnerships can make in addressing youth violence as a shared goal.

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