Youth & Society

Testing the Nurturing Environments Framework on Youth Violence across Ethnically and Geographically Diverse Urban and Rural Samples of Adolescents

Journal:	*Youth & Society*
Manuscript ID	Y&S-19-0012.R2
Manuscript Type:	Review
Keywords:	Aggressive Behavior/Bullying, Neighborhood Context, Violent Behavior

Abstract:	Although research advocates for comprehensive cross sector youth violence prevention efforts, mobilizing across sectors to translate scientific recommendations into practice has proven challenging. A unifying framework may provide a foundational step towards building a shared understanding of the risk and protective factors that impact youth violence. We conducted two empirical tests of the nurturing environment framework on youth violence across ethnic and geographically diverse rural and urban adolescent samples. Results show that overall the characteristics of nurturing environments are associated with lower levels of aggression and violence. Additionally, minimizing exposure to socially toxic conditions had the strongest associations with lower aggression and violence. Findings were supported across both samples, suggesting this framework may apply in urban and rural, economically disadvantaged contexts.

Introduction

A primary call to youth violence prevention researchers and practitioners is the interdisciplinary and coordinated implementation of comprehensive public health approaches to reduce risk factors and promote protective factors across all levels of the social ecology (Fagan & Catalano, 2013; Jenson & Fraser, 2011; Mercy & Vivolo-Kantor, 2016; National Academies of Science, Engineering and Medicine, 2019; Ridgeway, 2014). Such approaches: (1) are developmental (i.e., birth to young adulthood), (2) address varying levels of risk (i.e., universal, selective, indicated), (3) align evidence-based preventive interventions across multiple social contexts, and (4) recognize social contexts (e.g., family, school, community) may have differential effects depending on age (National Academies of Science, Engineering and Medicine, 2019; National Research Council and Institute of Medicine of the National Academies, 2009).

Mobilizing across disciplines to implement and sustain comprehensive evidence-based preventive interventions is an ongoing challenge. No single infrastructure handles mental health, substance abuse, juvenile justice, education, and child welfare services. Diverse and separate systems, agencies, and organizations across federal, state, local, and non-profit sectors provide these services making cross sector coordination difficult. A unifying prevention framework may be a foundational step towards building a shared understanding of prevention science that could ignite the collective action needed to build and sustain comprehensive cross sector violence prevention efforts. This paper provides two empirical tests of a unifying nurturing environment framework (Biglan, 2015; Biglan, Flay, & Sandler, 2012) on youth violence across ethnic and geographically diverse urban and rural adolescent samples. The nurturing environment framework could support strategic alignment across disciplines and sectors to implement and sustain programs, practices, and policies that result in population-level reductions in violence.

Nurturing Environments: An Integrated Framework for Organizing Risk and Protective Factors

Fundamental to the idea of forming an integrated framework is the finding across multiple literature reviews that the same risk and protective factors affect multiple forms of violence and problem behaviors (Biglan, 2015; Jenson & Fraser, 2011; Jessor & Turbin, 2014; Wilkins, Tsao, Hertz, Davis, & Klevins, 2014). Given that similar social processes contribute to the development of different types of problem behaviors (e.g., violence, substance use, truancy, school dropout, mental health issues), the lack of nurturing environments has been explored

as a possible underlying social condition that contributes to patterns of problem behavior, including violence (Biglan, 2015; Biglan et al., 2012).

The nurturing environment framework organizes research and practice efforts to focus on key malleable behavioral influences across multiple social contexts (e.g., family, peer school, community). Recognizing that youth struggle to develop protective factors in the face of high levels of risk behavior (Herrenkohl, Hill, Chung, Abbott, & Hawkins, 2003; Pollard, Hawkins, & Arthur, 1999), the nurturing environment framework focuses on both reducing risk conditions and increasing protection. Its main hypothesis states that youth develop patterns of problem behaviors when their environments fail to nurture them. In contrast, youth become prosocial members of society when they live in environments that nurture their prosocial skills. Biglan and colleagues identify four categories of nurturing environments.

Category 1. Nurturing environments promote and reinforce prosocial behavior. Nurturing environments provide access to protective factors, such as role models, opportunities, supports and recognition for prosocial behavior (Jessor & Turbin, 2014; Kim, Oesterle, Catalano, & Hawkins, 2015; Lerner & Benson, 2003). These processes operate in similar ways across multiple social contexts, with higher levels of exposure to environments that promote and reinforce prosocial behavior leading to lower levels of violence and other problem behaviors. For example, supportive parents who promote education and foster strong family bonds create a nurturing family environment that positively impacts adolescent behavior. Indeed, research suggests that parent nurturance, a protective factor characterized by support, is associated with decreased aggression (Arim, Dahinten, Marshall, & Shapka, 2011). Conversely, a comprehensive review found that low parental attachment was significantly associated with increased violence (Savage, 2014). Further, high family functioning, marked by family cohesion, problem solving, parent involvement, and positive parenting, was significantly associated with decreased aggression over time (Kramer-Kuhn & Farrell, 2016).

Category 2. Nurturing environments minimize socially and biologically toxic conditions. The Adverse Childhood Experiences research links aversive events and conditions to risky health behaviors, chronic health conditions, and early death (Anda et al., 2006; Brown et al., 2009). Furthermore, adverse childhood experiences have been found to be negatively associated with measures of life potential, such as adult education, employment, and income potential (Metzle, Merrick, Klevens, Ports, & Ford, 2017). Adverse experiences in childhood include

abuse and neglect, substance abuse and mental illness in the household, parental separation, childhood homelessness, and incarceration of a household member.

Socially toxic conditions may also occur at school. Experiencing victimization at school erodes students' sense of safety, well-being, potential, and achievement and limits the development of supportive, trusting relationships between students and adults in the school community (Espelage, Low, & Jimerson, 2014; Loukas & Pasch, 2013). School victimization is also associated with increased aggression (Smokowski et al., 2016a).

Coercive social interactions contribute to socially toxic conditions (Biglan, 2016). Coercion involves using aversive behavior to influence another's behavior and can be experienced within the family, peer, school, and community levels of the social ecology. Youth in these situations may view their daily experiences as a continuous pattern of coercion that can only be overcome by additional coercive force, and these behaviors tend to escalate over time (Dishion & Patterson, 2006). To counter this coercive cycle, attention must be given to reducing toxic conditions and strengthening protective factors that limit the damage done by coercive interactions.

Category 3. Nurturing environments monitor and set limits on influences and opportunities to engage in problem behavior. Adolescent exposure to problem behavior models (e.g., family, peer) influences the likelihood of problem behavior (Jessor & Turbin, 2014). Minimizing adolescents' exposure to negative peer and family influences can protect them from negative developmental outcomes. Nurturing environments at home, school, and in the community include adults or other caregivers who monitor children and provide appropriate sanctions for problem behavior (Sampson, 1997).

Social environments vary in the level and type of opportunities they provide for problem behavior (Cloward & Ohlin, 1960; Hawkins & Catalano, 2005; Lerner & Benson, 2003). For example, neighborhoods with lower levels of parental monitoring are likely to have a higher number of delinquent peer groups and normative structures that are favorable to violence (Cloward & Ohlin, 1960). Research shows that having delinquent friends is associated with increased aggressive behavior (Biglan, Brennan, Foster, & Holder, 2004; Elliott, Huizinga, & Ageton, 1985) and shielding youth from delinquent peers relates to lower levels of delinquency and problem behavior (Biglan et al., 2004; Elliott et al., 1985; Espelage, Low, & Jimerson, 2003; Ferguson, San Miguel, & Hartley, 2009).

Monitoring and setting limits on influences and opportunities to engage in problem behavior is important in all social contexts, although research suggests the impact may be stronger in high risk settings. For example,

parental monitoring (e.g., knowing where adolescents are and who they are with) provides protection in all contexts, but is particularly salient for decreasing violence and aggression in high risk conditions (Cutrin, Gomez-Fraguela, Maneiro, & Sobral, 2017). Conversely, youth who reported low levels of parental monitoring had aggression scores almost three times higher than youth with high levels of parental monitoring (Orpinas, Murray, & Kelder, 1999).

Category 4. Nurturing environments promote mindful psychological flexibility in the pursuit of prosocial values. Psychological flexibility involves: (1) being clear about our deepest values and authentic passions, (2) staying mindful of our thoughts and feelings, and (3) acting in alignment with our values and passions even when our thoughts and feelings discourage us from taking valued action (Biglan, 2015; Biglan et al., 2012). Findings from clinical psychology show that as individuals increase their psychological flexibility, their mental and behavioral health problems diminish (Baer, 2003; Biglan, Hayes, & Pistorello, 2008; Brown & Ryan, 2003).

Although research on protective factors linked to psychological flexibility in adolescents remains limited, related protective factors in the areas of religiosity and future optimism suggest this aspect of nurturing environments supports healthy adolescent development. For example, youth participation in religious activities (George, Larson, Koenig, & McCullough, 2000; Herrenkohl et al., 2003; Mercado-Crespo, 2013) and a belief in the importance of religion were associated with decreased aggression and violence (Leach, Berman, & Eubanks, 2008; Mercado-Crespo, 2013; Smokwoski et al., 2016a). Optimism about the future is also a protective factor for youth associated with decreased teacher and self-reports of aggression (Polgar & Auslander, 2009; Smokowski, Evans, Cotter, & Webber, 2014). Religious importance and involvement, and future optimism may foster psychological processes that enable youth to maintain their prosocial values even in challenging internal and external circumstances.

Current Study

In this study, we test the impact of the nurturing environment framework on youth violence across two samples with diverse geographic contexts – Study 1: urban Colorado and Study 2: rural North Carolina. We hypothesize the following:

1. The four key categories of nurturing environments will be associated with lower levels of aggression and violence.
2. The relationships between the four key categories in the Biglan model and violence outcomes will be similar across both the urban Colorado and rural North Carolina samples.

Methods – Study 1: Urban Colorado

Procedure

The Center for the Study and Prevention of Violence at the University of Colorado Boulder collected survey data from randomly selected, repeated cross-sectional samples of youth ages 10-17 from two high-risk neighborhoods in Colorado in 2013 and 2016. Both communities were urban and socioeconomically disadvantaged with high rates of youth violence.

For each neighborhood, a complete list of households was created and an independent random systematic sample of households was drawn using fractional zone sizes, resulting in an equal probability of selection for each household in a neighborhood. All youth aged 10-17 within the household were the eligible respondents for the survey. Surveys were administered through face-to-face interviews and used to determine initial levels and change in rates of violence, other problem behaviors, and prosocial behaviors, as well as attitudes, values, and beliefs among youth residing in these neighborhoods. The current analyses used data from the 2016 post intervention community survey because more measures aligned to Biglan's nurturing environment categories. For the analyses, data from participants were collapsed within sites for both intervention and comparison neighborhoods. Analyses testing for differences between the two urban neighborhoods showed no significant differences in the outcomes and only a few significant effects of predictors that were not in a consistent direction across the neighborhoods. Intervention effects are described in detail elsewhere (Kingston, Huizinga, Sigel, & Mattson, 2016) and are beyond the scope of the current analyses.

Participants

The Colorado sample contained 752 interviews from randomly selected youth (50% of identified eligible youth) in Grades 3 through 12, ranging in age from 10 to 17 (M = 13, SD = 2.2).

<INSERT TABLE 1 ABOUT HERE>

Measures

The Colorado project developed a 769-item youth community survey with 55 scales. For the current study, nine risk and protective factor constructs operationalized the four nurturing environment categories and researchers chose nine scales from the youth community survey that most closely measured each construct. A high scale score indicated a nurturing environment that is supportive of positive outcomes.

Demographics. Demographic data included age, gender, and race/ethnicity. Race included dummy-coded variables for non-Hispanic Black, mixed race, and other, with Hispanic/Latino as the reference group.

Three constructs (*parental support*, *school support*, and *parental attachment*) measured Category 1 Promoting and Reinforcing Prosocial Behavior. The 3 item Family Recognition for Prosocial Behavior (Glaser et al., 2009) measured parental support (e.g., When you have done something your parents like how often do your parents say something nice about it?; α = .87) and the 6 item Parents Encourage Prosocial Behavior at School Scale (Elliott, 2000) measured school support (e.g., At least one of my parents comes to activities at my school; α = .76). The 7-item Parental Attachment Scale (Johnson, 2004) assessed parental attachment (e.g., You can talk with your parents about anything; α = .80)

For Category 2, Minimizing Socially and Biologically Toxic Conditions, three constructs (*delinquent peers*, *perceptions of school safety*, and *school conflict and hassles*) measured socially toxic conditions. The 18 item Perceptions of Peer Antisocial Behavior Scale (Johnson, 2004) measured delinquent peers (e.g., friend purposely damaged or destroyed property that did not belong to them;α = .90). The 3 item School Safety Scale (Mattson & Kingston, 2018) measured perceptions of school safety (e.g., During the past 30 days, on how many days did you not go to school because you felt you would be unsafe; α = .65). The 4 item School Conflict Scale (Huizinga, 2003) measured school conflict and hassles (e.g., kids are always getting beaten up at my school; α = .94). Measures of biologically toxic conditions were unavailable.

Parental monitoring was the only construct identified in Category 3, Monitoring and Limit Setting. The 10 item Parental Monitoring Scale (Johnson, 2004) measured parental monitoring (e.g., Do your parents know who you are with when you are away from home? ;α = .67). Two constructs (*future optimism* and *religiosity*) measured Category 4, Promoting Mindful Flexibility in the Pursuit of Prosocial Values. The 5 item Perceived Future Opportunity Scale (Johnson, 2004) measured future optimism (e.g., There isn't much chance that a kid from your neighborhood will ever get ahead; α = .73). The four item Religiosity Scale (Johnson, 2004) assessed religiosity (e.g., To what extent do you think of yourself as a religious person; α = .66).

The five-item Strengths and Difficulties Questionnaire (Goodman, 1997) measured *Aggressive and problem behaviors*; these items inquire about the frequency of engaging in and being a victim of aggressive behaviors over the last six months (e.g., I often bully or am mean to others; add a problem behavior example). The six-item Denver Youth Survey Self-Report Delinquency Scale assessed *Violence related behaviors* (e.g., How many

times have you attacked someone with a weapon, used a weapon, force, or strong arm methods to get money or things from people?; Huizinga, Weiher, Espiritu, & Esbensen, 2003). Because linear regression models for the skewed continuous measures would be affected by heteroscedasticity, these measures were dichotomized and logistic regression models were estimated.

Data Analyses

Table 2 presents the key results for testing the hypotheses, listing the logistic regression odds ratios (OR) and confidence intervals for each of the 9 risk and protective factor measures by each of the two outcomes. Each OR comes from a separate model that includes controls for the demographic covariates of age, sex, and race/ethnicity. Given extremely high scores for a small part of the sample, the outcomes are right skewed. Because use of linear regression models for the skewed continuous measures would violate several underlying assumptions, these measures were dichotomized and logistic regression models were estimated. The reliance on OR coefficients allows for straightforward interpretations across multiple independent and dependent variables. Along with examining the significance of the associations, we examine the size of the associations. Given the different scale units across the many measures, we computed OR's for a one standard deviation increase in each of the protective factors. When transforming the predictors into the same standard deviation units, the coefficients for the diverse risk and protective factors can be more meaningfully compared. We present standard tests of significants, but the results change little when adjusting for multiple testing using the Benjamini and Hochberg (1995) procedure.

<INSERT TABLE 2 ABOUT HERE>

Results – Study 1: Urban Colorado

Hypothesis 1 predicts that the four key categories of nurturing environments will be associated with lower levels of violence and aggressive or other problem behaviors. The results in Table 2 generally support this hypothesis, with 67% (12 out of 18) of the relationships between the nine independent variables and three dependent variables demonstrating statistically significant effects. First, the two measures of promoting and reinforcing prosocial behavior (Biglan Category 1) are consistently associated with lower aggressive and other problem behavior and violence related behavior. Second, the measures of minimizing toxic conditions (Biglan Category 2) are consistently negatively associated with more aggressive or other problem behavior. The measure of school safety was not associated with the outcomes, but the other two measures show a clear pattern of benefit. Third, parental monitoring (Biglan Category 3) is consistently and negatively associated with aggressive and other problem

behaviors and violence related behavior. Fourth, future optimism (Biglan Category 4) is significantly associated with all outcomes. However, religiosity was not significantly associated with any of the outcomes.

Table 2 also lists the odds ratios (OR) for a standard unit change in the risk and protective factors (e.g., a one standard deviation change rather than a one unit change in the original metric) to allow for more direct comparisons across the scales. Table 2 shows that minimizing toxic conditions (Category 2) has the strongest associations with aggressive or other problem and violence related behavior. For example, a one standard deviation increase in having low perceptions of delinquent peers (OR = .50) reduces the odds of violence related behavior by 50%. Other Biglan Categories have more modest associations than for minimizing toxic conditions (Category 2). A similarly strong association with violence related behavior is observed in having low school conflict and hassles (OR = .61). A one standard deviation increase in having few school conflicts and hassles reduces the odds of violence related behavior by 39%. The next strongest association is found in Biglan Category 1 promoting and reinforcing prosocial behavior. Parental attachment has an OR of .63 and shows a 37% lower odds of aggressive or other problem behavior. Other Biglan Categories have more modest associations. For example, a one standard deviation increase in parental monitoring (Category 3) is associated with an OR of .69 and 31% lower odds of violence related behavior and a one standard deviation increase in future optimism (Category 4) is associated with an OR of .71 and 29% lower odds of aggressive and other problem behavior.

Next, we provide a second test of the nurturing environment framework on youth violence in a sample from rural North Carolina. We then compare results from Colorado and rural North Carolina to examine whether the relationships between the four key categories in the nurturing environment framework are similar across the diverse geographic contexts.

Methods – Study 2: Rural North Carolina

Procedure

The North Carolina Youth Violence Prevention Center project was a 6-year longitudinal panel study (2010-2015) of more than 7,000 middle- and high-school students from two rural, economically disadvantaged counties in North Carolina. In Year 1 of the North Carolina study, a complete census of all middle school students (Grades 6 through 8) was taken from County 1. Each year the new sixth grade class was added to the sample. Because County 2 was larger in both geography and student population, a random sample of 40% of the middle school students was taken in Year 1 and each year a random sample of 500 sixth graders was added to the sample. Both counties were

rural and socioeconomically disadvantaged with high rates of youth violence and low educational attainment. Students from both counties were tracked longitudinally through middle- and high-school so that by Year 5 the sample was comprised of youth from Grades 6 through 12.

Youth in the North Carolina study filled out a comprehensive survey that assessed perceptions of family, friends, school, self, health, and wellbeing in addition to aggressive and violent behavior. The current analyses used cross-sectional data from Year 5 to best parallel the cross-sectional data collection conducted in the Colorado sample. For the current analyses, data from participants were collapsed within sites for both intervention and comparison counties. Intervention effects are described in detail elsewhere (Smokowski et al., 2016a; Smokowski et al., 2017) and are beyond the scope of the current analyses.

Participants

The North Carolina sample contained 7,102 participants (a response rate of 79%) in Grades 6 through 12, ranging in age from 11 to 19 (M = 15, SD = 2.00).

<INSERT TABLE 3 ABOUT HERE>

Measures

The North Carolina study used a modified version of the School Success Profile (SSP; Bowen & Richman, 2008), a 195-item youth self-report with 22 scales that measured risk and protective factors, and aggressive and violent behavior. The modified version of the SSP, the SSP Plus (SSP+), contained 17 of the original SSP scales, plus 14 additional scales resulting in 267 items (see Evans & Smokowski, 2015; Smokowski et al., 2014; Smokowski et al., 2016a; see Smokowski et al., 2016b for additional information on the SSP+).

In order to replicate the Colorado study, North Carolina researchers identified eight comparable scales and two-single items to measure the nine risk and protective factor constructs Colorado researchers used to operationalize the nurturing environment categories. High scale scores indicated a nurturing environment supportive of positive outcomes.

Demographics. Demographic variables included: age, gender, and race/ethnicity. Race included dummy-coded variables for non-Hispanic Black, mixed race, and other, with Hispanic/Latino as the reference group.

Three constructs (*parental support*, *school support*, and *parental attachment*), measured Category 1 Promoting and Reinforcing Prosocial Behavior. The five-item Parent Support Scale (Bowen & Richman, 2008) measured parent support (e.g., Adults at home… make you feel appreciated; α = .95) and the six-item Parent

Education Support Scale (Bowen & Richman, 2008) measured school support (e.g., Adults at home encourage you to do well in school; α = .90). The six-item Strong Family Bonds Scale (Gil, Wagner, & Vega, 2000) assessed parental attachment (e.g., You and your family members trust and confide in each other; α = .95).

For Category 2, Minimizing Socially and Biologically Toxic Conditions, three constructs (*delinquent peers*, *perceptions of school safety*, and *school conflict and hassles*) measured socially toxic conditions. The nine- item Delinquent Friends Scale (Bowen & Richman, 2008) measured delinquent peers (e.g., I have friends who get in trouble with the police; α = .92). The 11-item School Safety Scale (Bowen & Richman, 2008) measured perceptions of school safety (e.g., Fights among students; α = .91). The four-item School Hassles Scale (Bowen & Richman, 2008; Solberg & Olweus, 2003) measured school conflict and hassles (e.g., Someone at school told lies or spread rumors about me; α = .94). Biologically toxic condition measures were unavailable.

Parental monitoring was the only construct identified in the Category 3, Monitoring and Limit Setting. North Carolina used two single-item measures to assess parental monitoring (Is there an adult in your home who knows where you are when you are not at home or in school? Do the adults in your home know most of your friends). Two constructs (*future optimism* and *religiosity*) measured Category 4, Promoting Mindful Flexibility in the Pursuit of Prosocial Values. The 12 item Future Optimism Scale (Bowen & Richman, 2008) measured future optimism (e.g., When I think about my future, I feel very positive; α = .73). The three-item Religious Orientation Scale (Bowen & Richman, 2008) measured Religiosity (e.g., Religion plays an important role in my daily life; α = .93).

The 12-item Aggression Scale (Achenbach & Rescoria, 2001) assessed *Aggressive and problem behaviors*; these items inquire about the frequency of engaging in aggressive behaviors over the past six months (e.g., I get in many fights). *Violence related behaviors* were measured with the 13-item North Carolina-Academic Center of Excellence Violent Behavior Checklist (e.g., I beat somebody up; I damaged or destroyed things that belonged to someone else; Cotter, Bacallao, Smokowski, & Robertson, 2013; Smokowski, 2011).

Data Analyses

Table 4 presents the key results for testing the hypotheses, listing the logistic regression odds ratios (OR) and confidence intervals for each of the eight scales and two items measuring the risk and protective factors by each of the two outcomes. The outcomes are dichotomized to remove the excessive influence of extreme scores and to allow for easy comparisons across models and samples. Each OR comes from a separate model that includes

controls for the demographic covariates of age, sex, and race/ethnicity. We also examine the size of the associations by computing OR's for a one standard deviation increase in each of the protective factors to provide more meaningful comparisons across the coefficients.

<INSERT TABLE 4 ABOUT HERE>

Results – Study 2: Rural North Carolina

Hypothesis 1 predicts that the four key categories of nurturing environments will be associated with lower levels of violence and aggressive or other problem behaviors. The results in Table 4 support this hypothesis, with 100% (20 out of 20) of the relationships between the ten independent variables and two dependent variables demonstrating statistically significant effects.

Table 4 also lists the odds ratios (OR) for a standard unit change in the risk and protective factors (e.g., a one standard deviation change rather than a one unit change in the original metric). Table 4 shows again that minimizing toxic conditions (Category 2) has the strongest associations with aggressive or other problem and violence related behavior. For example, a one standard deviation increase in having low school conflict or hassles (OR = .46) reduces the odds of aggressive or other problem behavior by 54%. A similarly strong association with violence related behavior is observed for low perceptions of delinquent peers (OR = .49). A one standard deviation increase in having few such peers reduces the odds of violence related behavior by 51%. The next strongest association is in Category 3 monitoring and limit setting. Parental monitoring of friends has an OR of .67 and shows a 33% lower odds of aggressive or other problem behavior. Other Biglan Categories have more modest associations. For example, a one standard deviation increase in parental attachment (Category 1) is associated with an OR of .69 and 31% lower odds of aggressive and other problem behavior and a one standard deviation increase in religiosity (Category 4) is associated with an OR of .74 and 26% lower odds of aggressive and other problem behavior.

Comparing Results – Urban Colorado and Rural North Carolina Samples

Hypothesis 2 predicts that the relationships between the nurturing environment measures and the outcome measures are similar across both the urban Colorado and rural North Carolina samples. Because the measures in the two samples are not identical, direct comparison of the coefficients and tests for statistically significant differences are not appropriate. Instead, we identify the relationships in Tables 2 and 4 that are both significant and in the expected direction for the two samples.

Overall, the results show more similarity than not. Of the 38 comparisons (nine protective factors by two outcomes in Colorado and 10 protective factors by two outcomes in North Carolina), 32 (84%) are significant and in the predicted direction. Note also that the standard unit ORs are generally similar in size across the two samples. For the outcomes, the results for the two samples are most similar for aggressive or other problem behavior and other violence related behavior. For the predictors, measures of minimizing toxic conditions show the most consistency across samples. The results for the two samples diverge most for the measure of school safety and religiosity (none of the Colorado relationships are significant).

Discussion

Biglan (2015) and colleagues' (2012) nurturing environment framework provides a helpful scheme for organizing a large volume of risk and protective factor research; however, this framework's predictive validity has never been tested. In this study, we sought to test the key assumptions and categories within the nurturing environment framework on aggression and violence. Furthermore, we tested the relationships with large, diverse samples of data from youth in different geographic locations, thus increasing confidence in the generalizability of the results.

The nurturing environment framework held up well under empirical scrutiny. Significant effects on the outcomes emerged for all four of the framework's major categories: promoting and reinforcing prosocial behavior, minimizing toxic conditions, monitoring and setting limits, and promoting mindful flexibility. Overall, this study validates our first hypothesis that the four key characteristics of nurturing environments (Biglan Categories 1-4) are associated with lower levels of violence and aggressive or other problem behaviors.

The strongest associations related to aggression and violence surfaced for measures of Biglan Category 2, minimizing exposure to toxic conditions. These results are consistent with previous research showing association with delinquent peers to be one of the strongest predictors of aggression and violence and a primary agent through which socialization at school and in the community adversely affects adolescent development (Dishion & Patterson 2006; Sampson 1992; U.S. Department of Health and Human Services, 2001). Likewise, this study shows a relationship between lower levels of coercive interactions at school and lower levels of aggression and violence related behavior.

We also observed strong associations in Biglan Category 1, promoting and reinforcing prosocial behavior. In particular, parental attachment and strong family bonds (i.e., the close loving bond between a parent and child)

were linked to lower aggression, violence, and relational aggression. These results are consistent with the emphasis that the Centers for Disease Control and Prevention (CDC) and the World Health Organization (WHO) place on safe, stable, nurturing relationships and environments (CDC, n.d.; WHO, 2009). In high-risk environments, such as those assessed for the current study in Colorado and North Carolina, implementing interventions to strengthen family cohesion and parent-adolescent attachment could be a viable means of violence prevention (see for example, Kingston, et al., 2016; Smokowski et al., 2016b for intervention evaluations from Colorado and North Carolina).

Monitoring and setting limits (Category 3) and promoting mindful flexibility (Category 4) were also related to lower levels of aggression and violence. Although our findings for Biglan Category 3 support our hypothesis, our test of this category was limited. We were only able to measure parental monitoring and the North Carolina site only had two single items to measure this construct. Future research on this category could also include measures for collective efficacy or the willingness of adults to intervene on behalf of the common good (e.g., neighbors intervening if kids are getting in trouble; Sampson 1997; Sampson, Raudenbush, & Earls, 1997). Additionally, measures promoting mindful flexibility (Category 4) were associated with decreased aggression and violence.

Overall, the relationships between the nurturing environment key characteristics and violence are similar across both the urban Colorado and rural North Carolina samples. A majority of the associations are significant and in the predicted direction for both samples suggesting that this framework may apply in both urban high-risk neighborhoods and rural, economically disadvantaged counties.

The results diverge in some areas across the two samples. The samples differed in the measure of school safety (Category 2) and religious orientation (Category 4). The North Carolina sample shows a fairly strong relationship between school safety and aggression and violence, but none of the relationships for these variables in the Colorado sample were significant. This could be related to differences in the urban and rural context or a result of differences in the way these two constructs were measured. The Colorado scale only included three items that asked directly about students' perceptions of safety. In contrast, the North Carolina scale included 11 items that assessed the degree of antisocial behaviors occurring in the school environment.

Additionally, religious orientation in the North Carolina sample was significantly associated with decreased aggression and violence; however, these relationships did not reach significance in the Colorado sample. Religion often takes a central role in the lives of rural adolescents (King, Elder, & Whitbeck, 1997), especially in the North Carolina rural area where churches are very common and attendance is expected. Salience of religion in the rural

sample might have exerted extra influence on youths' behavior and choices. Religious participation can expose youth to prosocial and health promoting behaviors and can provide them with a supportive and caring community with prosocial norms and expectations (Baier & Wright, 2001; Pope, Price, & Lillard, 2014).

Limitations and Strengths

There were measurement challenges related to operationalizing the nurturing environment framework. First, this research used data collected as part of larger research efforts and was limited to the measures included in those projects to operationalize the nurturing environment framework. The validity and reliability for the majority of scales used by both studies were well-documented, but may not fully capture the intended constructs of the Biglan categories. For example, the existing data sets did not include measures for biologically toxic conditions. Future research could benefit from refining and testing the measures for each of the four categories. Second, the measures across the two studies were similar, but not identical. Many of the measures were significant and supported the nurturing environment framework even if they were measured in slightly different ways. All measures were self-report. An inherent limitation of self-report measures is social desirability bias; respondents often answer questions in ways that present themselves in the best possible light (Fisher, 1993). The Colorado study utilized interviews while the North Carolina study used online surveys. This difference in format of self-report measures might have impacted responses; however, the larger pattern of effects is consistent and valuable.

Even with these limitations, this study had several strengths. We operationalized the four categories of the nurturing environment framework with common validated measures of risk and protective factors and provided the first stringent empirical test of the framework on three different measures related to violence. Furthermore, we tested these relationships with large, diverse samples of data from youth in very different geographic locations.

Conclusion and Policy Implications

Our results show that the four key characteristics of nurturing environments (i.e., (1) promoting prosocial behavior, (2) minimizing toxic conditions, (3) monitoring and limit setting, and (4) promoting mindful psychological flexibility) are associated with lower levels of violence and aggressive behaviors. Additionally, we found that minimizing exposure to socially toxic conditions had the strongest associations with aggression and violence. These findings are supported across two diverse samples suggesting that this framework may apply in both urban high-risk neighborhoods and rural, economically disadvantaged counties. Several policy implications follow.

First, our findings suggest that violence prevention efforts should implement effective programs, practices, and policies that reduce exposure to socially toxic conditions throughout childhood and adolescence. For example, the Nurse-Family Partnership Program provides comprehensive support to first-time high-risk mothers during their pregnancy and the first two years of the child's life and is projected to impact population level outcomes on a wide range of outcomes including violence and delinquency (Miller, 2015). Additionally, delivering social emotional learning programs in school may reduce socially toxic conditions and support prosocial behavior (Malti, Ribeaud, & Eisner, 2011; Webster-Stratton, Reid, & Hammond, 2004). Implementing strategies and programs that focus on reducing bullying and creating a positive school climate could also be critical to minimizing toxic conditions in the school environment (Elliott, 2009; Kingston et al., 2018; Nickerson, 2018).

Second, in addition to serving youth directly, reducing toxic stress and supporting the social and emotional capacity of the adults that care for children could be beneficial (Kingston & Wilensky, 2018). Adults must themselves be socially and emotionally competent in order to help youth develop their own social and emotional competencies and general well-being (Berman, Chaffee, & Sarmiento, 2018; Greenberg, Brown, & Abenavoli, 2016; Jennings & Greenberg, 2009). Policies that provide social and economic supports (e.g., Supplemental Nutrition Assistance Program, Temporary Assistance for Needy Families, job training, low-cost high quality child care) to families to reduce the burden and stress of low-income parental caregiving may be important to create nurturing environments and prevent youth violence (Centers for Disease Control and Prevention, 2019).

Third, we can strategically invest in building local prevention infrastructures that support the development and sustainability of nurturing environments in schools and communities (Bumbarger and Campbell, 2011). For example, Communities That Care (CTC) is a tested prevention service delivery system that enables a local coalition of community stakeholders to use a science-based approach to prevention and improve the behavioral health of young people (Chilenski, Frank, Summers, & Lew, 2019; Fagan, Hawkins, Catalano, & Farrington, 2019). Using the CTC system can produce enduring reductions in community-wide levels of risk factors and problem behaviors among adolescents beyond the years of supported implementation, potentially contributing to long-term public health benefits.

Finally, the nurturing environment framework can be used to support a widely shared vision of what is needed to prevent violence and promote healthy development. Just as society has mobilized to address cigarette smoking, we can marshal and expand the evidence about the value of nurturing environments so that individuals,

policymakers and major relevant organizations collectively create a movement to increase the prevalence of nurturing environments (Biglan et al., 2012). This framework could help unify and support strategic alignment across disciplines and sectors to implement comprehensive programs, practices and policies that create nurturing environments and result in population-level reductions in violence.

References

Anda, R. F., Felitti, V. J., Bremner, J. D., Walker, J. D., Whitfield, C., Perry, B. D.…Giles, W. H. (2006). The enduring effects of abuse and related adverse experiences in childhood: A convergence of evidence from neurobiology and epidemiology. *European Archives of Psychiatry and Clinical Neurosciences, 256(3), 174-186.* doi:10.1007/s00406-005-0624-4

Arim, R. G., Dahinten, V. S., Marshall, S. K., & Shapka, J. D. (2011). An Examination of the Reciprocal Relationships between Adolescents' Aggressive Behaviors and Their Perceptions of Parental Nurturance. *Journal of Youth and Adolescence, 40*(2), 207-220. doi:10.1007/s10964-009-9493-x

Baer, R. A. (2003). Mindfulness training as a clinical intervention: A conceptual and empirical review. *Clinical Psychology: Science and Practice, 10,* 125–143. doi:10.1093/clipsy.bpg015

Baier, C. J., & Wright, B. R. E. (2001). "If You Love Me, Keep My Commandments": A Meta-Analysis of The Effect of Religion On Crime. *Journal of Research in Crime and Delinquency,* 38(1): 3-21. doi: 10.1177/0022427801038001001

Benjamini, Y. & Hochberg, Y. (1995). Controlling the false discovery rate: A practical and powerful approach to multiple testing. *Journal of the Royal Statistical Society,* 57(1): 289-300.

Berman, S. Chaffee, S., & Sarmiento, J. (2018). The practice base for how we learn: Supporting students/ social, emotional, and academic development. *National Commission on Social, Emotional & Academic Development, The Aspen Institute*. https://assets.aspeninstitute.org/content/uploads/2018/03/CDE-Commission-report.pdf

Biglan, A. (2015). *The nurture effect: How the science of human behavior can improve our lives and our world*. Oakland, CA: New Harbinger Publications.

Biglan, (2016). *Coercion and public health*. In *The Oxford Handbook of Coercive Relationship Dynamics* editors Dishion, T. J. & Snyder, J. J. Oxford University Press.

Biglan, A., Brennan, P. A., Foster, S. L., & Holder, H. D. (with Miller, T. R. et al.). (2004). *Helping adolescents at risk: Prevention of multiple problem behaviors.* New York, NY: Guilford Press.

Biglan, A., Flay, B. R., Embry, D. D., & Sandler, I. N. (2012). The critical role of nurturing environments for promoting human well-being. *American Psychologist*, *67*(4), 257. doi:10.1037/a0026796

Biglan, A., Hayes, S. C., & Pistorello, J. (2008). Acceptance and commitment: Implications for prevention science.

Prevention Science, 9, 139–152. doi:10.1007/s11121-008-0099-4

Bowen, G. L., & Richman, J. M. (2008). *The school success profile*. Chapel Hill, NC: University of North Carolina.

Brown, D. W., Anda, R. F. Tiemeier, H., Felitti, V. J., Edwards, V. J., Croft, J. B., & Giles, W. H. (2009). Adverse childhood experiences and the risk of premature mortality. *American Journal of Preventative Medicine, 37*(5), 389-396. doi:10.1016/j.amepre.2009.06.021

Bumbarger, B. K., & Campbell, E. M. (2011). A state agency—university partnership for translational research and the dissemination of evidence-based prevention and intervention. *Adm Policy Mental Health,* published online September 8, 2011, DOI 10.1007/s10488-011-0372-x.

Centers for Disease Control and Prevention. (2019). *Essentials for Childhood: Creating Safe, Stable, Nurturing Relationships and Environments for all Children*. Atlanta, GA: Division of Violence Prevention, National Center for Injury Prevention and Control, CDC. https://www.cdc.gov/violenceprevention/pdf/essentials-for-childhood-framework508.pdf. Accessed September 26, 2019.

Centers for Disease Control and Prevention (CDC), (n.d.) Strategic direction for maltreatment prevention: Preventing child maltreatment through the promotion of safe, stable, and nurturing relationships between children and caregivers. Atlanta, GA. http://www.cdc.gov/violenceprevention/pdf/CM_Strategic_Direction-Long-a.pdf. Accessed on November 17, 2017.

Chilenski, S. M., Frank, J., Summers, N. & Lew, D. (2019). Public health benefits 16 years after a statewide policy change: Communities that Care in Pennsylvania. *Prevention Science, 20*(6), 947-958.

Cloward, R. L., & Ohlin. 1960. *Delinquency and Opportunity*. New York: Free Press.

Cotter, K. L., Bacallao, M., Smokowski, P. R., & Robertson, C. I. B. (2013). Parenting interventions implementation science: How delivery formats impacts the parenting wisely program. Research on Social Work Practice. Advance online publication. doi: 10.1177/1049731513490811

Crick, N. R., & Grotpeter, J. K. (1995). Relational aggression, gender, and social-psychological adjustment. *Child Development, 66*(3), 710-722. doi:10.1111/j.1467-8624.1995.tb00900.x

Cutrin, O., Gomez-Fraguela, J. A., Maneiro, L., & Sobral, J. (2017). Effects of parenting practices through deviant peers on nonviolent and violent antisocial behaviours in middle- and late-adolescence. The *European Journal of Psychology Applied to Legal Context, 9*(2), 75-82. doi:10.1016/j.ejpal.2017.02.001

Dishion, T. J., & Patterson, G. R. (2006). The development and ecology of antisocial behavior. In D. Cicchetti & D. J. Cohen (Eds.), Developmental psychopathology: Vol. 3. *Risk, disorder, and adaptation*. New York: Wiley.

Elliott, D. S. (2009). Lessons from Columbine: Effective school-based violence prevention strategies and programmes. *Journal of Children's Services*, *4*(4), 53-62.

Elliott, D. S. (2000). Safe Communities Safe Schools Survey Questionnaire. Center for the Study and Prevention of Violence. Institute of Behavioral Science, University of Colorado.

Elliott, D. S., Huizinga, D., & S. S. Ageton. (1985). *Explaining Delinquency and Drug Use.* Newbury Park, CA: Sage.

Espelage, D. L., Holt, M. K., & Henkel, R. R. (2003). Examination of peer-group contextual effects on aggression during early adolescence. *Child Development, 74*(1), 205–220. doi:10.1111/1467-8624.00531

Espelage, D. L., Low, S. K., & Jimerson, S. R. (2014). Understanding school climate, aggression, peer victimization, and bully perpetration: Contemporary science, practice, and policy. *School Psychology Quarterly*, *29*(3), 233. doi:10.1037/spq0000090

Evans, C. B. R., & Smokowski, P. R. (2015). Prosocial bystander behavior in bullying dynamics: Assessing the impact of social capital. *Journal of Youth and Adolescence, 44*(12), 289-307. doi:10.1007/s10964-015-0338-5

Fagan, A. A., Hawkins, J. D., Catalano, R. F., & Farrington, D. P. (2019). Communities That Care: Building community engagement and capacity to prevent youth behavior problems. New York: Oxford University Press.

Fagan, A. A., & Catalano, R. (2013). What works in youth violence prevention: A review of the literature. *Research on Social Work Practice 23*(2), 141-156. doi:10.1177/1049731512465899

Fisher, R. J. (1993). Social desirability bias and the validity of indirect questioning. *Journal of Consumer Research, 20,* 303-315. doi:10.1086/209351

George, L. K., Larson, D. B., Koenig, H., & McCullough, M. E. (2000). Spirituality and health: What we know, what we need to know. *Journal of Social and Clinical Psychology, 19*, 102-116. doi:10.1521/jscp.2000.19.1.102

Glaser, R. R., Horn, M. L. V., Arthur, M. W., Hawkins, J. D., & Catalano, R. F. (2005). Measurement properties of the Communities That Care® Youth Survey across demographic groups. *Journal of Quantitative Criminology*, *21*(1), 73-102.

Goodman, R. (1997). The Strengths and Difficulties Questionnaire: a research note. *Journal of child psychology and psychiatry*, *38*(5), 581-586.

Greenberg, M., Brown, J. & Abenavoli, R. (2016). Teacher stress and health effects on teachers, students, and schools. *Edna Bennett Pierce Prevention Research Center*, Pennsylvania State University. https://www.rwjf.org/content/dam/farm/ reports/issue briefs/2016/rwjf430428

Hawkins, J. D., & Catalano, R. F. (2005). *Investing in your community's youth: An introduction to the Communities That Care System*. Retrieved from http://www.communitiesthatcare.net/userfiles/files/Investing-in-Your-Community-Youth.pdf. Accessed September 26, 2019.

Herrenkohl, T. I., Hill, K. G., Chung, I. J., Abbott, R. D., & Hawkins, J. D. (2003). Protective factors against serious violent behavior in adolescence: A prospective study of aggressive children. *Social Work Research, 27(3),* 179-191. doi:10.1093/swr/27.3.179

Huizinga, D., Weiher, A. W., Espiritu, R. C., & Esbensen, F.A. (2003). Delinquency and Crime: Some Highlights From the Denver Youth Survey. In T. P. Thornberry and M. Krohn, Eds. *Taking Stock: An Overview of Findings from Contemporary Longitudinal Studies*. Plenum Press, NY.

Jennings, P. & Greenberg, M. (2009). The prosocial classroom: Teacher social and emotional competencies in relation to student and classroom outcomes. *Review of Educational Research, 79* (1), 491-525. https://doi.org/10.3102/0034654308325693

Jenson, J. M., & Fraser, M. W. (2011). *Social policy for children and families: A risk and resilience perspective* (2nd ed.). Thousand Oaks, CA: Sage Publications.

Jessor, R., & Turbin, M. S. (2014). Parsing protection and risk for problem behavior versus pro-social behavior among US and Chinese Adolescents. *Journal of Youth and Adolescence, 43*, 1037-1051. doi:10.1007/s10964-014-0130-y

Johnson, K. (2004). Reliabilities of Scales of the Denver Youth Survey – Youth Interviews Waves 1-5. A Report of the Denver Youth Survey, Institute of Behavioral Science, University of Colorado.

Kim, B. E., Oesterle, S., Catalano, R. F., & Hawkins, J. D. (2015). Change in protective factors across adolescent development. *Journal of Applied Developmental Psychology*, *40*, 26-37. doi:10.1016/j.appdev.2015.04.006

King, V., Elder, G. H., & Whitbeck, L. B. (1997). Religious involvement among rural youth: An ecological and life-course perspective. *Journal of Research on Adolescence, 7*, 431–456. doi:10.1207/s15327795jra0704_5

Kingston, B., Arredondo Mattson, S., Dymnicki, A., Spier, E., Fitzgerald, M., Shipman, K., … Elliott, D. (2018). Building Schools' Readiness to Implement a Comprehensive Approach to School Safety. *Clinical Child and Family Psychology Review 21*: 433-449.

Kingston, B., Huizinga, D., Sigel, E., Mattson, Arredondo, S. (2016). Centers for Disease Control Final Report. Unpublished report, Center for the Study and Prevention of Violence, Boulder, CO.

Kingston, B. & Wilensky R. (2018). Building Adult Social and Emotional Capacity: A Key Ingredient for Unleashing the Power of Prevention. *Journal of the Society for Social Work and Research 9*(4), 783-797.

Kramer-Kuhn, A. M., & Farrell, A. D. (2016). The promotive and protective effects of family factors in the context of peer and community risks for aggression. *Journal of Youth and Adolescence*, *45*(4), 793-811. doi:10.1007/s10964-016-0438-x

Leach, M. M., Berman, M. E., & Eubanks, L. (2008). Religious activities, religious orientation, and aggressive behavior. *Journal for the Scientific Study of Religion, 47*(2), 311-319. doi:10.1111/j.1468-5906.2008.00409.x

Lerner, R. M., & Benson, P. L. (Eds.). (2003). *Developmental assets and asset-building communities: Implications for research, policy, and practice*. New York: Kluwer Academic Publishers.

Loukas, A., & Pasch, K. E. (2013). Does School Connectedness Buffer the Impact of Peer Victimization on Early Adolescents' Subsequent Adjustment Problems? *Journal of Early Adolescence, 33*(2), 245-266. doi:10.1177/0272431611435117.

Malti, T., Ribeaud, D., & Eisner, M.P. (2011). The effectiveness of two universal preventive intervention in reducing children's externalizing behavior: A cluster randomized controlled trial. *Journal of Clinical Child & Adolescent Psychology, 40(5), 677-692.*

Mattson, Arredondo, S. & Kingston, B. (2018). School Safety Scale. Unpublished Report, Center for the Study and Prevention of Violence, Boulder, CO.

Mercado-Crespo, M.C. (2013). The role of connectedness and religious factors on bullying participation among preadolescents in Puerto Rico. Doctoral Dissertation, Department of Community and Family Health, College of Public Health, University of South Florida, Tampa, FL. http://scholarcommons.usf.edu/etd/4545.

Mercy, J. A., & Vivolo-Kantor, A. M. (2016). The Center for Disease Control and Prevention's (CDC) Youth Violence Prevention Centers: Paving the Way to Prevention. *The Journal of Primary Prevention*, *37*(2), 209-214. doi: 10.1007/s10935-016-0433-8

Metzler, M., Merrick, M.T., Klevens, J., Ports, K.A., & Ford, D.C. (2017). Adverse childhood experiences and life opportunities: Shifting the narrative. *Children and Youth Services Review, 72*, 141-149.

Miller, T. R. (2015). Projected outcomes of Nurse-Family Partnership home visitation during 1996-2013. Prevention Science, 16(6), 765-777. https://doi.org/10.1007/s11121-015-0572-9

National Academies of Science, Engineering and Medicine, (2019). Fostering Healthy Mental, Emotional, and Behavioral Development in Children and Youth: A National Agenda. Washington, D.C.: The National Academies Press. https://doi.org/10.17226/25201.

National Research Council, and Institute of Medicine of the National Academies. (2009). *Preventing mental, emotional, and behavioral disorders among young people: Progress and possibilities.* Washington, DC: The National Academies Press. Retrieved from http://www.nap.edu/download.php?record_id=12480#

Nickerson, A. (2018). Can SEL reduce school violence? *Educational Leadership, 76*(2), 46-50

Orpinas, P., Murray, N., & Kelder, S. (1999). Parental influences on studetns' aggressive behaviors and weapon carrying. *Health Education & Behavior, 26*, 774–787. doi:10.1177/109019819902600603

Polgar, M., & Auslander, W. (2009). HIV prevention for youths in foster care: Understanding future orientation and intended risk behaviors. *Journal of HIV/AIDS & Social Services, 8,* 397–413. doi:10.1080/15381500903417646

Pollard, J. A., Hawkins, J. D., & Arthur, M. W. (1999). Risk and protection: Are both necessary to understand diverse behavioral outcomes in adolescence? *Social Work Research, 23,* 145-158. doi:10.1093/swr/23.3.145

Pope, B., Price, J., & Lillard, D. R. (2014). The impact of religion on youth outcomes. *The Journal of Business Inquiry, 13*(1): 48-60.

Ridgeway, G. (2014, April 11). Comprehensive School Safety Initiative: Dear Colleague Letter Investigator-Initiated Research. http://www.nij.gov/funding/pages/fy14-dear-colleague-school-safety.aspx. Accessed on July 1, 2017.

Sampson, R. J. (1992). Family management and child development. In *Facts, Frameworks, and Forecasts: Advances in Criminological Theory Volume 3*, edited by McCord, J., 63-93. New Jersey: Transaction Publishers.

Sampson, R. J. (1997). Collective regulation of adolescent misbehavior: Validation results from eighty Chicago neighborhoods. *Journal of Adolescent Research, 12*, 227-244. doi:10.1177/0743554897122005

Sampson, R. J., Raudenbush, S. W., & Earls, F. (1997). Neighborhoods and violent crime: A multilevel study of

collective efficacy. *Science*, *277*, 918-924. doi: 10.1126/science.277.5328.918

Savage, J. (2014). The association between attachment, parental bonds and physically aggressive and violent behavior: A comprehensive review. *Aggression and Violent Behavior, 19*(2), 164-178. doi:10.1016/j.avb.2014.02.004

Smokowski, P.R., Evans, C.B.R., Cotter, K.L., & Webber. (2014). Ethnic identity and mental health in American Indian youth: Examining mediation pathways through self-esteem, and future optimism. *Journal of Youth and Adolescence, 43*(3), 343-355. doi:10.1007/s10964-013-9992-7

Smokowski, P. R., Guo, S., Rose, R., Evans, C. B. R., Cotter, K. L., & Bacallao, M. (2014). Multilevel risk factors and developmental assets for internalizing symptoms and self-esteem in disadvantaged adolescents: Modeling longitudinal trajectories from the Rural Adaptation Project. *Development and Psychopathology, 26*, 1495-1513. doi:10.1017/S0954579414001163

Smokowski, P. R., Guo, S., Evans, C. B. R., Wu, Q., Rose, R. A., Bacallao, M., & Cotter, K. L. (2016a). Risk and protective factors across multiple microsystems associated with internalizing symptoms and aggressive behavior in rural adolescents: Modeling longitudinal trajectories from the Rural Adaptation Project. *American Journal of Orthopsychiatry.* online first. doi:10.1037/ort0000163

Smokowski, P. R., Guo, S., Wu, Q., Evans, C. B. R., Cotter, K. L., & Bacallao, M. (2016b). Evaluating dosage effects for the positive action program: How implementation impacts internalizing symptoms, aggression, school hassles, and self-esteem. *American Journal of Orthopsychiatry, 86*(3), 310-322. doi:10.1037/ort0000167

Smokowski, P. R., Rose, R. A., Evans, C. B. R., Bargee, J., Cotter, K. L., & Bower, M. (2017). The impact of teen court on rural adolescents: Improved social relationships, psychological functioning, and school experiences. *Journal of Primary Prevention, 38*, 447-464. doi:10.1007/s10935-017-0470-y

Solberg, M. E., & Olweus, D. (2003). Prevalence estimation of school bullying with the Olweus Bully/Victim Questionnaire. *Aggressive Behavior, 29*, 239-268. doi:10.1 002/ab.10047

U.S. Department of Health and Human Services. (2001). *Youth Violence: A Report of the Surgeon General*. Rockville, MD: Office of the Surgeon General (U.S.). https://www.ncbi.nlm.nih.gov/books/NBK44294/. Accessed July 1, 2017.

Webster-Stratton, C., Reid, M.J. & Hammond, M. (2004). Treating children with early-onset conduct problems: Intervention outcomes for parent, child, and teacher training. *Journal of Clinical Child and Adolescent Psychology, 33*(1), 105-124.

Wilkins, N., Tsao, B., Hertz, M., Davis, R., & Klevens, J. (2014). *Connecting the Dots: An Overview of the Links Among Multiple Forms of Violence*. Atlanta, GA: National Center for Injury Prevention and Control, Centers for Disease Control and Prevention. Oakland, CA: Prevention Institute. https://www.cdc.gov/violenceprevention/pdf/connecting_the_dots-a.pdf. Accessed July 1, 2017.

World Health Organization (WHO). (2009). *Preventing violence through the development of safe, stable and nurturing relationships between children and their parents and careivers*. Geneva, Switzerland. http://apps.who.int/iris/bitstream/10665/44088/1/9789241597821_eng.pdf . Accessed November 17, 2017.

Table 1. Demographic Characteristics – Colorado

Study Location	Neighborhoods
Total Sample (N)	752
Demographic Characteristics	
% Female	52
Mean age (years)	13
% Non-Hispanic	
American Indian	1
Black	26
Mixed/Other	11
White	4
% Hispanic or Latino	58
% Free/Reduced Lunch Program Participants	78
% Two-Parent Families	73

Table 2. Colorado Results – Logistic Regression Odds Ratios and Confidence Intervals for Aggression and Violence Outcomes

	Aggressive and Other Problem Behavior			Violence Related Behavior		
	OR-OU	95% CI	OR-SU	OR-OU	95% CI	OR-SU
Category 1: Promoting & Reinforcing Prosocial Behavior						
Parental Support	0.538*	0.380, 0.760	0.75	0.598*	0.413, 0.866	0.79
School Support	0.800	0.564, 1.136	0.91	0.780	0.526, 1.155	0.9
Parental Attachment	0.431*	0.318, 0.584	0.63	0.493*	0.360, 0.674	0.68
Category 2: Minimizing Toxic Conditions						
Delinquent Peers	0.277*	0.178, 0.431	0.55	0.225*	0.150, 0.337	0.5
Perceptions of School Safety	0.784	0.549, 1.118	0.9	0.782	0.525, 1.165	0.9
School Conflict and Hassles	0.691*	0.565, 0.845	0.75	0.529*	0.422, 0.662	0.61
Category 3: Monitoring & Limit Setting						
Parental Monitoring	0.367*	0.224, 0.602	0.72	0.319*	0.192, 0.531	0.69
Category 4: Promote Mindful Psychological Flexibility						
Future Optimism	0.616*	0.492, 0.772	0.71	0.622*	0.485, 0.799	0.72
Religiosity	0.940	0.805, 1.099	0.94	0.948	0.795, 1.129	0.95

Note. OR-OU = odds ratio, original units; CI = confidence interval; OR-SU = odds ratio, standard units

*p is significant using the Benjamini-Hochberg procedure with a false discovery rate of 0.05

Table 3. Demographic Characteristics – North Carolina

Study Location	Middle- and High-Schools
Total Sample (N)	7,102
Demographic Characteristics	
% Female	50
Mean Age (years)	15
% Non-Hispanic	
American Indian	25
Black	25
Mixed/Other	13
White	28
% Hispanic or Latino	9
% Free/Reduced Lunch Program Participants	79
% Two-Parent Families	70

Table 4. North Carolina Results – Logistic Regression Odds Ratios and Confidence Intervals for Aggression and Violence Outcomes

	Aggressive and Other Problem Behavior			Violence Related Behavior		
	OR-OU	95% CI	OR-SU	OR-OU	95% CI	OR-SU
Category 1: Promoting & Reinforcing Prosocial Behavior						
Parental Support	0.584*	0.534, 0.640	0.72	0.731*	0.673, 0.794	0.83
School Support	0.580*	0.530, 0.635	0.72	0.733*	0.673, 0.799	0.83
Parental Attachment	0.609*	0.564, 0.656	0.69	0.695*	0.648, 0.745	0.76
Category 2: Minimizing Toxic Conditions						
Delinquent Peers	0.219*	0.189, 0.253	0.49	0.228*	0.201, 0.258	0.50
Perceptions of School Safety	0.462*	0.416, 0.514	0.67	0.430*	0.388, 0.476	0.64
School Conflict and Hassles	0.177*	0.149, 0.210	0.46	0.261*	0.229, 0.298	0.55
Category 3: Monitoring & Limit Setting						
Parental Monitoring - Whereabouts	0.582*	0.514, 0.659	0.79	0.542*	0.482, 0.609	0.77
Parental Monitoring - Friends	0.541*	0.462, 0.633	0.67	0.733*	0.634, 0.848	0.81
Category 4: Promote Mindful Psychological Flexibility						
Future Optimism	0.837*	0.776, 0.902	0.88	0.828*	0.771, 0.888	0.88
Religiosity	0.656*	0.608, 0.707	0.74	0.777*	0.723, 0.835	0.84

Note. OR-OU = odds ratio, original units; CI = confidence interval; OR-SU = odds ratio, standard units

*p is significant using the Benjamini-Hochberg procedure with a false discovery rate of 0.05