Risk Versus Direct Protective Factors and Youth Violence:

Seattle Social Development Project

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Abstract

Background—Numerous studies have examined predictors of youth violence associated with the individual child, the family, school, and the surrounding neighborhood or community. However, few studies have examined predictors using a systematic approach to differentiate and compare risk and direct protective factors.

Purpose—This study examines risk and protective factors associated with youth violence in an ongoing longitudinal panel study of 808 students from 18 Seattle public elementary schools followed since 1985 when they were in fifth grade. Predictors span the individual, family, school, peer, and neighborhood domains.

Methods—Data were collected annually, beginning in 1985, to age 16 years, and then again at age 18 years. This paper provides findings of analyses in which continuous predictor variables, measured at ages 10–12 years, were trichotomized to reflect a risk end of the variable, a direct protective end, and a middle category of scores. Youth violence was measured at ages 13–14 years and 15–18 years.

Results—Bivariate analyses of risk and direct protective factors identified the following predictors of violence at ages 13–14 years and 15–18 years. Risk for violence was increased by earlier antisocial behavior (e.g., prior violence, truancy, nonviolent delinquency), attention problems, family conflict, low school commitment, and living in a neighborhood where young people were in trouble. Direct protective factors at ages 10–12 years include a low level of attention problems, low risk-taking, refusal skills, school attachment, and low access and exposure to marijuana at ages 10–12 years. Multivariate regressions showed neighborhood risk factors to be among the most salient and consistent predictors of violence after accounting for all other variables in the tested models.

Conclusions—Relatively few direct protective factors were identified in these statistical tests, suggesting the need for further review and possible refinement of the measures and methods that were applied. Implications provide important information for programs and policy.

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Background

The Seattle Social Developmental Project (SSDP) is an ongoing longitudinal panel study of 808 students from 18 Seattle public elementary schools followed since 1985 when they were in fifth grade. Children in the study were assessed annually to age 16 years, and then again at age 18 years. Assessments of the panel have continued since then at 3-year intervals. The SSDP sample is gender balanced and racially diverse. Of the 808 participants, 396 (49%) are female; 381 (47%) are white; 207 (26%) are black/African-American; 177 (22%) are Asian-American; 43 (5%) are Native American; and 44 (5%) are Hispanic/Latino. Over 52% of the sample was from economically disadvantaged families, as evidenced by students having participated in the national school lunch/school breakfast program during Grades 5–7.

Retention across study waves has been consistently high, with 93% of participants assessed into adulthood. Analyses for the current study use data from multiple sources--youth, parents, teachers, and school records -- in Grades 5–12 (which corresponds to ages 10–18 years for participating youth). Data cover potential risk factors for and direct protective factors against youth violence in the individual and peer, family, school, and neighborhood domains.

Research has shown that a range of factors increase risk for adolescent violence, including characteristics of young people themselves (e.g., attention problems; risk-taking and sensation-seeking); their peer associations; their families (e.g., family conflict; poor family management); their school experiences (e.g., academic failure; low commitment to school); and the neighborhoods in which they grow up (neighborhood disorganization; availability of drugs/weapons). The paper by Lösel and Farrington[1] in this supplement to the *American Journal of Preventive Medicine* provides a detailed review of relevant literature; readers should consult that paper for a thorough treatment of other relevant work.

In earlier analyses of data from the Seattle Social Development Project, Herrenkohl and colleagues[2] investigated developmental predictors of violence perpetration at age 18 years. Potential risk factors were measured at ages 10 years, 14 years, and 16 years and violence was coded dichotomously to indicate whether a youth engaged in any of six violent acts at age 18 years (hit a teacher, picked a fight, hit someone with intent of hurting him or her, threatened someone with a weapon, used force or threats of force to get things from others, and beat someone so badly he or she required medical attention). At each of the three ages, risk factors strongly related to violence at age 18 years were distributed across these domains.

For example, predictors from age 10 years of violence at age 18 years included teacher and parent ratings of child hyperactivity; parental attitudes favorable to violence; low academic performance (achievement), association with delinquent peers, and an environment of easy availability of drugs. Many constructs, such as poor family management, predicted violence at age 18 years from several earlier ages, suggesting their importance across development. Other studies have also examined risk factors for youth violence.[3-7] As noted by Lösel and Farrington,[1] fewer have examined protective factors[7] that inhibit violent behavior.

Generally, there is a need for more longitudinal analyses of risk and direct protective factors, particularly those that examine both types of predictors within the same study. As noted by Loeber and Farrington[8] and Lösel and Farrington,[1] analyses are needed to understand which longitudinal predictors of violence function as risk factors, which function as direct or buffering protective factors against violent behavior, and which have dual risk/direct protective influences when analyzed in bivariate and multivariate models.

A detailed explanation of the analytic methods used in this and other studies reported in this supplement is presented in the paper by Loeber and Farrington.[8] In brief, one way to conceptualize risk versus direct protective effects is to ask whether those who score at opposite ends of a single distribution of scores on a given predictor variable are more likely to engage in violence (risk factor) or are less likely to engage in violence when compared with those who score in the middle range of that variable. In the present analyses, an investigation is made of the prediction of self-reported violence in youth at ages 13–14 years and 15–18 years from earlier measured variables conceptualized in this way.[9,10]

As in prior studies by Stouthamer-Loeber and colleagues,[10] risk and direct protective factors are operationalized as opposite ends of a distribution of scores for a single predictor (independent variable); scores in between those on either end represent a neutral category to which each "pole" can be compared, bringing into view the nature of the association between each variable and the specified outcome (violence). Here "direct protective" is used to describe an effect leading to less violence and "risk" refers to an effect possibly leading to more violence perpetration. Analyses focus on violence at two points in adolescence to help in determining if certain predictors relate differently to similarly measured outcomes at different ages.

This study is part of an ongoing research effort supported by the CDC to examine risk and direct protective factors for youth violence. This effort includes analysis of four longitudinal data sets including the Pittsburgh Youth Study, the Chicago Youth Development Study, the Seattle Social Development Project, and the National Longitudinal Study of Adolescent Health (Add Health). Similar risk and direct protective factors were identified in each data set, and the data sets were analyzed using similar methods. The goal was to identify those factors in the lives of young people that increase or decrease the risk of violence. Individually and together, these studies should advance understanding of the etiology of youth violence and provide knowledge for planning preventive interventions that target predictors or inhibitors of violence.

Methods

Measures

Violence at ages 13–14 years and 15–18 years—Analyses examined the prevalence of violence at ages 13–14 years and 15–18 years. Composite, past-year measures of violence were operationalized at each year based on the following: three or more incidents of fighting in a given year; three or more incidents of hitting someone with the intent to hurt that person; hitting a parent; using force against others; and hitting a teacher. At age 18 years, two additional items were added to the measure: beating someone badly and threatening someone with a weapon.

Each indicator of violence was coded "0" for no offense or "1" indicating that an offense was committed. These responses were summed by year and then recoded to dichotomous measures. To arrive at prevalence estimates for ages 13–14 years and 15–18 years, data were combined so that individuals with any offense in any year as defined above were counted as having committed a violent act (coded 1); all others were coded 0 (non-offenders). At ages 13–14 years, 28.3% (223 of 787 available cases) committed a violent act; at ages 15–18 years, 35.6% (283/795 of available cases) committed a violent act.

Predictors of violence at ages 10–12 years—Conceptually similar predictors of violence (core variables) were chosen to allow a common set of analyses across the four data sets. Several additional variables were also added by each project (data set-specific variables) and included in a final multivariate analysis.

Scores for many predictor variables combined separate measures for the fifth and sixth grades (ages 10–12 years for participating youth). Scale descriptions are provided for each grade, although analyses use a single composite measure that combines the fifth- and sixth-grade measures. (Additional information on the score distributions of the scaled variables is available on request from the first author.)

Sociodemographic variables—These include measures of poverty and race/ethnicity. *Poverty* is based on a young person's participation in the national school lunch/school breakfast program at some point in the fifth, sixth, or seventh grade (0=never participated, 1=participated in the program). *Race/ethnicity* consists of a series of dummy-coded variables that compare African Americans, Native Americans, and Asian Americans to whites. *Gender* is coded 1 for men/boys and 0 for women/girls.

Individual variables—These include prior violence, truancy, running away from home, self-reported nonviolent delinquency, alcohol use, marijuana use, attention problems/ADHD, depressive symptoms, and religious attendance. *Prior violence* is based on one item assessing the frequency of self-reported fighting (picking fights) at ages 10 and 12 years (0= Never; 1= 1 or 2 times; 2= 3 or 4 times; 4= >4 times). *Truancy* is based on a teacher-report item on a youth's truancy or unexplained absence, measured as part of the Child Behavior Checklist (CBCL).[9] The CBCL items were originally scored on a 3-point scale (0 = Not True, 1 = Somewhat or Sometimes True, 2 = Very True or Often True) and then dichotomized using 1 as the cutoff (0 = none, 1 = any truancy) for the current analyses. *Running away from home* is based on a youth's report of whether he or she has ever run away from home (0 = No, 1 = Yes).

Self-reported *nonviolent delinquency* is a composite of five Yes/No items. Examples include: Have you ever taken something that didn't belong to you, like other kids' money? and Have you ever broken into a house, store, school or other building without permission?. Self-reported *lifetime alcohol use* was assessed at ages 10 years and 12 years (0 = No, 1 = Yes). *Lifetime marijuana use* also is based on a single item measured 0 = No and 1 = Yes.

For attention-deficit hyperactivity disorder/attention problems, a mean of 11 items from parent and teacher reports on the CBCL (e.g., difficulties with concentration; restlessness; hyperactivity). Items were scored on a 3-point scale (0 = Not True, 1 = Sometimes True, 2 = Often True for teacher reports and 1 = Not True, 2 = Sometimes True, 3 = Often True for parent reports); standardized; and then combined (α = 0.842 for the scale at age 10 years; α = 0.858 for the scale at age 12 years). *Depressive symptoms* are measured by 10 items from the teacher CBCL (e.g., feels he/she has to be perfect; feels hurt when criticized; overconforms to rules) (α = 0.825 for the scale at age 10 years, α = 0.765 for the scale at age 12 years). Finally, *religious attendance* is based on youth responses to a single question: *How often do you attend religious services?* The variable was scored on a 4-point scale: 1 = once a year or never, 2 = two or three times a year, 3 = once or twice a month, 4 = once a week.

Family variables—These were limited to one core predictor: *involvement of the child in family activities*. This variable is a composite of eight youth self-report items at age 10 years. Examples include: In the last week did you work around the house with your mom? and In the last week did you read a book or story with your mom or dad? coded 0 = No and 1 = Yes (α = 0.624). At age 12 years, a similar set of indicator variables was used (α = 0.578).

School variables—These consist of academic achievement, low educational expectations/aspirations, low school commitment, and school attachment. A*cademic achievement* was

measured using children's scores on the California Achievement Test and their self-reported grades. *Low educational expectations/aspirations* is a mean of youth reports regarding educational aspirations at age 10 years (If you could go as far as you wanted in school, how far would you like to go?) and educational expectations at age 12 years ('Eventually how much schooling do you actually expect to get?'). Both variables were measured using a 4-point scale (1 = go to high school for a while, 2 = finish high school, 3 = go to college for a while, 4 = finish college). Scores were reversed.

Low school commitment is based on two youth-report items: *I do extra work on my own in class* and 'When I have an assignment to do, I keep on working on it until it is finished' scored: 1 = YES! 2 = yes, 3 = no, 4 = NO! These items are correlated 0.331 (p<0.01) at age 10 years and 0.373 (p<0.01) at age 12 years. *School attachment* refers to looking forward to going to school, liking school, liking the teacher (measured only at age 10 years), and liking the class. Items were scored: 1 = YES! 2 = yes, 3 = no, 4 = NO! These were reversed and combined (α=0.784 for the scale at age 10 years and 0.714 for the scale at age 12 years).

Peer and neighborhood variables—These include peer delinquency, peer prosocial behavior, neighborhood kids in trouble, low neighborhood attachment, and perceived availability and exposure to marijuana. *Peer delinquency at age 10 years* is measured by items that pertain to the behavior of a youth's first-, second-, third-, and fourth-best friends (α=0.669). The same items are used to measure the construct at age 12 years (α=0.716). Youth indicated for each friend whether he/she got in trouble with a teacher and whether he/she had experimented with or used alcohol (0 = NO, 1 = Yes). The indicators were averaged to estimate the proportion of a young person's friends who were involved in delinquent behavior at ages 10 years and 12 years.

Peer prosocial behavior, based on the reported behavior of an individual's first-, second-, third-, and fourth-best friends at age 10 years and first-, second-, and third-best friends at age 12 years, refers to the degree to which each friend tries to do well in school (α=0.467 at age 10 years and α=0.277 at age 12 years). *Neighborhood kids in trouble* is based on a single item: 'Lots of kids in my neighborhood get in trouble', scored: 1 = YES! 2 = yes, 3 = no, 4 = NO! Scores on the item were reversed.

For *low neighborhood attachment*, three youth-report items were used (e.g., 'I like my neighborhood'; 'I know many people in my neighborhood'; and 'I feel safe in my neighborhood'). Items were scored similarly (1 = YES! 2 = yes, 3 = no, 4 = NO!) and (α=0.643 at age 10 years and α=0.697 at age 12 years). Finally, perceived availability of and exposure to marijuana refers to a young person having known someone who has tried marijuana, having ever had a chance to try marijuana, and having believed that he/she could buy marijuana if wanted. The first two items were dichotomous variables (0 = No, 1 = Yes) and the last variable was assessed using a 4-point scale (1 = YES! 2 = yes, 3 = no, 4 = NO!). The last variable was reversed. All items were standardized (α=0.743 at age 10 years and α=0.680 at age 12 years).

Data set–specific variables—Measures of potential risk and direct protective factors identified in prior analyses of the Seattle Social Development Project data set[3] were added to the set of predictors of violence for inclusion in a final multivariate test of predictors. These variables include: **individual variables** (refusal skills and risk-taking). *Refusal skills* is based on a mean of two items: "If one of your friends asked you to skip school, what would you do?" (scored 1 = Go with friend, 2 = Make up a good excuse and tell my friend I had something else to do and leave, 3 = Just say no and walk away, 4 = Name trouble, say what would happen if you got caught, and suggest something else to do); and "If you were at a party and one of your friends offered a beer, what would you do?" (scored 1 = Drink the

beer, 2 = Say, "That's minor in possession," suggest something else to do, and ask my friend to come with me, 3 = Just say no and walk away, 4 = Make up a good excuse, tell my friend, and walk away). <u>Risk taking</u> was derived from a youth's self-report responses on the following item "It's fun to do things you are not supposed to do" (scored 1 = NO!, 2 = no, 3 = yes, 4 = YES!).

Data set–specific **family variables** include physical punishment, poor family management, and family conflict. *Physical punishment* combines two youth-report items at age 10 years: When you have misbehaved, do your parents hit or spank you? and When you have misbehaved, do your parents slap or hit you? scored on a 4-point scale (1 = YES! 2 = yes, 3 = no, 4 = NO!) (r = 0.463, *p*-value <0.01). At age 12 years, physical punishment was assessed with a single youth-report item: When you have misbehaved, do your parents hit or spank you?, scored similarly; and a single parent-report item: When your child disobeys you, do you spank him or her? scored '1' = almost always to '5' = almost never. These items were reversed and standardized before being combined (r= 0.359, *p*<0.01).

Poor family management includes six youth self-report items at age 10 years (e.g., "The rules in my family are clear" and "My parents praise me for my school achievements"). These items were scored on a 4-point scale (1 = YES! 2 = yes, 3 = no, 4 = NO!) (α= 0.66 at age 10 years and 0.720 at age 12 years). *Family conflict* is based on a youth self-report item at age 10 years (e.g., "Our family members get along with each other."). The item was scored on a 4 point scale (1 = YES!, 2 = yes, 3 = no, 4 = NO!). At age 12 years, four additional parent-report items were added to assess the construct. Examples include: How often are people in your family critical of each other? and *How often do you and your family quarrel?* (1 = Almost never, 2 = Seldom, 3 = Sometimes, 2 = Fairly often, 1 = Almost Always) (α=0.66).

Data Analysis

Bivariate and multivariate tests of predictors were conducted for each outcome measure of violence, following the method described in Loeber and Farrington.[8] For bivariate models, when possible, all predictor variables were separated into two dummy variables so the lowest and highest 25% of scores in a score distributi on could be compared to the middle (neutral) 50% of scores. This approach allowed examination of possible "risk" and "direct protective" effects of each predictor: Multivariate tests were based on the selection of significant bivariate predictors. For these models, predictors were coded so that cases in the top 25% of the score distribution were compared to the remaining 75% of scores on that measure. For some variables, a cutoff at precisely the 25th percentile was not possible; for these, a cut-point nearest to that point was used. This recoding of the variables allowed examination of the unique effects of each predictor while ensuring inclusion of the maximum number of cases in the analysis.

For bivariate models, both the risk and direct protective variables for each predictor were simultaneously entered into a logistic regression equation. Because certain variables were not continuously distributed according to their original scoring (e.g., lifetime marijuana use, no/yes) or had low-scale frequency, it was not always possible to test both risk and direct protective effects. For these, only risk effects were examined.

In the multivariate analyses, significant predictors from the bivariate models (defined as having either a risk or direct protective effect, or both) were examined using hierarchic logistic regressions. Prior violence and other measures of early antisocial behavior (truancy, running away from home, self-reported delinquency, alcohol use, and marijuana use) were removed from the multivariate models to allow a more direct assessment of the unique effects of other variables. In both the bivariate and multivariate models, gender (male) and

race (white as the reference category) were included as controls. Analyses were not conducted separately for ethnic or gender groups because of small group sizes and the limited variability of scores within groups on hypothesized predictors or outcome variables.

Results

Bivariate Logistic Regressions

Violence at ages 13–14 years—As shown in Table 1, after controlling for gender and race, at ages 10–12 years, the following commonly measured constructs predicted violent behavior at ages 13 years and 14 years: a risk effect of prior violence and a direct protective effect of having not perpetrated violence previously, a risk effect of truancy, a risk effect of running away from home, both a risk effect of nonviolent delinquency and a direct protective effect of no prior delinquency, a direct protective effect of not using alcohol, a risk effect of marijuana use, a risk effect of low attention/ADHD, a risk effect of delinquent peers, a direct protective effect of prosocial peers, a risk effect of low grades, a direct protective effect of attachment to school, a risk effect of low school commitment, a risk effect of neighborhood kids in trouble, and both a risk effect of perceived availability and exposure to marijuana and a direct protective effect of low perceived availability and exposure to marijuana.

Variables measured at ages 10–12 years that had neither risk nor direct protective effects for violence at ages 13–14 years included depressive symptoms, religious attendance, physical punishment, involvement of the child in family activities, academic achievement measured by CAT scores, youth-reported low grades in school, low educational aspirations/ expectations, and low neighborhood attachment. Four additional constructs measured at ages 10–12 years included in the SSDP data set also predicted violence at ages 13–14 years. Bivariate analyses revealed a risk effect of low refusal skills and a direct protective effect of high refusal skills, a risk effect of risk-taking, a direct protective effect of the absence of poor family management, and a risk effect of family conflict.

Violence at ages 15–18 years—In bivariate analyses, the following predictive relationships were found between commonly measured constructs assessed at ages 10–12 years and violence at ages 15–18 years: a risk effect of prior violence, a risk effect of attention problems and a direct protective effect of low attention problems, a risk effect of truancy, a risk effect of running away from home, a risk effect of nonviolent delinquency, a risk effect of marijuana use, a risk effect of peer delinquency, a direct protective effect of academic achievement, a risk effect of low educational aspirations/expectations, a risk effect of low school commitment, a risk effect of neighborhood kids in trouble, a risk effect of low neighborhood attachment, a risk effect of perceived availability and exposure to marijuana and a direct protective effect of low marijuana availability and exposure.

Variables measured at ages 10–12 years that had neither risk nor direct protective effects for violence at ages 15–18 years included lifetime alcohol use, depressive symptoms, religious attendance, involvement of child in family activities, physical punishment, youth-reported low grades, and school attachment. Of the constructs added as possible predictors from ages 10–12 years in the SSDP data set analyses, the following effects were found in predicting violence at ages 15–18 years: a risk effect of poor refusal skills, a risk effect of poor family management, and a risk effect of family conflict.

Multivariate Analyses: Hierarchic Logistic Regressions

Predictors at ages 10–12 years of violence at ages 13–14 years—To examine possible unique effects of constructs measured at ages 10–12 years on future violence,

hierarchic logistic regression models were conducted for violence at ages 13–14 years and 15–18 years using all variables (risk effect, direct protective effect, or both) that were found to predict violence in the bivariate analyses for each violence outcome. (Correlations among the measured variables included in the multivariate analysis are available on request from the first author.) Variables were entered in the following order: Step 1: controls of gender, poverty, and race; Step 2: individual factors if significant in the bivariate tests; Step 3 school factors if significant in the bivariate tests; and Step 4: peer and neighborhood factors if significant in the bivariate tests.

Results are shown in Table 2. In Step 2 of the multivariate model for violence at ages 13–14 years (Table 2), attention problems emerged as a risk factor for violence (OR: 2.10) after controlling for gender, poverty, and race in Step 1. In Step 3, attention problems remained significant. Attachment to school at ages 10–12 years, one of three variables entered in Step 3, was a direct protective factor that reduced the odds of violence at ages 13–14 years (OR: 0.57).

In Step 4, the final step of the analysis, the following factors remained significant. Native American race predicted increased risk of violence (OR: 2.88). Asian American race predicted decreased risk of violence (OR: 0.55). Attention problems predicted increased risk of violence (OR: 1.98). Attachment to school predicted lower risk of future violence (OR: 0.58). Neighborhood kids in trouble predicted higher risk of future violence (OR: 1.72). Finally, perceived availability and exposure to marijuana predicted higher risk of future violence (OR: 2.45).

To assess the explanatory power of each block of predictors added to the model, analyses included a likelihood ratio test of model fit. In each step, the variables added to the model improved the prediction of violence. For example, the addition of peer and neighborhood factors in Step 4 resulted in a reduction in the log-likelihood statistic from Step 3 (–2 log-likelihood = 756.898) to Step 4 (–2 log-likelihood=722.306).

Violence at ages 15–18 years—Results of the hierarchic regression for violence at ages 15–18 years are shown in Table 3. The ordering of block entry in this analysis is the same as in the previous analysis (e.g., demographics in Step 1, individual factors in Step 2). Variables entered here are those found to be significant in the bivariate analyses of predictors at age 10–12 years of violence at ages 15–18 years.

Results of this analysis show that, in Step 2, after accounting for demographics, attention problems at ages 10–12 years increased the risk of violence at age 15–18 years (ORs of 1.89). In Step 3, school factors measured at ages 10–12 years were added to the model. None predicted violence at ages 15–18 years after controlling for demographics and individual factors in Steps 1 and 2.

In Step 4, the final step in the analysis, the following risk effects on violence remained. Coming from a family in poverty increased risk for future violence (OR: 1.71). Asian American race predicted decreased risk for violence (OR: 0.58). Attention problems predicted increased risk for future violence (OR: 1.77). Having delinquent peers predicted increased risk for future violence (OR: 1.51). Coming from a neighborhood where kids were in trouble predicted increased risk of future violence (OR: 1.55). Finally perceived availability of and exposure to marijuana at ages 10–12 years predicted increased risk of future violence (OR: 1.93). The likelihood ratio tests of model fit indicate that the addition of school factors measured at ages 10–12 years in Step 3 did not improve the prediction of violence at ages 15–18 years, although variables entered in all other steps did.

Approximately 17% of the variance in violence was explained in the final step of the regression.

Seattle Social Developmental Project data set–specific predictors—Two final multivariate model tests were conducted to determine whether any of the variables added as potentially unique predictors of violence from SSDP, those not included in the common list of variables for the four data sets, was significant after accounting for other previously tested risk and direct protective variables (Tables 4 and 5). Variables measured at ages 10–12 years and added as possible predictors of violence at ages 13–14 years and 15–18 years included: refusal skills, risk-taking, poor family management, and family conflict.

As shown in Table 4, risk-taking at ages 10–12 years increased the risk for violence at ages 13–14 years when added in Step 2 of the model, and remained a marginally significant predictor in Steps 3 and 4 of the analysis. When entered in Step 3, poor family management at ages 10–12 years did not quite achieve significance and became less predictive in later steps after peer, neighborhood, and marijuana availability variables were entered. As shown in Table 5, poor family management at ages 10–12 years also approached significance in the model predicting violence at ages 15–18 years. Again, this relationship weakened with the later entry of other variables (peer, and neighborhood variables).

Discussion

Summary implications of the panel's collective effort are described in the concluding paper by Hall et al.[12] In the following paragraphs, a summary is provided of key findings of this particular study, along with several implications that emerge from this research.

Bivariate models of risk and direct protective variables revealed a number of childhood predictors of later violence, including antisocial behavior and marijuana use, attention problems (low attention/ADHD), family conflict, and poor family management, low school grades, low commitment to school, and peer delinquency measured at ages 10–12 years. Perceived availability of and exposure to marijuana and living in a neighborhood where children are in trouble also appeared to increase the risk of later violence in youth, after accounting for child gender and race/ethnicity.

Fewer direct protective factors were identified in the course of these analyses. For violence at ages 13–14 years, direct protective factors included refusal skills, low risk-taking, good family management, school attachment, peer prosocial behavior, and low perceived availability of and exposure to marijuana at ages 10–12 years. Avoiding early alcohol use and antisocial behavior at ages 10–12 years also appeared to lessen the risk of violence at ages 13–14 years. For violence at ages 15–18 years, direct protective factors in bivariate analyses include low attention problems, high academic achievement, and low perceived availability and exposure to marijuana at ages 10–12 years.

Multivariate regression results showed early attention problems and neighborhood factors of marijuana exposure and availability and neighborhood children in trouble to be among the strongest predictors of violence in adolescence, after accounting for all other variables in the tested models. The only direct protective variable that emerged from multivariate tests was strong attachment to school at ages 10–12 years, which predicted nonviolence at ages 13–14 years.

It is noteworthy that in this study, teacher-rated attention problems at ages 10–12 years consistently predicted violence at ages 13–14 years and 15–18 years across all analyses and remained significant across all steps in the multivariate tests. Results suggest that teachers

can recognize those with attention deficits and that these deficits appear to increase the risk of violence years later. Thus, selective violence prevention interventions are warranted for these young people. It is also noteworthy that only the highest levels of school attachment during the late elementary grades appeared to promote later nonviolence.

The current findings suggest more generally the need for prevention programs that lessen early problem behavior by promoting social and emotional skill development in children and by promoting consistency in norms across social settings that discourage access to and early use of alcohol and marijuana. Findings of this study also suggest the potential of parenting interventions to promote stable, positive relationships in the home and reduce conflict and poor family management; efforts to enhance children's academic achievement and attachment and commitment to schooling; and community efforts to improve public education and mobilization to promote healthy neighborhoods. A related set of recommendations and implications focused on building capacity for youth violence prevention through deep-sustained collaborations involving researchers, practitioners, and school personnel is provided by Hall and colleagues.[12] Readers should review that paper for examples of promising approaches and future research directions.

Limitations

The method used in this study sought to empirically distinguish between possible risk effects and possible direct protective effects of a number of variables possibly associated with later violence or nonviolence. General limitations of the method are discussed in the concluding paper by Hall et al.[12] In general, more of the variables investigated here were found to have risk effects (increasing the probability of violence) than to have direct protective effects (lessening the risk of violence during adolescence).

However, findings may depend to some extent on the variables included in analyses, the unique characteristics of the study sample, and the referenced method of data scaling, which differentiates scores according to predetermined cutpoints that may or may not best capture the poles of each variable. It is possible that an alternative, theory-informed analysis of possible direct protective factors might better distinguish factors that increase and lessen risk for violence. Studies of cumulative risk and cumulative direct protective effects could also extend knowledge of the developmental underpinnings of youth violence in adolescence.

Acknowledgments

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Table 1

Summary of bivariate logistic regression analyses for variables predicting outcomes of violence

	Violence at Ages 13–14 years		Violence at Ages 15–18 years	
	B	**OR (95% CI)**	**B**	**R (95% CI)**
INDIVIDUAL FACTORS				
Prior violence				
Direct protective effect	–0.741[**]	0.477(0.308,0.738)	–0.332	0.718 (0.483,1.067)
Risk effect	0.922[**]	2.514(1.629, 3.881)	0.903[**]	2.466(1.627, 3.739)
Truancy				
Risk effect	0.675[**]	1.965(1.188,3.248)	1.468[**]	4.342(2.545, 7.409)
Running away from home				
Risk effect	1.109[**]	3.03(1.821, 5.041)	0.815[**]	2.259(1.37, 3.723)
Self-reported NV Delinquency				
Direct protective effect	–0.507[*]	0.602(0.409,0.887)	–0.15	0.86(0.597, 1.24)
Risk effect	0.677[**]	1.967(1.226,3.157)	0.846[**]	2.331(1.46,3.718)
Lifetime Alcohol use				
Direct protective effect	–0.624[**]	0.536(0.353,0.813)	–0.113	0.89(0.596,1.339)
Risk effect	0.017	1.017(0.632,1.636)	0.360	1.43(0.897,2.291)
Lifetime Marijuana use				
Risk effect	0.917[**]	2.501(1.385,4.515)	0.964[**]	2.622(1.436,4.789)
Attention problem/ADHD				
Direct protective effect	–0.431	0.65 (0.414,1.02)	–0.487[*]	0.614 (0.407, 0.928)
Risk effect	0.67[**]	1.954(1.34, 2.85)	0.605[**]	1.831 (1.272, 2.636)
Depressive symptoms				
Direct protective effect	0.088	1.092 (0.733, 1.627)	–0.351	0.704 (0.489, 1.014)
Risk effect	0.391	1.479 (0.952, 2.298)	0.031	1.031 (0.683, 1.557)
Religious attendance				
Direct protective effect	–0.142	0.867 (0.581,1.295)	0.215	1.239 (0.851,1.805)
Risk effect	0.086	1.09 (0.708,1.678)	0.279	1.322 (0.875,1.999)
Refusal Skills				
Direct protective effect	0.582[*]	1.79 (1.119, 2.864)	0.209	1.233 (0.796,1.908)
FAMILY				
Involvement of child in family activities				
Direct protective effect	0.055	1.056(0.715,1.559)	0.188	1.207(0.837,1.741)
Risk effect	0.134	1.144(0.771,1.696)	0.248	1.282(0.887,1.852)
Physical punishment				
Direct protective effect	–0.317	0.728(0.489,1.086)	–0.006	0.994(0.687, 1.439)
Risk effect	–0.061	0.941(0.629,1.047)	0.002	1.002 (0.687, 1.462)
Poor family management				

	Violence at Ages 13–14 years		Violence at Ages 15–18 years	
	B	**OR (95% CI)**	**B**	**R (95% CI)**
Direct protective effect	−0.504[*]	0.604(0.393,0.929)	0.063	1.065(0.726,1.562)
Risk effect	1.126[**]	3.085(1.908,4.987)	0.629[**]	1.876 (1.188,2.963)
Risk-Taking				
Direct protective effect	−0.385[*]	0.68 (0.471, 0.982)	−0.064	0.938 (0.664,1.324)
Risk effect	0.217	1.242 (0.783,1.969)	0.384	1.469 (0.947,2.279)
Risk effect	0.291	1.338(0.919,1.949)	0.383[*]	1.466(1.026,2.096)
Family Conflict				
Direct protective effect	0.024	1.025(0.679,1.545)	0.23	1.258 (0.863,1.833)
Risk effect	0.383[*]	1.466(1, 2.149)	0.448[*]	1.565 (1.087,2.253)
SCHOOL				
Academic achievement: CAT				
Direct protective effect	−0.289	0.749 (0.49, 1.145)	−0.498[*]	0.608 (0.407,0 .907)
Risk effect	0.376	1.457 (0.974, 2.179)	0.298	1.347 (0.923, 1.964)
Y-R low-grades				
Direct protective effect	0.000	1.00 (0.699, 1.432)	−0.133	0.875 (0.627, 1.222)
Risk effect	0.559[*]	1.749(1.113, 2.748)	0.247	1.28 (0.825, 1.987)
Low expectations/aspirations toward school				
Direct protective effect	0.177	1.19 (0.778,1.831)	0.088	1.09 2(0.732, 1.63)
Risk effect	0.188	1.21 (0.737, 1.977)	0.513[*]	1.67 (1.057, 2.636)
Low-school commitment				
Direct protective effect	−0.268	0.765 (0.502, 1.165)	0.087	1.091 (0.751, 1.586)
Risk effect	0.493[*]	1.637(1.107, 2.421)	0.406[*]	1.5 (1.027, 2.191)
School attachment				
Direct protective effect	−0.552[*]	0.593 (0.389, 0.904)	−0.003	0.997 (0.686, 1.45)
Risk effect	0.014	1.014 (0.694, 1.481)	0.256	1.292 (0.901, 1.853)
NEIGHBORHOOD				
Peer delinquency				
Risk effect	0.571[**]	1.771(1.248, 2.513)	0.543[**]	1.721(1.242, 2.386)
Peer prosocial behavior				
Direct protective effect	−0.378[*]	0.685 (0.471, 0.999)	−0.201	0.82 (0.571, 1.172)
Neighborhood kids in trouble				
Direct protective effect	−0.163	0.849 (.575, 1.253)	−0.247	0.781(0.542, 1.125)
Risk effect	0.501[*]	1.65 (1.103, 2.469)	0.59[**]	1.805 (1.23, 2.649)
Low neighborhood attachment				
Direct protective effect	0.132	1.141(.765, 1.703)	0.244	1.277(.874, 1.866)
Risk effect	0.34	1.405(0.954, 2.071)	0.626[**]	1.87(1.302, 2.685)
Perceived availability and				

	Violence at Ages 13–14 years		Violence at Ages 15–18 years	
	B	**OR (95% CI)**	**B**	**R (95% CI)**
exposure to marijuana				
Direct protective effect	−0.71[**]	0.492(0.307, 0.788)	−0.535[*]	0.585(0.39, 0.878)
Risk effect	0.828[**]	2.289(1.579, 3.318)	0.71[**]	2.034(1.418, 2.918)

[**]
p-value <0.01

[*]
p-value <0.05

Table 2

Summary of hierarchic regression analysis for variables predicting violence at ages 13–14 years—core variables (n=681)

	Model 1			Model 2			Model 3			Model 4		
	B	p-value	OR (95% CI)	B	p-value	OR (95% CI)	B	p-value	OR (95% CI)	B	p-value	OR (95% CI)
Male	0.077	0.659	1.080 (0.77,1.52)	−0.055	0.761	0.946 (0.66, 1.35)	−0.086	0.640	0.918 (0.641,1.31)	−0.261	0.182	0.771 (0.525,1.130)
Poverty	0.387	0.044	1.472 (1.01,2.15)	0.321	0.099	1.378 (0.94, 2.02)	0.333	0.091	1.396 (0.95, 2.05)	0.216	0.294	1.241 (0.829,1.859)
African-American	0.170	0.436	1.185 (0.773,1.82)	0.130	0.555	1.139 (0.74, 1.76)	0.196	0.383	1.216 (0.78, 1.89)	0.183	0.434	1.200 (0.760,1.897)
Native American	0.961	0.011	2.614 (1.25,5.46)	0.923	0.015	2.518 (1.19, 5.31)	0.991	0.010	2.695 (1.27,5.74)	1.056	0.009	2.876 (1.306,6.33)
Asian American	−1.153	0.000	0.316 (0.18, 0.55)	−0.983	0.001	0.374 (0.214, 0.654)	−0.878	0.002	0.416 (0.24, 0.73)	−0.604	0.043	0.547 (0.304,0.981)
Attention problem/ADHD ages 10–12 years(R)				0.741	0.000	2.099 (1.42, 3.11)	0.693	0.001	2.000 (1.33, 3.02)	0.682	0.002	1.978 (1.29,3.036)
Low grades, ages 10–12 years (R)							0.107	0.665	1.113 (0.69,1.803)	0.057	0.821	1.059 (0.644,1.741)
School attachment ages 10–12 years (P)							−0.572	0.012	0.565 (0.361, 0.883)	−0.546	0.021	0.579 (0.364,0.921)
Low school commitment ages 10–12 years (R)							0.248	0.264	1.282 (0.829,1.98)	0.072	0.758	1.074 (0.681,1.694)
Peer delinquency ages 10–12 years										0.338	0.091	1.402 (0.948, 2.073)
Peer prosocial behavior ages 10–12 years										−0.027	0.902	0.973 (0.633,1.496)
Neighborhood kids in trouble ages 10–12 years (R)										0.543	0.015	1.722 (1.11, 2.667)
Perceived availability of and exposure to marijuana ages 10–12 years (R)										0.894	0.000	2.445 (1.63, 3.663)
Nagelkerke R²	0.080			0.106			0.125			0.190		
−2 Log-likelihood	780.057			766.576			756.898			722.306		
log-likelihood ratio test (χ²-value)	39.194**			13.481**			9.678*			34.592**		

(R) indicates risk effect

(P) indicates direct protective effect

Table 3

Summary of hierarchic regression analysis for variables predicting violence at ages 15–18 years—core variables (*n*=685)

	Model 1			Model 2			Model 3			Model 4		
	B	*p*-value	OR (95% CI)	B	*p*-value	OR (95% CI)	B	*p*-value	OR (95% CI)	B	*p*-value	OR (95% CI)
Male	0.487	0.004	1.628 (1.17,2.26)	0.377	0.029	1.457 (1.04,2.04)	0.356	0.039	1.428 (1.02,2.00)	0.201	0.270	1.222 (0.856,1.745)
Poverty	0.729	0.000	2.074 (1.45,2.97)	0.676	0.000	1.967 (1.37,2.82)	0.597	0.002	1.817 (1.25,2.634)	0.533	0.006	1.705 (1.16,2.502)
African-American	0.158	0.454	1.171 (0.77,1.773)	0.120	0.576	1.127 (0.74,1.714)	0.051	0.820	1.052 (0.680,1.627)	0.031	0.891	1.032 (0.658,1.619)
Native American	0.645	0.085	1.906 (0.91,3.977)	0.629	0.097	1.875 (0.89,3.943)	0.553	0.151	1.738 (0.818,3.691)	0.640	0.105	1.896 (0.875,4.110)
Asian-American	−0.823	0.001	0.439 (0.27,0.703)	−0.672	0.006	0.511 (0.316,0.825)	−0.729	0.004	0.482 (0.294,0.792)	−0.550	0.039	0.577 (0.342,0.973)
Attention problems/ADHD ages 10–12 years (R)				0.635	0.001	1.888 (1.29,2.77)	0.551	0.006	1.734 (1.168,2.575)	0.543	0.009	1.722 (1.114,2.595)
CAT scores ages 10–12 years (P)							−0.284	0.197	0.753 (0.489,1.159)	−0.214	0.345	0.807 (0.517,1.259)
Low expectations/aspirations toward school ages 10–12 years (R)							0.250	0.205	1.284 (0.872,1.889)	0.194	0.343	1.214 (0.813,1.811)
School attachment ages 10–12 years (P)							0.000	0.999	1.000 (0.674,1.484)	0.085	0.683	1.089 (0.722,1.642)
Low school commitment ages 10–12 years(R)							0.158	0.457	1.172 (0.772,1.778)	−0.041	0.855	0.960 (0.621,1.484)
Peer delinquency ages 10–12 years (R)										0.410	0.025	1.507 (1.05, 2.158)
Neighborhood kids in trouble ages 10–12 years (R)										0.440	0.045	1.553 (1.009, 2.39)
Low neighborhood attachment ages 10–12 years (R)										0.331	0.113	1.393 (0.924, 2.099)
Perceived availability of and exposure to marijuana ages 10–12 years (R)										0.656	0.001	1.927 (1.298, 2.86)
Nagelkerke R^2	0.085			0.105			0.112			0.169		
−2 Log-likelihood	848.44			837.874			833.711			802.283		
log-likelihood ratio test (χ^2-value)	43.708**			10.566**			4.163			31.428**		

(R) indicates risk effect

(P) indicates direct protective effect

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Table 4

Summary of hierarchic regression analysis for variables predicting violence at ages 13–14 years—adds SSDP unique predictors (n=503)

	Model 1			Model 2			Model 3			Model 4			Model 5		
	B	Sig.	OR (95% CI)	B	Sig.	OR (95% CI)	B	Sig.	OR (95% CI)	B	Sig.	OR (95% CI)	B	Sig.	OR (95% CI)
Sex	0.269	0.192	1.309 (0.873,1.962)	0.064	0.769	1.066 (0.7,1.64)	0.033	0.879	1.034 (0.67,1.59)	−0.024	0.914	0.976 (0.63,1.51)	−0.172	0.469	0.842 (0.528,1.342)
Poverty	0.488	0.036	1.630 (1.03,2.575)	0.458	0.056	1.580 (0.99,2.53)	0.420	0.081	1.522 (0.95,2.44)	0.466	0.056	1.594 (0.99,2.57)	0.356	0.164	1.427 (0.865,2.353)
African-American	0.069	0.792	1.071 (0.643,1.785)	0.027	0.918	1.028 (0.61,1.73)	0.061	0.821	1.063 (0.63,1.8)	0.082	0.761	1.086 (0.64,1.85)	0.028	0.921	1.029 (0.588,1.799)
Native American	0.833	0.066	2.300 (0.947,5.585)	0.833	0.075	2.300 (0.92,5.75)	0.909	0.054	2.483 (0.99,6.26)	0.981	0.040	2.667 (1.05,6.8)	1.030	0.040	2.801 (1.05,7.473)
Asian-American	−1.304	0.000	0.271 (0.137,0.536)	−1.188	0.001	0.305 (0.15,0.612)	−1.205	0.001	0.300 (0.148,0.61)	−1.138	0.002	0.320 (0.16,0.65)	−0.858	0.022	0.424 (0.203,0.885)
Attention problems/ADHD ages 10–12 years (R)				0.783	0.001	2.187 (1.37,3.5)	0.786	0.001	2.194 (1.37,3.5)	0.813	0.001	2.254 (1.37,3.7)	0.850	0.002	2.340 (1.38,3.957)
Refusal skills age 12 years (P)				0.217	0.342	1.242 (0.79,1.94)	0.243	0.289	1.275 (0.8,1.999)	0.300	0.196	1.350 (0.86,2.13)	0.317	0.188	1.373 (0.857,2.2)
Risk-taking ages 10–12 years (R)				0.572	0.029	1.771 (1.1,2.96)	0.487	0.067	1.627 (0.97,2.74)	0.454	0.091	1.575 (0.9,2.67)	0.180	0.534	1.198 (0.679,2.113)
Poor family management ages 10–12 years (R)							0.417	0.090	1.517 (0.94,2.46)	0.372	0.135	1.451 (0.89,2.37)	0.344	0.187	1.411 (0.846,2.351)
Family conflict ages 10–12 years (R)							0.207	0.400	1.230 (0.76,1.99)	0.175	0.481	1.191 (0.73,1.94)	0.160	0.533	1.173 (0.71,1.938)
Low grades ages 10–12 years (R)										0.107	0.710	1.113 (0.63,1.96)	0.106	0.721	1.112 (0.621,1.99)
School attachment ages 10–12 years (P)										−0.597	0.044	0.551 (0.31,0.99)	−0.572	0.062	0.564 (0.31,1.029)
Low school commitment ages 10–12 years (R)										−0.012	0.964	0.988 (0.57,1.7)	−0.200	0.494	0.819 (0.462,1.452)
Peer delinquency ages 10–12 years (R)													0.325	0.180	1.383 (0.86,2.224)
Peer prosocial behavior ages 10–													0.159	0.542	1.173 (0.703,1.956)

	Model 1		Model 2		Model 3		Model 4		Model 5	
	B	Sig.	OR (95% CI)	B	Sig.	OR (95% CI)	B	Sig.	OR (95% CI)	B	Sig.	OR (95% CI)	B	Sig.	OR (95% CI)
12 years										
Neighborhood kids in trouble ages 10–12 years (R)									0.365	0.211	1.440 (0.813,2.55)
Perceived availability and exposure to marijuana ages 10–12 years(R)									1.079	0.000	2.943 (1.81,4.779)
Nagelkerke R^2	0.085			0.127			0.138			0.149			0.216		
−2 Log likelihood	564.423			548.703			544.488			539.969			513.387		
log-likelihood ratio test (χ^2–value)	30.494**			15.72**			4.216			4.519			26.582**		

SSDP,

Table 5

Summary of hierarchic regression analysis for variables predicting violence at ages 15–18 years—adds SSDP unique predictors (*n*=505)

	Model 1			Model 2			Model 3			Model 4			Model 5		
	B	Sig.	OR	B	Sig.	OR	B	Sig.	OR	B	Sig.	OR	B	Sig.	OR
Gender	0.594	0.003	1.811 (1.2,2.69)	0.465	0.025	1.591 (1.06,2.387)	0.422	0.044	1.525 (1.01,2.3)	0.430	0.042	1.538 (1.02,2.33)	0.294	0.188	1.342 (0.866, 2.08)
Poverty	0.955	0.000	2.599 (1.66,4.1)	0.903	0.000	2.467 (1.57,3.88)	0.871	0.000	2.390 (1.52,3.77)	0.791	0.001	2.206 (1.38,3.525)	0.717	0.004	2.049 (1.263,3.32)
African-American	0.026	0.919	1.026 (0.62,1.69)	−0.045	0.861	0.956 (0.57,1.593)	−0.015	0.953	0.985 (0.589,1.647)	−0.082	0.765	0.922 (0.54,1.574)	−0.152	0.592	0.859 (0.494,1.496)
Native American	0.317	0.485	1.373 (0.56,3.35)	0.239	0.607	1.270 (0.51,3.16)	0.302	0.519	1.353 (0.54,3.387)	0.219	0.645	1.244 (0.49,3.158)	0.227	0.642	1.255 (0.48,3.260)
Asian-American	−1.052	0.001	0.349 (0.19,0.63)	−0.896	0.004	0.408 (0.22,0.749)	−0.924	0.003	0.397 (0.214,0.734)	−0.999	0.002	0.368 (0.195,0.694)	−0.823	0.015	0.439 (0.226,0.854)
Attention problems/ADHD ages 10–12 years (R)				0.787	0.001	2.197 (1.39,3.47)	0.786	0.001	2.195 (1.39,3.468)	0.723	0.003	2.060 (1.27,3.337)	0.740	0.004	2.096 (1.26,3.475)
Refusal skills age 12 years (P)				−0.020	0.929	0.981 (0.64,1.51)	0.013	0.952	1.014 (0.657,1.563)	0.006	0.980	1.006 (0.65,1.557)	0.009	0.970	1.009 (0.644,1.581)
Poor family management ages 10–12 years (R)							0.427	0.066	1.533 (0.97,2.419)	0.411	0.084	1.508 (0.947,2.402)	0.319	0.197	1.375 (0.848,2.23)
Family conflict ages 10–12 years (R)							0.104	0.667	1.109 (0.69,1.778)	0.123	0.615	1.130 (0.70,1.823)	0.093	0.708	1.098 (0.674,1.788)
CAT ages 10–12 years (P)										−0.195	0.459	0.823 (0.49,1.380)	−0.162	0.553	0.850 (0.498,1.45)
Low expectations/aspirations toward school ages 10–12 years (R)										0.302	0.207	1.353 (0.846,2.163)	0.294	0.238	1.342 (0.823,2.186)
School attachment ages 10–12 years (P)										0.132	0.613	1.141 (0.685,1.90)	0.249	0.353	1.283 (0.759,2.169)
Low school commitment ages 10–12 years (R)										0.003	0.990	1.003 (0.598,1.684)	−0.190	0.490	0.827 (0.483,1.417)
Peer delinquency ages 10–12 years (R)													0.298	0.188	1.347 (0.864,2.100)
Neighborhood kids in trouble ages 10–12													0.299	0.286	1.349 (0.779,2.337)

	Model 1			Model 2			Model 3			Model 4			Model 5		
	B	Sig.	OR	B	Sig.	OR	B	Sig.	OR	B	Sig.	OR	B	Sig.	OR
years (R)															
Neighborhood attachment ages 10–12 years (R)													0.390	0.126	1.477 (0.896,2.434)
Perceived availability and exposure to marijuana ages 10–12 years (R)													0.812	0.001	2.253 (1.41,3.60)
Nagelkerke R^2		0.106			0.134			0.144			0.15			0.205	
−2 Log-likelihood		598.398			586.955			582.958			580.491			557.995	
log-likelihood ratio test (χ^2-value)		39.761**			11.444**			3.997			2.466			22.496**	

(R) indicates risk effect

(P) indicates direct protective effect