Examining Protective Factors Against Violence among High-risk Youth: Findings from the Seattle Social Development Project

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Abstract

Purpose—This paper examined proximal and distal effects of protective factors specified in the social development model (SDM) on youth violence among high-risk youth.

Methods—Data come from the Seattle Social Development Project, a longitudinal study of development from childhood into adulthood. A community sample of 808 participants from the Seattle Public School District was surveyed from the 5th grade through adulthood. This paper uses data from participants' adolescent years, ages 10–18.

Results—Higher levels of protective factors in early and middle adolescence reduced the odds of violence during late adolescence in the full sample and in two different risk groups (high cumulative risk and low SES). Although risk exposure increased the odds of violence, protective factors in middle adolescence predicted lower odds of violence during late adolescence. Importantly, protective factors had a greater effect in reducing violence among youth exposed to high levels of cumulative risk than among youth exposed to lower levels of cumulative risk. This difference was not observed between youth from higher and lower SES families.

Conclusion—Protective factors specified in the SDM appear to reduce violence in late adolescence even among youth from low SES families and youth exposed to high levels of cumulative risk.

Keywords

Protective factors; longitudinal study; violence; developmental predictors; At-risk youth

The prevention of youth violence is an important public health issue in the United States. According to the U.S. National Youth Risk Behavior Survey, in 2013, 24.7% of high school youth had engaged in a physical fight in the past year and 17.9% had carried a weapon to

school in the past month (Center for Disease Control, 2014). Both the physical and fiscal consequences are devastating: violence is the 3rd leading cause of death among youth ages 15–24. An average of 1,642 young people aged 10 to 24 years are treated in emergency departments each day due to physical assault injuries, which carries an estimated annual medical and work loss costs of $16 billion. Some youth also come in contact with the juvenile justice system, costing states millions of dollars each year (Petteniti, Walsh, Velazquez, 2009). Thus, preventing violent behaviors before they become less amenable to change may be an effective strategy to reduce the short- and long-term negative consequences of violent behaviors among young people (Coie et al., 1993; Catalano, Fagan, Gavin et al., 2012).

Understanding the etiology of youth violence, especially modifiable factors that predict the likelihood of violence, provides important information for how prevention and intervention programs should be implemented and which relevant predictors they should target. Predictors that increase the likelihood of negative outcomes are called risk factors and, despite some disagreements in the definition, protective factors broadly refer to variables that decrease the likelihood of negative outcomes (Coie et al., 1993; Hall et al., 2012; Losel & Farrington, 2012). Extensive work has been done in identifying risk factors for violence. For example, early initiation of violence, family antisocial norms, antisocial peers, availability of drugs in the community, poverty, and family conflict increase the likelihood of violence (Hawkins et al., 1998; Lipsey & Derzon, 1998; Herrenkohl et al., 2000; Hawkins et al., 2000; Hall et al., 2012). Less is known about protective factors against violence (Hall et al., 2012). One of the first coordinated efforts to understand the role of protective factors in the development of violence came from a Center for Disease Control (CDC) Initiative. An expert panel examined the direct protective and risk effects of factors that predicted the likelihood of violence (Losel & Farrington, 2012). Four longitudinal studies were included and sought to use the same set of predictors to understand whether these variables had a direct protective effect in reducing the likelihood of violence or a risk effect in increasing the likelihood of violence (Pardini, Loeber, Farrington, & Stouthamer-Loeber, 2012; Herrenkohl, Lee, & Hawkins, 2012; Bernat, Oakes, Pettingell, & Resnick, 2012; Henry, Tolan, Gorman-Smith, & Schoeney, 2012). Across the four studies – although limited by the small number of shared measures across studies – the only shared predictor that had a direct protective effect was strong school attachment, while they found many factors with risk effects.

This paper extends prior work by examining proximal and distal effects of a set of hypothesized protective factors on youth violence among high-risk youth and the interrelationship between risk and protective factors across ecological domains (e.g., school, community, family). Specifically, we address the following four research questions. First, to what extent do protective factors predict reduced violence among different groups? In a previous study from this sample, Herrenkohl, Hill, Chung, Guo, Abbott, & Hawkins (2003) identified youth with high aggression level at age 10 as an at-risk group. The study found that aggressive youth at age 10 were less likely to have committed violence at age 18 when they reported religious attendance, good family management, and positive school bonding at age 15. The study also found that a cumulative index of all protective factors specified in the social development model measured at age 15 reduced the likelihood of violence among

these youth at age 18. The current study uses measures of 1) high cumulative risk exposure and 2) low family socioeconomic status (SES) to identify two potential risk groups. The cumulative risk group includes youth with high levels of risk exposure across individual, family, school, and community domains. The low SES group includes youth from families with high levels of poverty and low parental education. In addition to identifying protective factors against violence in these two groups, we also examine whether specific protective factors are equally salient across these different groups.

The risk and protective factor measures in this study are guided by the Social Development Model (SDM, Hawkins & Weis, 1985; Catalano & Hawkins, 1996), a developmental theory of human behavior. The SDM hypothesizes both antisocial and prosocial pathways to explain the etiology of antisocial and prosocial behaviors. In these parallel socialization paths, the SDM asserts that *opportunities* for pro- or antisocial behavior, *involvement* with pro- or antisocial group, *skills* necessary for enhancing these involvements, and *rewards or recognition* for involvement would likely form *bonding* between individuals and the socializing group. If the bonding is strong, individuals are then more likely to adopt the beliefs and norms of the socializing group. Depending on the strengths of the pro- or antisocial beliefs that the socializing group holds, individuals will engage in pro- or antisocial behaviors. These pro- and antisocial processes also interact with each other to continue or discontinue pro- and antisocial behaviors. According to the social development model, opportunities for involvement with prosocial others, involvement with prosocial others, skills for prosocial involvement, recognition or rewards for prosocial involvement, bonding to prosocial others and prosocial beliefs or values are protective factors that inhibit behavioral problems such as violent behavior. In contrast, opportunities, involvement, and rewards from interactions with antisocial others as well as bonding to antisocial others and antisocial beliefs or values are viewed as risk factors for antisocial behaviors such as violence in the social development model.

Second, do the effects of protective factors on violence differ by developmental period? Influential factors in one developmental period may not be as salient in another developmental period. For example, one might expect that family factors might be more influential in early childhood, while peer factors might have a greater effect in adolescence (Maxwell, 2002; Albert, Chein, & Steinberg, 2013). Studies of risk factors for violence found that some risk factors are predictive in a single developmental period (Brewer, Hawkins, Catalano, & Neckerman, 1995; Hawkins, Herrentkohl et al., 1998; Lipsey & Derzon, 1998) while others remain predictive across developmental periods (Herrenkohl et al., 2000). In the current study, we test whether this holds true for protective factors. We examine protective factors in grades 5–6 and grades 7–8 predicting violence in two later periods (grades 7–8, and grades 9–12 respectively).

Third, what are the unique effects of risk and protective factors in predicting violence? In other words, when the level of protection is held constant, how much does risk increase the likelihood of violence; and conversely, when the level of risk is held constant, how much does protection decrease the likelihood of violence? Because individuals are often exposed to multiple risk or protective factors (Pollard et al., 1999; Hawkins et al., 2000; Evans, Li, Whipple, 2013), we examine the effects of cumulative exposure to risk factors and

cumulative exposure to protective factors. When examining the relationship between cumulative risk and protection among high-risk youth, Stoddard and colleagues (2013) found that even after adjusting for risk, cumulative protection had a direct effect on decreasing the likelihood of violence. We examine these relationships with a total protective score and a total risk score to determine their direct effects on violent behavior.

Fourth, do the effects of protective factors on violent behavior differ by at-risk group? Researchers have suggested that protective factors moderate the exposure to risk and mitigate the negative effect of risk on youth outcomes (Fergus & Zimmerman, 2005; Rutter, 1985) – in essence, truly functioning as a protection or buffer (Stoddard et al., 2013). Using the risk groups we have identified, we examine whether protective factors function differently for high-risk groups compared to lower risk groups in predicting violence. This information can potentially improve intervention targets and goals in selective prevention programming.

Methods

Data and Sample Description

Data come from the Seattle Social Development Project (SSDP), a longitudinal study that examines the development of positive and problem behaviors among adolescents and young adults. The current study began in 1985 with 18 elementary schools in the Seattle Public School District serving high-crime neighborhoods. Due to mandated bussing at the time, these schools and this sample included students from several parts of the city. Thus, the study oversampled children from high-risk neighborhoods, but is not limited to these children. At the time, all 5th grade students in participating schools were recruited for the longitudinal study and 808 students and their parents (76.7%) of the eligible population) agreed to participate in the SSDP study. Of the 808 students, 388 (49%) were female; 47% European American, 26% African American, 22% Asian American, and 5% Native American. The participants and their parents were surveyed or interviewed annually from 5th grade through 10th grade. Then the participants only were interviewed in 12th grade.

Measures

Violence in middle and late adolescence—The dependent variable, violent behavior, was measured in 7th and 8th grades (ages 13–14 or middle adolescence), and again in 9th through 12th grades (ages 15–18 or late adolescence). The present study used a violence seriousness measure consistent with Herrenkohl, et al. (2003). During each of the two time periods (middle and late adolescence), youth were coded with (0) if they did not report committing a violent act during that period; (1) if they reported committing at least one act that was considered low violence (example: throwing objects at people); (2) if they reported committing a least one act that was considered moderate violence (example: hitting a teacher); or (3) if they reported committing at least one act that was considered serious violence (example: using weapons or force to get money). The final variables represent the most serious offense reported during each time period. For example, a youth was coded with (2) in middle adolescence if the most serious offense he/she reported during that time period

fell into the "moderate" violence category, and (3) in late adolescence if the most serious offense reported during that period fell into the "serious" violence category.

Protective factors against violence in early and middle adolescence—Only protective factor scales that were consistently assessed across early and middle adolescence were examined in this paper. Of the SDM constructs, prosocial opportunities, rewards, involvement, and bonding were measured in the community and school domains. In the family domain, family management as well as rewards, involvement, and bonding were viewed as protective in the current analyses. Each of these constructs is represented by a scale of related items. Items were standardized within each year and then averaged to create a scale. Fifth and 6th grade (ages 10–12) scores were averaged to create the protective factor scales for early adolescence, and 7th and 8th grade (ages 13–14) scores were averaged to create the middle adolescence protective factor scores. Table 1 shows all protective factor scales used in the present analyses, the number of items used to create the scale (sometimes varying by year), the range of Cronbach's alpha statistics across years, and an example item.

In addition to the protective factor scales, protective factor composites by domain as well as across the three domains were created for early and middle adolescence. Protective factor scores created above were averaged within each domain and developmental period, creating family protective factor composites, school protective factor composites, and community factor composites for early and middle adolescence. These domain specific composites were then averaged across all domains (i.e., family, school, and community) within each developmental period to create the total protective factor score for early (Cronbach's alpha = 0.66) and middle (Cronbach's alpha = 0.70) adolescence.

Risk—Two variables, both measured in 5th and 6th grades, were used to divide the sample into high- (top 25%) and low-risk (the other 75%) groups. Dichotomization at the top quartile has been shown to be a useful split to study nonlinear relationships and interaction effects (Farrington & Loeber, 2000). First, socioeconomic status (SES) variable was created as a composite including three separate measures: eligibility for the free/reduced school lunch program and parental report of family income and parental education. Family income and parental education were both reverse coded, each measure was standardized, and the average of these three measures was taken. The final variable was coded as (1) to represent the 25% of the sample with the lowest SES and (0) to represent the other 75% (Youth in the bottom 25% of the SES category is hereinafter referred to as the low SES group). As described more fully below, the dichotomous measures were used to understand interaction effects of risk and protective factors and continuous measures were used to understand the main effects of risk.

The second variable used to distinguish a group exposed to a high level of risk from the remainder of the sample was a cumulative risk score. Included in this composite variable were six constructs covering the individual, peer, family, and neighborhood domains, including: individual risk/rebelliousness, family conflict, antisocial peers, peer alcohol use, neighborhood antisocial environment, and neighborhood drug environment. Each construct was created by standardizing and averaging several related items. To create the risk score, the average of the six constructs was taken (Cronbach's alpha = 0.63). It was then

dichotomized so that the top 25% of the sample represent highest risk (coded as 1), while the remaining 75% represent lower risk (0) (Youth in the top 25% of the highest risk category is hereinafter referred to as the high cumulative risk group). Again, both the continuous and dichotomous measures were used in the analytic models. The two risk designations (SES and cumulative risk) were related, but not redundant: about 7% of youth (n = 55) were in both the low SES and high cumulative risk groups while 36% (n =294) of youth fell into either one of the high-risk groups, and 53% (n=459) were at lower risk on both measures.

Demographic variables—Additional control variables in these models included self-reported gender (0 = female, 1 = male) and ethnicity (European American, African American, Asian American, and Native American).

Analysis

Analytic procedures are discussed below for each of the research questions addressed in this paper. All analyses were conducted in Mplus version 6.11 (Muthen and Muthen, 1998–2011). Mplus uses Full Information Maximum Likelihood (FIML) to handle missing data, which allows the use of all available data including the cases with missing values and is a superior method to listwise deletion, pairwise deletion, and mean imputations (Enders, 2001). The average percentage of missing values across all measures used in the analyses was 3.5%.

Protective factors against violence among different at-risk groups—Multivariate ordered logistic regression models were used to estimate the effect of protective factors on predicting the odds of violence (0–3) after adjusting for race and gender. To examine the unique effect of protective factors by domain, a separate model was estimated for each environmental domain (family, school, and community). Each model included all four domain-specific protective factors as independent variables, with race and gender as control variables. The domain-specific protective factors were constrained to be correlated in the model estimation in order to reduce multicollinearity. Identical models were estimated three times: first in the full sample (n = 808), second, among the high cumulative risk subsample (n = 202), and finally among the low SES subsample (n = 202).

The effects of protective factors over different developmental periods—To test whether some protective factors were salient in a single developmental period, all models estimated in this paper were strictly time-ordered: (1) protective factors in early adolescence predicting violence in middle and late adolescence and (2) protective factors in middle adolescence predicting violence in late adolescence.

Relationship between risk and protective factors and violence—To understand the unique effects of risk and protective factors on violence, multivariate ordered logistic regression models were estimated in the full sample (n = 808) with a total risk score and a total protective score as predictors and race and gender as control variables. The total risk score and total protective score were constrained to be correlated in the model estimation in order to reduce multicollinearity. The continuous composites created to identify the high cumulative risk group and the low SES group were used as two separate total risk scores.

Two models were estimated – one examining the unique effect of high cumulative risk and the other examining the unique effect of low SES.

Interaction of risk and protective factors in predicting violence—To examine the effects of protective factors in the context of risk, multivariate ordered logistic regression models including an interaction term between the total protective score and the total risk score were estimated in the full sample (n = 808). For ease of interpretation, dichotomous measures of the risk composites (both cumulative risk and SES) were used. Each risk measure was estimated in the interaction model separately to uncover the effects of protective factors in the context of different risk types. Finally, domain-specific protective composites were entered into the model separately to examine the protective effect by domain.

Results

Research question #1: To what extent do protective factors predict reduced violence among different at-risk groups?

Table 2 reports the odds of youth reporting a higher category of violence for one standardized unit increase in each protective factor variable for the whole sample and for the two previously identified high-risk subgroups (high cumulative risk group and low SES group). Across the full sample and the two high-risk groups, school rewards in early adolescence and school bonding in middle adolescence reduced the odds of higher levels of violence during late adolescence. This relationship was statistically significant for the full sample (rewards OR = 0.514, p<0.001; bonding OR = 0.608, p<0.01) and the low SES group (rewards OR = 0.345, p<0.01; bonding OR =0.449, p<0.01). Further, family bonding during early adolescence reduced the odds of violence in late adolescence for all groups but this relationship was statistically significant for only the high cumulative risk group (OR = 0.553; p<0.05). Finally, family management in middle adolescence significantly reduced the odds of higher levels of violence during late adolescence in the full sample (OR = 0.751, p<0.05) and among the high-cumulative risk (OR = 0.524, p<0.01) and low SES (OR = 0.451, p<0.01) groups. Similar patterns of protection can be seen in the smaller risk groups, but these did not consistently achieve statistical significance.

Table 2 also shows partial associations between family, school, and neighborhood involvement (particularly in middle school) and violence in the full sample analyses in the unexpected direction. This finding can most likely be attributed to a suppressor effect (Cohen & Cohen, 1975). In bivariate, zero-order correlations the associations between these items and violence were non-significant and very close to zero (not tabled). However, once gender and race were included in the regression, the partial coefficients were in the opposite direction than expected. Follow-up analyses examining potential associations between these involvement measures and violence within each gender and within each race/ethnic strata yielded associations that were again non-significant and very close to zero. Thus, this is likely a suppressor effect due to the correlations between gender and race and the involvement predictors.

Research question #2: Do the effects of protective factors on violence differ by developmental period?

No single protective factor significantly reduced the odds of violence across developmental periods, despite some consistencies in the relationship (See Table 2). In the full sample, school rewards in early adolescence significantly reduced the odds of serious violence in both middle (OR = 0.553, p<0.01) and late (OR = 0.514, p<0.001) adolescence but school rewards in middle adolescence did not significantly reduce the odds of serious violence in late adolescence. However, school bonding in middle adolescence did significantly reduce the odds of serious violence in late adolescence in the full sample and in the low SES group. Although family bonding consistently reduced the odds of serious violence across developmental periods for the high cumulative risk group, this relationship was statistically significant only for early family bonding and violence in late adolescence (OR = 0.553, p<0.05). Likewise, community rewards consistently reduced the odds of serious violence across developmental periods for the low SES group, but this relationship was statistically significant only for early community rewards and violence in middle adolescence (OR = 0.628, p<0.05).

Research question #3: what is the unique effect of risk and protective factors in predicting violence?

Table 3 provides the odds ratios for the total protective factor score predicting violence after controlling for different categories of risk (high cumulative risk or low SES) in the full sample (n = 808). As shown in models 1 and 3, increased cumulative risk during early adolescence and middle adolescence significantly increased the odds of youth reporting more serious violence by nearly 4 to 5 times during middle (OR = 4.734; p<0.001) and late adolescence (OR = 3.662; p<0.001) even after controlling for levels of protective factor composite scores. In contrast, as shown in models 2 and 4, low SES during early and middle adolescence did not significantly increase risk for violence after controlling for levels of protection.

Model 1 also shows that controlling for the cumulative risk composite and demographic variables, the total protective score in early adolescence did not significantly reduce the likelihood of higher levels of violence during middle adolescence. However, as indicated in model 5, controlling for the cumulative risk composite and demographic variables, a one unit increase in the total protective factor score in middle adolescence significantly reduced the odds of youth reporting higher levels of violence in late adolescence by 43.1% (OR = 0.569; p<0.01) during late adolescence.

In model 2 and 4, when controlling for demographic variables and the SES composite, an increase in the total protective factor score in early adolescence decreased the odds of youth reporting higher levels of violence by 37.2% (OR = 0.628; p<0.01) during middle adolescence and by 44.4% (OR = 0.556; p<0.05) during late adolescence. Finally, in model 6, controlling for demographic variables and SES, the total protective factor score in middle adolescence reduced the likelihood of more serious violence by 61.1% (OR = 0.389; p<0.001) during late adolescence.

Research question #4: do the effects of protective factors on violent behavior differ by at-risk group?

Table 4 provides information on whether the relationship between protective factors and violence outcomes changes based on the two risk groups (high cumulative risk group and low SES group) in the full sample (n = 808). Across all groups (i.e., low/high risk, low/high SES), protective factors in middle adolescence consistently reduced the odds of violence in late adolescence. Specifically, the total protective factor score and the family protective scores in middle adolescence significantly decreased the odds of violence during late adolescence for both the low cumulative risk group (total protective factor OR = 0.605, p<0.05; family protective factor OR = 0.670, p<0.05) and the high cumulative risk group (total protective factor OR = 0.257, p<0.01; family protective factor OR = 0.249, p<0.001). However, the difference in the protective effect was statistically significant, suggesting a stronger protective effect for youth in the high cumulative risk group compared to those in the low cumulative risk group. The protective effect of the total protective factor score and the family protective score in middle adolescence on violence in late adolescence was consistently observed in both the high SES group (total protective factor OR = 0.399, p<0.001; family protective factor OR = 0.366, p<0.001) and the low SES group (total protective factor OR = 0.343, p<0.01; family protective factor OR = 0.536, p<0.05). The difference in the protective effect was not statistically significant, suggesting that these protective factors are equally important for youth in both high SES and low SES groups.

Conclusion and Discussion

This paper addressed several important questions about the relationship between protective factors and violence across early to late adolescence. In answering our first research question, we found that several shared protective factors were salient across the full sample, the high cumulative risk group, and the low SES group. Though they did not reach statistical significance in all groups, school rewards, bonding, and opportunities, as well as family bonding consistently predicted reduced odds of more serious violence in later developmental periods. Family management in middle adolescence, however, significantly decreased the likelihood of violence in late adolescence for all groups.

Furthermore, consistent with some studies suggesting developmental salience of risk factors (Brewer, Hawkins, Catalano, & Neckerman, 1995; Hawkins, Herrenkohl et al., 1998; Lipsey & Derzon, 1998), we found no overlap of protective factors across developmental periods. For example, in the full sample, school reward in early adolescence, but not in middle adolescence, reduced the odds of violence in middle and late adolescence. Similarly, among youth in the low SES group, school bonding in middle adolescence, but not in early adolescence, was a statistically significant predictor of decreased violence during late adolescence. However, despite the differences in specific statistically significant protective factors across the developmental periods, protective factors in the family and school domains were important in reducing the likelihood of violence across developmental periods.

These findings highlight the need for implementing universal, cross-domain prevention programs early on, particularly school-based prevention programs that foster positive environments in school settings. Given the importance of school protective factors in

reducing violence among the two risk groups, it is imperative that prevention programming reaches these populations. Furthermore, protective factors in the family domain during mid adolescence were found in this study to play an important role in reducing violence in later adolescence, supporting claims from others that family influences continue to reduce adolescent problem behaviors despite seemingly reduced involvement (Viner et al. 2012). Thus, engaging families of middle school students in parenting programs could potentially have lasting impact on reducing later violent behaviors.

Examining the relationship between cumulative risk and cumulative protection also yielded interesting results. As reported by Stoddard and colleagues (2013), we found that, cumulative protection in middle adolescence significantly reduced the likelihood of violence during late adolescence when risk levels were held constant. We also found that cumulative risk – measured by high levels of risk – predicted significantly greater likelihood of violence across all developmental periods, even after controlling for cumulative protection. This finding suggests that prevention programs are likely to have greatest impact if they focus both on reducing high levels of cumulative risk exposure in the population and seek to enhance protection at all levels of risk exposure.

An examination of whether risk and protective factors interact with each other revealed that protective factors more strongly predicted reduced likelihood of more serious violence among youth in the high cumulative risk group compared to the low cumulative risk group. The effect of protective factors was not different between high and low SES groups. Protective factors lowered the likelihood of violence among youth in both high and low SES groups. The findings suggest that all young people would benefit from universal programs that build protective factors but those who report high levels of risk exposure would benefit the most from these programs.

This study has limitations. First, the protective factor scales used in this study were congeneric, and differed in some items across ages. For example, some scale items were added as respondents aged to ensure that the scales were developmental appropriate. However, these protective factor constructs were theoretically driven by the Social Development Model and have been empirically tested and verified in other populations (Catalano, Oxford, Harachi, Abbott, & Haggerty, 1999; Fleming, Catalano, Oxford, & Harachi, 2002; Roosa et al., 2011; Sullivan & Hirschfield, 2011). In addition, results are best generalized to similar higher-risk urban populations. Comparable studies should be conducted in other populations.

Despite these limitations, this study uncovered important information about the relationship between risk and protective factors in predicting violence across adolescence. The longitudinal nature of the study allowed us to examine three developmental periods within adolescence to understand the proximal and distal effects of protective factors on violence. Furthermore, by examining two different risk-based groups, this study provides important insight regarding how protective factors might function similarly or differently for these different groups. Overall, the questions answered in this paper could improve the development and implementation of future prevention programming as well as reveal why some prevention programs are differentially effective with different subpopulations.

Acknowledgments

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Highlights

■ Higher levels of protective factors in early and middle adolescence reduced the odds of violence in late adolescence

■ Specific protective factors against violence varied across different risk groups

■ Protective factors had a greater effect in reducing violence among youth with high levels of cumulative risk exposure.

Table 1

Protective Factor Scale Description Grade 5–8

Construct	# of items (α range)	Sample item
COMMUNITY		
Opportunities	1 – 6 (N/A – 0.58)	Kids from my neighborhood have a chance to be successful
Involvement	1 – 3 (N/A – 0.32)	How many other groups <u>outside of school</u> such as scouts, little league, service clubs, or hobby clubs are you a member of?
Rewards	1 – 3 (N/A – 0.67)	Are you satisfied with your neighborhood?
Bonding	1 – 4 (N/A – 0.88)	I like my neighborhood
FAMILY		
Family management	3 (0.44 – 0.58)	The rules in my family are clear
Involvement	9 (0.52 – 0.61)	On weekdays, how many meals does your family eat together each day
Rewards	3 (0.51 – 0.62)	My parents notice when I'm doing a good job and let me know about it
Bonding	5 (0.62 – 0.65)	Do you share your thoughts and feelings with your mother?
SCHOOL		
Opportunities	9 – 11 (0.66 – 0.79)	I have lots of chances to take part in class activities
Involvement	2 – 5 (0.25 – 0.52)	I take part in class discussion and activities
Rewards	6 – 12 (0.68 – 0.79)	My teacher praises or compliment me when I work hard
Bonding	4 – 8 (0.67 – 0.78)	Most mornings I look forward to going to school

Table 2

Domain-specific Protective Factors Predicting Violence in the Full Sample and Risk Subsamples[a]

	Middle Adolescence Violence			Late Adolescence Violence		
	Full Sample (n=808)	High Cumulative risk group (n=202)	Low SES Group (n=202)	Full Sample (n=808)	High Cumulative risk group (n=202)	Low SES Group (n=202)
			Odds Ratio			
Early Adolescence						
COMMUNITY						
Opportunities	1.006	0.937	1.146	0.957	0.955	1.036
Rewards	0.845	1.201	0.628 *	0.873	0.982	0.795
Involvement	0.91	1.016	1.088	1.076	1.08	0.936
Bonding	0.945	0.871	1.482	0.856	0.858	1.029
SCHOOL						
Opportunities	0.938	0.551	0.739	1.012	0.611	1.637
Involvement	1.206	1.31	0.862	1.176	1.01	0.944
Rewards	0.553 **	0.687	0.97	0.514 ***	0.585	0.345 **
Bonding	0.912	1.463	1.156	1.014	1.137	1.606
FAMILY						
Management	0.944	1.568	1.714	0.82	1.232	1.119
Rewards	0.998	0.917	0.986	0.872	0.665	0.593
Involvement[b]	1.065	1.099	0.552	1.508 *	1.89	1.286
Bonding	0.798	0.719	0.801	0.805	0.553 *	0.876
Middle Adolescence						
COMMUNITY						
Opportunities				0.831	1.428	1.232

	Middle Adolescence Violence			Late Adolescence Violence		
	Full Sample (n=808)	High Cumulative risk group (n=202)	Low SES Group (n=202)	Full Sample (n=808)	High Cumulative risk group (n=202)	Low SES Group (n=202)
Rewards				0.885	0.947	0.724
Involvement[b]				1.323*	0.887	1.174
Bonding				0.845	0.868	0.778
SCHOOL						
Opportunities				0.672*	0.551	0.783
Involvement[b]				1.467**	1.61	1.508
Rewards				0.96	0.707	0.913
Bonding				0.608**	0.619	0.449**
FAMILY						
Management				0.751*	0.524**	0.451**
Rewards				0.638***	0.706	1.014
Involvement[b]				1.815**	1.878	1.972
Bonding				0.653**	0.593	0.842

*
p<0.05.

**
p<0.01.

***
p<0.001.

[a] A multivariate ordered logistic regression assessed each protective factor, adjusting for race and gender

[b] In bivariate, zero-order correlations the associations between these items and violence were non-significant and very close to zero. As described in the text, this is likely a suppressor effect due to correlations between gender and race and the involvement predictors.

Table 3

Risk and Protective Factor Composites Predicting Violence in the Full Sample (n = 808)[a]

	Middle Adolescence Violence		Late Adolescence Violence	
	Model 1	Model 2	Model 3	Model 4
Early Adolescence				
Risk composite	4 734 ***		3.662 ***	
SES composite		1.204		1.202
Total protective factor score	1.449	0.628 **	1.151	0.556 **

			Model 5	Model 6
Middle Adolescence				
Risk composite			2.944 ***	
SES composite				1.172
Total protective factor score			0.569 **	0.389 ***

*
p<0.05.

**
p<0.01.

***
p<0.001.

[a]Coefficients presented are odds ratios. Race and gender were included as covariates in all model

Table 4

Interaction between Risk and Protective Factors in Predicting Violence in the Full Sample[a]

Middle Adolescence Violence

	[b]Risk=0 Odds Ratio	Risk=1	Interaction PF × Risk	[c]SES=0 Odds Ratio	SES=1	Interaction PF × SES
Early Adolescence						
Total protective score	0.923	1.057	0.225	0.522 **	0.938	0.601
Community protective score	0.974	0.994	0.010	0.760 *	1.021	0.301
Family protective score	1.111	1.153	0.025	0.751	0.919	0.253
School protective score	0.770	0.907	0.230	0.517 **	0.797	0.381
Middle Adolescence						
Total protective score						
Community protective score						
Family protective score						
School protective score						

Late Adolescence Violence

	Risk=0 Odds Ratio	Risk=1	Interaction PF × Risk	SES=0 Odds Ratio	SES=1	Interaction PF × SES
Early Adolescence						
Total protective score	0.985	0.541	−0.561	0.536 **	0.583	0.150
Community protective score	0.863	0.830	−0.060	0.702 **	0.835	0.036
Family protective score	1.373	0.654	−0.693 *	0.828	0.584	−0.210
School protective score	1.027	0.522	−0.557	0.597 **	0.735	0.209
Middle Adolescence						
Total protective score	0.605 *	0.257 **	−0.916 *	0.399 ***	0.343 **	−0.157
Community protective score	0.740	0.895	0.082	0.758	0.582 *	−0.226
Family protective score	0.670 *	0.249 ***	−0.984 **	0.366 ***	0.536 *	0.348
School protective score	0.802	0.375 **	−0.713	0.608 *	0.449 *	−0.371

*
p<0.05.

**
p<0.01.

***
p<0.001.

[a]Each protective factor score was examined separately in a multivariate ordered logistic regression, adjusting for race and gender

[b]Risk = 0 refers to the low cumulative risk subsample (n = 606) and Risk =1 refers to the high cumulative risk subsample (n = 202)

[c]SES = 0 refers to the high socioeconomic status subsample (n = 606) and SES =1 refers to the socioeconomic status subsample (n = 202)