



Protective factors for violence: Results from the Pittsburgh Youth Study



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ABSTRACT

Purpose: The main aim of this research is to investigate risk-based protective and interactive protective factors for violence.

Methods: The youngest sample of the Pittsburgh Youth Study, a prospective longitudinal survey of 503 boys followed-up from age 7 onwards, was analyzed. Variables measured at age 10–12 were investigated as predictors of an all-source measure of violence between ages 13 and 19.

Results: A number of individual (e.g., low hyperactivity, low psychopathic features) family (good supervision, low parental stress), school (high academic achievement, positive attitude to school) and demographic characteristics (older mother, good quality housing) were found to be risk-based protective factors for the various risk groups identified. High academic achievement was consistently found to be an interactive protective factor and was consistently independently related to low levels of violence.

Conclusions: Much more research on risk-based protective factors and interactive protective factors is needed so that these can be integrated into developmental and life-course explanations of offending. Also, interventions should be tailored to include knowledge about these protective factors in light of the specific risks that individuals possess.

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1. Introduction

In its short history, developmental and life-course criminology has been predominantly devoted to identifying the most important risk factors for various criminal career parameters (e.g., prevalence, frequency). A risk factor is commonly defined as a variable that predicts a high probability of an offending, and the individual, family, neighborhood, and socio-demographic risk factors for youth violence have been extensively studied (e.g. Derzon, 2010; Farrington, 2015; Loeber & Farrington, 1998).

Amongst the most important individual risk factors for youth violence are hyperactivity-impulsiveness, deceitful interpersonal style, and low intelligence/low school attainment (e.g., Denno, 1990; Jolliffe & Farrington, 2009). A number of child rearing and parental characteristics have also been associated with the later violence, as are coming from a disrupted home and living in a single-parent female headed household (Farrington, 2015). In general coming from a low socioeconomic status (SES) family, family dependence on welfare benefits, low family income and poor housing predict later violence (Derzon, 2010).

However, the emphasis on risk factors has attracted criticism for focussing specifically on deficits or problems. In response, some

researchers have suggested re-aligning the risk factor approach to include both risk and protective factors (e.g. Pollard, Hawkins, & Arthur, 1999). Unfortunately, protective factors lack a clear nomenclature, resulting in considerable confusion. Some have conceptualized the term 'protective factor' as the polar opposite of a risk factor (e.g., White, Moffitt, & Silva, 1989), while others have considered a protective factor as one which interacts with a risk factor to negate its impact (Rutter, 1985). Alternatively, protective factors have been considered variables that predict a low likelihood of offending in a group at risk, such as children living in deprived conditions (Werner & Smith, 1992).

Loeber, Farrington, Stouthamer-Loeber, and White (2008) attempted to resolve this definitional issue by adopting the approach of Sameroff, Bartko, Baldwin, Baldwin, and Seifer (1998) in proposing that a variable that predicted a low probability of offending should be termed a promotive factor. In a recent Centers for Disease Control special issue exploring protective factors for violence (Hall et al., 2012) the same factors (i.e., promotive factors, or those which had desirable main effects) were referred to as *direct* protective factors while *buffering* protective factors were those that mitigated the impact of a risk factor. The fact that a variable can be a risk factor, a promotive factor, both a risk and promotive factor (what Loeber et al., 2008, referred to as a mixed factor), a buffering protective factor for a specific risk factor (e.g., low impulsivity buffering the impact of peer delinquency) or a buffering protective factor for a risk category (e.g., academic

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achievement buffering the impact amongst those from disadvantaged neighborhoods), and that these categorizations could change with age, shows why confusion about what is meant by 'protective factors' persists. For the purposes of the current study, the terminology of Loeber et al. (2008) will be adopted with regards to risk, promotive and mixed factors.

In order to determine whether a variable is a risk, promotive, or mixed factor, it must be empirically tested. One approach to this is to trichotomize the variable into the 'worst' quarter (e.g., high impulsivity) the middle half, and the 'best' quarter (e.g., low impulsivity) and compare both the risk end and the promotive end of the same variable to offending. If a variable is linearly related to offending so that the percent delinquent is low in the best quarter and high in the worst quarter, then that variable could be regarded as both a risk and promotive factor, or what Loeber et al. (2008) referred to as a mixed factor. However, if the percent delinquent is high in the worst quarter, but not low in the best quarter, that variable would be regarded as a risk factor. Alternatively, if the percent delinquent is low in the best quarter but not high in the worst quarter, that variable could be regarded as a promotive factor (see Farrington & Tfofi, 2011).

One of the most comprehensive investigations exploring risk, promotive and mixed factors for serious theft and violence, was conducted by Loeber et al. (2008, Chapter 7, Table 7.1). The results suggest that many variables, including hyperactivity-impulsivity, and parental supervision were best conceptualized as promotive factors, while others, such as depressed mood, and parental reinforcement, were in fact mixed factors. Many of these factors had previously been considered only as risk factors, but including them as promotive factors improved the prediction of serious theft and violence.

The term buffering protective factor, as used by Hall et al. (2012) in introducing the CDC special issue on promotive factors for violence, could include both a variable that interacts with a risk factor to nullify its effect and also a variable that predicts a low probability of offending amongst a high-risk group; however, these two concepts should be considered separately. For the purposes of this research, the term 'risk-based protective factor' will be used to refer to a variable that predicts a low probability of offending amongst a defined group 'at risk', and the term 'interactive protective factor' will be used to refer to a variable that interact to nullify the impact of a specific risk factor.

Much less is known about protective factors than about risk factors, but a number of individual, family, school, socioeconomic, peer, and neighborhood factors have been identified as potential protective factors (for a more complete review see Lösel & Farrington, 2012). Many of these factors have been identified in the process of studying resilience, or the factors that associated with desirable outcomes amongst children variously defined as 'at risk'. For example, the Kauai Longitudinal Study followed all children born in 1955 on a Hawaiian island from the perinatal period to age 30 years (Werner & Smith, 1992). Those children who faced challenging individual, family, and environmental conditions (e.g., poverty, low maternal education, disrupted family, perinatal stress), but did not develop serious learning or behavioral problems were more likely to be first born, active and affectionate infants from smaller cohesive families. These children also tended to have high verbal skills, high self-esteem, and to have received a relatively high level of attention in infancy.

Perhaps the most replicable protective factors are found in the broad domain of intelligence and academic achievement. In their study of high-risk 14–17 year old adolescents from residential homes, Lösel and Bliesener (1994) found that those who had not developed behavioral or emotional problems tended to be more intelligent and to have a better self-concept than those who did develop such issues. Other studies have identified high intelligence or academic achievement as potentially important protective factors amongst children possessing particular risks (e.g., Kolvin, Miller, Scott, Gatzanis, & Fleeting, 1990).

Good parental supervision and a warm emotional attachment to parents appear to be protective factors for children's later delinquency

and violence. For example, in the Newcastle Thousand Family Study, Kolvin et al. (1990) found that children who faced multiple impediments, such as coming from a family dependent on welfare, living in an overcrowded house, receiving poor physical care, poor mothering, parental illness, and disrupted family, were less likely to have official offenses at age 32 if they had received good parental supervision.

There have been relatively few studies of the potential protective influence of socioeconomic factors for later offending and violence. However, in the aforementioned Newcastle Thousand Family study, high socioeconomic status was a protective factor against delinquency amongst deprived children (Kolvin et al., 1990).

Neighborhood protective factors have been more thoroughly investigated. For example, in the study of Kupersmidt, Griesler, DeRosier, Patterson, and Davis (1995), the effect on aggression of living a middle-class neighborhood was studied amongst 1271 second through fifth grade children (40% African American). The results suggested a protective effect of middle-class neighborhoods on the aggressive behavior of African American children from low-income, single-parent homes. It was suggested that middle-class neighborhoods might provide more prosocial role models and opportunities and fewer stressors, such as threats to personal safety, as well as fewer opportunities for aggression.

A number of studies have focussed specifically on the potentially protective relationship that might exist between neighborhoods and high impulsiveness (e.g. Lynam et al., 2000; Zimmerman, 2010). Using 1191 subjects aged 12–15 from the Project on Human Development in Chicago Neighborhoods, Zimmerman (2010) discovered that the risk of self-reported offending and violence was greater for impulsive individuals living in non-deprived neighborhoods, while impulsivity had no effect on offending in deprived neighborhoods.

There is some limited evidence to suggest that the peer factors, specifically having non-deviant friends or not having delinquent friends, could be protective. In the Christchurch Health and Development Study, Fergusson and Horwood (2003) examined resilience to a number of different forms of adversity. These included socioeconomic adversity, (low SES, low parental education, low standard of living), parental change and conflict (single parent family, changes of parents, interparental violence), child abuse exposure (physical punishment, experience of sexual abuse) and poor parental adjustment (parent alcohol problems, parental criminality). The results suggested that lower levels of externalizing behavior in both adolescence and adulthood were associated with limited deviant peer affiliations.

1.1. The current study

The present analyses extend the work of Pardini, Loeber, Farrington, and Stouthamer-Loeber (2012) and Loeber et al. (2008) both of which focussed on identifying promotive factors (direct protective factors) for violence using the Pittsburgh Youth Study. In the current study the purpose was to first identify promotive factors, and then risk-based protective factors and potentially interactive protective factors. Specifically, risk-based and interactive protective factors were explored for those from deprived neighborhoods, those living in deprived families, and those who have repeated a grade. In the past, all of these have been considered risk factors for violence (e.g., Farrington, 2015) and previous research on protective factors has generally explored resilience to an amalgamation of these background factors (e.g. Werner & Smith, 1992). However, this research is one of a small number of studies where the risk-based and interactive protective factors for specific risk groups were explored.

In addition, this research explores the risk-based and protective factors for African American boys. Previous research has established that African American boys appear more likely to commit serious violence than Caucasian boys, with evidence that this race difference can be accounted for by an over-exposure to various risk factors. For example, previous results from the youngest and oldest cohorts of the Pittsburgh

Youth Study indicated that, while bivariate comparisons suggested that African American boys were more likely to commit violence, when relevant individual (e.g. academic achievement), family (e.g., number of caretaker changes), and socio-demographic (e.g., family on welfare) factors were controlled, the impact of race on predicting violence disappeared (Loeber et al., 2008, p.202).

There is evidence that some risk factors might operate differently for African American and Caucasian boys. In the Pittsburgh Youth Study, harsh physical punishment predicted violence for Caucasians but not for African Americans (Farrington, Loeber, & Stouthamer-Loeber, 2003). It has been suggested (e.g. by Deater-Deckard, Dodge, Bates, & Pettit, 1996; Kelley) that this is because physical discipline is associated with neglect and coldness in Caucasian families but with concern and warmth in African American families. In addition, Lynam, Moffitt, and Stouthamer-Loeber (1993) found that low intelligence was related to self-reported offending for both African American and Caucasian boys, but for African American boys this relationship was mediated by school failure while for Caucasian boys it was not. There has been no previous research on whether protective factors operate in the same way for African American and Caucasian boys.

The present article explores the following questions: (1) What are the risk and promotive factors at ages 10–12 for serious violence between the ages of 13–19? (2) What are the key risk-based protective factors for those from deprived neighborhoods, those living in deprived families, those living in disrupted families, and those who have repeated a grade at school? (3) Are there any differences in protective factors for African American as opposed to Caucasian boys?

2. Methods

This article analyzes data from the youngest cohort of the Pittsburgh Youth Study. Details regarding the sample selection, study characteristics, and participants can be found in Loeber et al., 2008.

The longitudinal follow-up of the youngest cohort consisted of interviews conducted with the boys and their primary adult caretakers (hereafter referred to as “parents”) and questionnaires completed by the parents and teachers. The retention rate of this study has remained consistently high, never falling below 82%, and 70% of the participants were interviewed across all 18 assessments.

This article examines the extent to which variables measured at ages 10–12 predicted violence between the ages of 13–19. In order to investigate promotive and protective effects age 10–12 variables were divided into the ‘worst’ quarter (the risk end), the middle half and the ‘best’ quarter (the promotive end). The promotive or protective effect of some age 10–12 variables could not be examined because they are naturally occurring dichotomies, such as coming from a disrupted family or repeating a grade at school, or because they were originally measured as dichotomies, notably family on welfare and living in a small house. However, 23 variables across six domains were trichotomized.

3. Measures

The measures were classified into the general domains of individual, family, school, peer, and community factors. Measures indicative of early antisocial behavior (e.g., drug use, truancy, theft, vandalism) were not included.

3.1. Individual factors

3.1.1. Attention-deficit hyperactivity problems

This construct was based on questions to caretakers which measured fourteen ADHD symptoms.

3.1.2. Psychopathic features

This construct included an assessment of behaviors by parents and teachers which assessed the interpersonal and affective features associated with psychopathy.

3.1.3. Depression

This construct was assessed using the self-report Recent Mood and Feelings Questionnaire (Costello & Angold, 1988), which measures major depression in children and adolescents.

3.1.4. Anxiety

This construct measured the youth's anxious behaviors (e.g., clings to adults'), based on the reports of both parents and teachers.

3.1.5. Shyness/withdrawal

This construct measured the youth's withdrawn and shy behaviors based on reports from the youth, parents and teachers. Behaviors included ‘likes to be alone’ and ‘refuses to talk’.

3.1.6. Attitude towards delinquency

This construct was measured using the youth's response to the Attitude Toward Delinquency Questionnaire (Loeber, Farrington, Stouthamer-Loeber, & Van Kammen, 1998), which asked the youth to rate how *wrong* it was to engage in various illegal behaviors using a 4-point scale.

3.1.7. Likelihood of getting caught

This construct was measured using 10 items from youth reports on the Likelihood of Getting Caught Questionnaire (Loeber et al., 1998). The items asked the youth to judge the likelihood that he would be caught by police if he committed specific delinquent acts.

3.2. Family factors

3.2.1. Persistence of discipline

This construct included both the parent's and youth's reports of the degree to which the parent persisted in disciplinary action towards the child.

3.2.2. Physical punishment

This construct included both the parent's and youth's reports of whether the parent hit, slapped, or spanked the youth when he misbehaved.

3.2.3. Supervision

This construct combined parent and youth reports of the extent of the parent's knowledge of the youth's activities outside of the home.

3.2.4. Boy not involved

This construct combine parent and youth reports of the degree to which the youth was involved in planning and participating in family activities.

3.2.5. Parental reinforcement

This construct combined parent and youth's reports of the parent's tendency to reward the child using special privileges or compliments for good behavior.

3.2.6. Parental stress

This construct summarizes the caretaker's perceptions of their stress levels and ability to handle problems.

3.3. Peer behavior

3.3.1. Peer delinquency

This construct summarized the participation of the youth's friends in various delinquent activities such as stealing, vandalism and physical fighting.

3.3.2. Relationship with peers

This construct combined the parent, teacher and youth views of the youth's tendency to get along with his peers.

3.4. School factors

3.4.1. Academic achievement

This construct combined the parent's, teacher's and youth's evaluation of the youth's performance in reading, math, writing and spelling.

3.5. Attitude to school

This construct was a summary of seven questions asking about the youth's feelings about and behavior at school. For example, 'Do you care what the teachers think of you?'

3.6. Repeated grade

This construct counted the number of grades repeated by a youth over his educational career.

3.7. Neighborhood Factors

3.7.1. Neighborhood impression

Parents were asked to rate the prevalence of various problems in their community, including abandoned buildings, unemployment, racial tension, and various criminal activities.

3.7.2. Neighborhood disadvantage

This construct was made from 1990 U.S. Census data on the neighborhood in which the youth resided at screening. The youths address was used to determine his census tract, and then the tracts were matched to neighborhoods.

3.8. Demographic factors

3.8.1. Race/ethnicity

This construct was based on data completed by the caretaker at screening. A total of 42.3% of the sample was Caucasian and 57.7% African American. About 2.4% of those in the African American category were Asian (1.0%), Hispanic (0.4%), mixed race (0.8%) and American Indian (0.2%).

3.8.2. Number of biological parents in home

This construct categorized the youth's living situation according to how many biological parents lived in the home. For the purposes of these analyses children were classified as living with no or one biological parent (68.8%) or two biological parents (31.2%).

3.8.3. Age of mother when having her first child

This construct indicated the age of the youth's biological mother when her first child (whether or not it was the participant) was born. The mother's age was trichotomized into three categories: ages 12–17 (called young mother), ages 18–22, and ages 23–37 (called older mother).

3.8.4. Family socioeconomic status

This construct measured the socioeconomic status (SES) of the youth's family by applying the Hollingshead (1975) index of social

status which includes an assessment of the educational level and occupational prestige of the youth's caretakers.

3.8.5. Family on welfare

This construct was positive if anyone in the youth's household had received public assistance during the previous year.

3.8.6. Family size

This construct was based on the youth's report of the total number of children under 18 years old, other than himself, living in his house.

3.8.7. Small house

This construct was positive if the number of rooms in the youth's home, including kitchens and bathrooms, was fewer than six.

3.8.8. Housing quality

This construct summarized the interviewer's assessment of the youth's home, based on the structural condition of the home, visible signs of deterioration, and cleanliness.

3.9. Serious violence Age 13–19

Neither official records nor self-reports provide an unbiased measure of offending (e.g. Jolliffe & Farrington, 2014). In order to address the limitations of each of these approaches, this study utilized an all-source measure of serious violence which combined self-reports and official records. Self-reported serious violence included robbery, attacking to hurt or kill, or forced sex, and official serious violence included convictions for robbery, aggravated assault, aggravated indecent assault, homicide, forcible rape, and involuntary deviate sexual intercourse. This construct was scored positively if a youth had either a self-reported serious violent offense or a conviction for a serious violent offense.

4. Results

4.1. Risk and promotive factors

Table 1 shows the percent convicted in each of the three categories of each variable. For example, 9.8% of the 123 boys with low hyperactivity committed violence, compared with 24.2% of 236 boys with medium hyperactivity, and 35.8% of the 120 boys with high hyperactivity. Each variable was classified as a risk factor, a promotive factor (having positive direct main effects), or a mixed factor (linearly related to offending). The promotive odds ratio (OR) compares the promotive ('best') category with the middle category, while the risk OR compares the risk ('worst') category with the middle category. For hyperactivity, the promotive OR was 3.0 (95% confidence interval or CI = 1.5 to 5.7, $p < .001$), while the risk OR was 1.8 (CI = 1.1–2.8, $p < .02$). Therefore, hyperactivity was considered a promotive factor. About 45% of the trichotomized variables (10 out of 23) had mainly promotive effects. Of the rest, seven seemed to be linearly related to offending (mixed) and six were classified as risk factors.

The promotive factors up to age 12 with the strongest association with (low) serious violence at ages 13 to 19 were high academic achievement (OR = 5.5), hyperactivity (OR = 3.0) and age of mother (OR = 2.9). These variables were also found to be promotive factors when predicting violence in a more restricted age range (Loeber et al., 2008, p. 183–187).

One of the key challenges in investigating risk-based protective factors is to identify a reasonably large risk group. For example, information about child maltreatment (official records of a substantiated case of maltreatment) was available in the Pittsburgh Youth Study and it would have been interesting to see which factors buffer the impact of this type of trauma on later violence. However, only 88 boys had been officially maltreated and of these only a very small proportion possessed

Table 1
Risk and promotive factors for serious violence.

Factors up to age 12	Violent offending 13–19			Odds ratios		Type
	Prom %	Mid %	Risk %	Prom	Risk	
Individual factors						
Hyperactivity	9.8	24.2	35.8	3.0**	1.8*	Prom
Psychopathic features	10.1	20.1	43.0	2.2*	3.0***	Mixed
Depressed mood	15.3	24.8	28.0	1.8*	1.2	Prom
Anxiety	15.4	25.3	27.7	1.9*	1.1	Prom
Shyness/withdrawal	15.2	23.2	28.6	1.7	1.3	Prom
Attitude to delinquency	16.7	18.9	39.2	1.2	2.8***	Risk
Likelihood of getting caught	12.6	22.6	37.1	2.0*	2.0*	Mixed
Family factors						
Persistence of discipline	18.7	21.7	31.2	1.2	1.6*	Risk
Physical punishment	16.7	24.3	29.7	1.6	1.3	Prom
Supervision	12.2	24.3	33.3	2.3*	1.6	Prom
Boy not involved	20.2	21.3	30.8	1.1	1.6*	Risk
Parental reinforcement	21.5	20.5	31.4	0.9	1.8*	Risk
Parental stress	16.1	24.2	29.9	1.7	1.3	Prom
Peer behavior						
Peer delinquency	8.5	20.3	45.3	2.7**	3.2***	Mixed
Relationship with peers	11.1	21.6	39.7	2.2**	2.4***	Mixed
School factors						
Academic achievement	5.9	25.5	36.8	5.5***	1.7*	Prom
Attitude towards school	15.2	22.8	31.8	1.6	1.6	Mixed
Repeated grade	X	15.8	35.0	X	2.9***	–
Neighborhood factors						
Neighborhood impression	14.3	23.2	31.0	1.8*	1.5	Mixed
Neighborhood disadvantage	13.9	20.8	30.1	1.6	1.6*	Mixed
Demographic factors						
African American ethnicity	X	15.6	29.6	X	2.3***	–
Number of biological parents in home	X	28.9	11.4	X	3.2***	–
Age of mother	9.8	23.7	32.7	2.9**	1.6	Prom
Socioeconomic status	13.9	24.9	30.2	2.1*	1.3	Prom
Family on welfare	X	16.9	36.1	X	2.8***	–
Family size	21.2	20.9	31.3	1.0	1.7*	Risk
Small house	X	20.9	29.9	X	1.6*	–
Housing quality	12.0	24.0	34.5	2.3**	1.7*	Risk

* $p < .05$.

** $p < .01$.

*** $p < .001$.

potentially important protective factors such as high academic achievement (only 7%), low hyperactivity (10%), older mother (9%) or low peer delinquency (16%).

As a result, conceptually and empirically overlapping variables needed to be combined to create risk groups of sufficient size to explore potential risk-based protective factors.

4.2. Protective factors for disadvantaged neighborhoods

Information on neighborhood deprivation was available for 446 of the boys, with 115 (25.8%) identified as being the 'worst' in terms of parental impression of the neighborhood and 210 (47.1%) living in the most deprived neighborhoods according to the census. There was considerable overlap, with 74% of those living in the most deprived areas according to the census also having been nominated in the 'worst' category for neighborhood impression. This was compared to 38% who were in the most deprived areas according to the census but not in the 'worst' category according to impression (OR = 4.7, CI. 2.9–7.6, $p < .0001$).

In order to create a neighborhood risk category, those in the 'worst' category according to neighborhood impression were combined with those living in the worst areas according to the census. If an individual was missing on one variable but present on the other they were included. As a result 51.9% (251/484) comprised the risk group of coming from a deprived neighborhood, with 30.3% of this group having a violent offense, compared to 16.1% of those from a less deprived neighborhood. This difference was statistically significant (OR = 2.2, CI = 1.4–3.3, $p < .0001$). The key question therefore was whether there were any

protective factors that would reduce the percent violent amongst those in deprived neighborhoods to somewhere near the 16% rate of those from less deprived neighborhoods.

The variables in Table 2 show the percent of those from the most deprived neighborhoods and less deprived neighborhoods who committed violence in the protective category ('best', labeled Prom in the table) and nonprotective ('rest', labeled Not Prom) categories. For example, amongst those from the most deprived neighborhoods, 10.0% of those who had low hyperactivity were convicted compared with 34.0% of the remaining boys (OR = 4.6, $p < .01$).

There were fourteen variables that were considered to be risk-based protective factors, because each was associated with at least a 10% decrease in the number of boys from the most deprived neighborhoods committing violence and because the odds ratios were substantial (at least 1.7). The key risk-based protective factors that were most strongly related to a reduction in the likelihood of violence for those living in bad neighborhoods were having high academic achievement, low hyperactivity, having an older mother, having few delinquent friends and living in a good quality house. For those from better neighborhoods, low psychopathic features, having good relationships with peers, low peer delinquency and a good attitude to school were protective.

High academic achievement was clearly an interactive protective factor. While it also reduced the percent violent amongst those in less deprived neighborhoods it did this much more substantially in the most deprived neighborhoods. The interaction effect was significant in an analysis of variance ($F = 4.2$, $p < .039$). Low parental stress might also be considered an interactive protective factor, but the interaction was only statistically significant in a one-tailed test ($F = 3.3$, $p < .07$).

Logistic regression was used to identify the protective factors which independently reduced the likelihood of serious violence amongst those from deprived neighborhoods. Including the 14 protective factors as predictors, the results suggested that high academic achievement (OR = 19.1, CI 2.5 to 143.1, $p < .004$), low peer delinquency (OR = 2.9, CI 1.1 to 7.4, $p < .03$) and good quality housing (OR = 2.9, CI 1.0 to 8.0, $p < .04$) were independently associated with a reduced likelihood of serious violence.

Table 2
Protective factors for boys living in deprived neighborhoods.

Factors up to age 12	Violence 13–19		Deprived neighborhood		Non-deprived neighborhood	
			Prom	Not Prom	Prom	Not Prom
	%V	%V	OR	%V	%V	OR
Individual factors						
Hyperactivity	10.0	34.0	4.6**	9.6	19.9	2.3*
Psychopathic features	20.4	32.5	1.9	2.9	22.0	9.6***
Depressed mood	20.0	33.2	2.0	10.7	17.9	1.8
Anxiety	19.4	33.7	2.1*	11.5	17.9	1.7
Shyness/withdrawal	15.0	33.0	2.8*	15.8	16.2	1.0
Likelihood of getting caught	16.7	34.6	2.6**	9.1	19.0	2.3
Family factors						
Supervision	20.5	32.1	1.8	8.3	20.7	2.9**
Parental stress	17.0	33.8	2.5*	15.5	16.5	1.1
Peer behavior						
Peer delinquency	15.0	33.7	2.9*	5.2	21.7	5.1**
Relationship with peers	17.5	34.4	2.5**	4.8	20.5	5.2**
School factors						
Academic achievement	2.6	35.1	20.0***	7.4	20.9	3.3**
Attitude towards school	22.7	33.0	1.7	4.4	19.0	5.1*
Demographic factors						
Age of mother	13.6	32.4	3.0**	8.8	17.4	2.2
Housing quality	15.0	33.5	2.9*	10.6	19.0	2.0

* $p < .05$.

** $p < .01$.

*** $p < .001$.

4.3. Protective factors for boys from deprived families

Four variables measured at ages 10–12 were combined to create a measure of family deprivation. These were family socioeconomic status, family on welfare, a small house and a poor quality house. These variables were significantly inter-related and were associated with an increase in the likelihood of violence.

In order to create a family deprivation category, those in the ‘worst’ category according to each of low SES, welfare, small house and poor quality house were combined. If information about individuals was available for at least half of the measures they were included. As a result 60.3% (288) out of 478 boys comprised the risk group of coming from a deprived family, with 30.2% of this group having a violent offense, compared to 13.2% of those from a less deprived family. This difference was statistically significant (OR = 2.9, CI = 1.8–4.7, p < .0001).

The variables in Table 3 show the percent of those from the most deprived families and less deprived families who committed violence in the protective (‘best’) and nonprotective (‘rest’) categories. For example, amongst those from the most deprived families, 13.6% of those who had low hyperactivity were convicted compared with 34.5% of the remaining boys (OR = 3.4, p < .01). There were thirteen variables that were considered to be risk-based protective factors, because each was associated with at least a 10% decrease in the number of boys from the most deprived families committing violence and because the odds ratios were substantial (at least 1.7). The protective factors that most strongly predicted violence amongst those from deprived families were high academic achievement, low hyperactivity and low psychopathic features. No interactive protective factors were found to be statistically significant.

Logistic regression was used to identify the protective factors which independently reduced the likelihood of serious violence for those from deprived families. Including the 13 protective factors as predictors, the results suggested that high academic achievement (OR = 6.7, CI 2.0 to 22.7, p < .002), low peer delinquency (OR = 2.5, CI 1.2 to 5.3, p < .02) and a high likelihood of getting caught (OR = 2.4, CI 1.1 to 5.0, p < .02) were independently associated with a reduced likelihood of serious violence amongst those from deprived families.

Table 3
Protective factors for boys from deprived families.

Violence 13–19	Deprived family			Not deprived family			
	Factors up to age 12		OR	Prom		Not Prom	
	%V	%V		%V	%V	%V	OR
Individual factors							
Hyperactivity	13.6	34.5	3.4**	6.2	16.7	3.0*	
Psychopathic features	14.3	34.1	3.1**	6.5	16.4	2.8*	
Anxiety	21.4	33	1.8	7.7	15.2	2.2	
Shyness/withdrawal	20.9	31.8	1.8	8.6	14.2	1.8	
Likelihood of getting caught	20.3	33.3	2.0*	3.4	17.4	5.9**	
Family factors							
Physical punishment	21.6	33.2	1.8	10.9	14.3	1.4	
Peer behavior							
Peer delinquency	18.4	32.9	2.2*	1.5	19.8	16.6***	
Relationship with peers	15.9	34.7	2.8**	5.3	16.5	3.6*	
School factors							
Academic achievement	8.5	34.4	5.7***	4.2	18.6	5.3**	
Attitude towards school	19.4	33.8	2.1*	7.5	14.7	2.1	
Neighborhood factors							
Neighborhood impression	20.0	32.1	1.9	11.4	11.5	1.0	
Neighborhood census	16.7	31.7	2.3	10.9	14.4	1.4	
Demographic factors							
Age of mother	20.6	31.8	1.8	4.4	15.2	3.9*	

* p < .05.
** p < .01.
*** p < .001.

4.4. Protective factors for boys from disrupted families

Information on disrupted families was available at ages 10–12 for 478 of the boys, with 329 (68.8%) having either only one or no biological parents in the home. Of those from disrupted homes, 28.3% (95) had committed violence compared to 11.4% (17/149) of those who came from homes with two biological parents. This difference was statistically significant (OR = 3.2, CI 1.8–5.5, p < .0001). The key question therefore was whether there were any protective factors that would reduce the percent violent amongst those from disrupted families to somewhere near the 11% rate of those from intact families.

The variables in Table 4 show the percent of those from disrupted families and intact families who were violent in the protective category (‘best’) and nonprotective (‘rest’) categories. For example, amongst those from disrupted families, 12.3% of those who had low hyperactivity were convicted, compared with 33.0% of the remaining boys (OR = 3.0 = 5, p < .01).

There were sixteen variables that were considered to be risk-based protective factors, because each was associated with at least a 10% decrease in the number of boys from disrupted families committing violence and because the odds ratios were substantial (at least 1.7). High academic achievement, low hyperactivity and low psychopathic features were associated with reduced violence amongst those from disrupted families. Low peer delinquency and high levels of parental supervision were protective for those from intact families.

High academic achievement was clearly an interactive protective factor. While it also reduced the percent violent amongst those in intact families it did so much more substantially amongst those in disrupted families. The interaction effect was significant in an analysis of variance (F = 6.37, p < .012).

Logistic regression was used to identify the protective factors which independently reduced the likelihood of serious violence for those from disrupted families. Including the 16 protective factors as predictors, the results suggested that high academic achievement (OR = 23.9, CI 3.2 to 177.6, p < .003), a high likelihood of getting caught (OR = 3.2, CI 1.5 to 6.7, p < .02), and low peer delinquency (OR = 2.7, CI 1.2 to 6.0, p < .01)

Table 4
Protective factors for boys from disrupted families.

Violence 13–19	Disrupted family		OR	Intact family		
	Factors up to age 12			Prom	Not Prom	
	%V	%V			%V	%V
Individual factors						
Hyperactivity	12.3	33.0	3.5**	6.9	14.3	2.3
Psychopathic features	13.1	32.5	3.2**	7.0	14.1	2.2
Depressed mood	20.3	31.4	1.8	5.4	13.4	2.7
Anxiety	20.8	31.3	1.7	6.7	13.5	2.2
Shyness/withdrawal	18.6	30.4	1.9	11.4	11.4	1.0
Likelihood of getting caught	16.1	33.5	2.6**	5.0	13.8	3.0
Family factors						
Supervision	19.4	31.3	1.9*	3.6	16.1	5.2*
Parental stress	19.7	31.7	1.9*	10.4	11.9	1.2
Peer behavior						
Peer delinquency	14.3	32.7	2.9**	1.9	16.8	10.7**
Relationship with peers	14.7	33.1	2.9**	5.9	14.3	2.7
School factors						
Academic achievement	4.8	34.5	10.3***	7.0	14.1	2.2
Attitude towards school	19.5	31.7	1.9*	5.7	13.2	2.5
Neighborhood factors						
Neighborhood impression	20.0	29.6	1.7	10.1	13.0	1.3
Neighborhood census	13.6	30.6	2.8	11.9	12.0	1
Demographic factors						
Age of mother	13.6	30.3	2.8*	6.9	14.9	2.4
Housing quality	16.1	32.0	2.5**	7.9	13.4	1.8

* p < .05.
** p < .01.
*** p < .001.

were independently associated with a reduced likelihood of serious violence amongst those from deprived families.

4.5. Protective factors for boys who repeated a grade

Information on who repeated a grade was available for 485 of the boys, with 200 (41.2%) having done so. Of those who repeated a grade 35.0% (70) had committed violence compared to 15.8% (45/285) of those who had not repeated a grade. This difference was statistically significant (OR = 2.9, CI 1.9–4.4, p < .0001).

The variables in Table 5 show the percent of those who repeated a grade and those who had not repeated a grade who were violent in the protective category ('best') and nonprotective ('rest') categories. For example, amongst those who repeated a grade, 15.6% of those who had low hyperactivity were convicted compared with 38.6% of the remaining boys (OR = 3.4, p < .01).

There were fourteen variables that were considered to be risk-based protective factors, because each was associated with at least a 10% decrease in the number of boys who repeated a grade committing violence and because the odds ratios were substantial (at least 1.7). Low peer delinquency, the perception of a high likelihood of getting caught, and high levels of shyness/withdrawal most strongly predicted later violence.

Being shy/withdrawn (F = 4.8, p < .03), perceiving a high likelihood of getting caught (F = 5.9, p < .015), and having a positive attitude to school (F = 3.7, p < .05) were all interactive protective factors which significantly reduced the likelihood of violence amongst those who had repeated a grade.

Logistic regression was used to identify the protective factors which independently reduced the likelihood of serious violence for those who had repeated a grade. Including the 14 protective factors as predictors, the results suggested that high shyness/withdrawal (OR = 4.2, CI 1.2 to 15.1, p < .03), a high likelihood of getting caught (OR = 3.7, CI 1.4 to 9.8, p < .02), and low peer delinquency (OR = 2.8, CI 1.0 to 8.2, p < .05) were independently associated with a reduced likelihood of serious violence amongst those who repeated a grade.

Table 5
Protective factors for boys who have repeated a grade.

Violence 13–19	Repeated grade		Not repeated grade			
	Prom	Not prom	Prom	Not prom	OR	
Factors up to age 12	%V	%V	%V	%V	OR	
Individual factors						
Hyperactivity	15.6	38.6	3.4**	7.7	18.9	2.8**
Psychopathic features	20.0	38.0	2.5*	6.0	19.3	3.8**
Depressed mood	23.7	37.5	1.9	11.0	16.9	1.7
Anxiety	23.1	39.1	2.4*	11.8	16.6	1.5
Shyness/withdrawal	14.8	38.0	3.5*	15.4	15.3	1.0
Likelihood of getting caught	15.1	42.1	4.1***	10.8	17.0	1.7
Family factors						
Supervision	24.4	37.5	1.9	6.1	19.2	3.7**
Peer behavior						
Peer delinquency	14.0	40.9	4.3***	5.4	19.1	4.1**
Relationship with peers	19.0	39.1	2.7*	7.1	18.8	3.0**
School factors						
Attitude towards school	18.4	38.8	2.8*	13.5	16.0	1.2
Neighborhood factors						
Neighborhood impression	21.1	37.8	2.3*	11.1	16.0	1.5
Neighborhood census	21.4	36.5	2.1	11.8	17.4	1.6
Demographic factors						
Age of mother	22.2	36.0	2.0	5.3	18.2	3.9**
Housing quality	20.7	38.0	2.4	9.4	18.0	2.1

* p < .05.
** p < .01.
*** p < .001.

4.6. Protective factors for African American boys

Of the 485 boys, 280 (57.7%) were African American and 205 (42.3%) were Caucasian. Similar to previous research, African American boys were significantly more likely to have committed violence (29.6%), compared to Caucasian boys (15.6%, OR = 2.3, CI 1.4–3.6, p < .0001). However, when the likelihood of violence was compared between African American and Caucasian boys within the previous risk groups that have been explored, most race differences were no longer significant. That is, amongst those from the worst neighborhoods, the most deprived families, disrupted families, and those who had thinking most conducive to delinquency, African American and Caucasian boys were about equally likely to commit violence. African American boys who repeated a grade were significantly more likely than Caucasian boys to commit violence (OR = 2.0, CI 1.0–3.8, p < .05).

The variables in Table 6 show the percent of those who were African American and Caucasian who committed violence in the protective category ('best') and nonprotective ('rest') categories. For example, amongst African American boys, 13.7% of those who had low hyperactivity were violent compared with 32.9% of Caucasian boys (OR = 3.1, p < .01).

There were fifteen variables that were considered to be risk-based protective factors, because each was associated with at least a 10% decrease in the number of African American boys committing violence and because the odds ratios were substantial (at least 1.7). High academic achievement, a high likelihood of getting caught, low peer delinquency and low hyperactivity predicted low levels of violence amongst African American boys. There were only 9 African American boys who lived in the best neighborhood according to the census, and while none committed violence this figure was too small to interpret.

No interactive protective factors were statistically significant at the p < .05 level. High academic achievement (F = 2.8, p < .10) and high likelihood of getting caught (F = 2.9, p < .09) were significant on one-tailed tests.

Logistic regression was used to identify the protective factors which independently reduced the likelihood of serious violence for African

Table 6
Protective factors for African American boys.

Violence 13–19	African American		White			
	Prom	Not prom	OR	Prom	Not prom	
Factors up to age 12	%V	%V	OR	%V	%V	OR
Individual factors						
Hyperactivity	13.7	32.9	3.1**	6.9	19.8	3.3**
Psychopathic features	15.4	32.6	2.7**	6.0	19.9	3.9**
Depressed mood	21.9	31.8	1.7	6.4	17.9	3.2*
Shyness/withdrawal	20.5	31.0	1.8	8.6	16.7	2.1
Likelihood of getting caught	14.1	34.8	3.3**	10.7	17.0	1.7
Family factors						
Supervision	17.1	31.6	2.2*	9.8	19.0	2.2
Parental stress	17.9	33.2	2.3*	14.0	15.9	1.2
Peer behavior						
Peer delinquency	13.3	33.0	3.2**	5.6	20.6	4.4**
Relationship with peers	17.4	33.3	2.4**	3.5	19.9	6.8**
School factors						
Academic achievement	4.7	33.9	10.5***	6.6	20.5	3.7**
Attitude towards school	19.7	32.8	2.0*	7.3	17.3	2.6
Neighborhood factors						
Neighborhood impression	16.7	29.9	2.1	13.7	16.5	1.2
Neighborhood census	0.0	30.9	4.0 ^a	16.1	15.9	1.0
Demographic factors						
Age of mother	18.5	30.1	1.9	6.7	19.7	3.4**
Housing quality	15.7	33.2	2.7*	9.5	17.7	2.1

^a 1 was imputed to calculate odds ratio.
* p < .05.
** p < .01.
*** p < .001.

American boys. Including the 15 protective factors as predictors, the results suggested that high academic achievement (OR = 8.1, CI 1.9 to 35.2, $p < .005$), a high likelihood of getting caught (OR = 3.6, CI 1.6–8.2, $p < .002$), and good relationships with peers (OR = 2.4, CI 1.1 to 5.2, $p < .03$) were independently associated with a reduced likelihood of serious violence amongst African American boys.

5. Conclusions

This paper reports the results of a series of relatively straightforward analyses examining promotive factors, risk-based protective factors, and interactive protective factors for serious violence. The results showed that many factors which have traditionally been considered to be linearly related to violence may, in fact, have non-linear relationships, and these relationships were identified for individual, family, school and demographic factors. Future research should continue to empirically explore the way in which factors are related to violence, as the results have clear implications for interventions, not only in terms of what should be delivered, but to whom. For example, based on the current study, interventions which aimed to decrease hyperactivity amongst those with certain risks would be desirable, and critically these would be best delivered to those who have both high levels of hyperactivity and also those who have medium levels of hyperactivity.

This research also showed that under a number of high-risk conditions some protective factors can significantly reduce the likelihood of serious violence, and these factors were identified across the domains of individual, family, school, neighborhood and peers. A number of key risk-based protective factors were identified across the range of risk categories, with high academic achievement being the most consistently identified, and independently related to reduced violence. Perhaps this consistency is not surprising as the risk groups were also generally highly inter-related. The relationship with the greatest magnitude was between African American and bad neighborhoods (OR = 31.3, $p < .0001$), and the only two categories that were not statistically significantly related were thinking conducive to delinquency and repeated a grade (OR = 1.4).

The finding that academic achievement was a consistent risk-based and occasionally an interactive protective factor is in accordance with much previous research highlighting the importance of success in school as a key preventative mechanism amongst high-risk children (e.g., Lösel & Farrington, 2012; Werner & Smith, 1992). What is less clear is the extent to which this finding reflects the protective influence of high intelligence, a potentially challenging intervention target, or school-related such as school bonding, which might be more easily addressed. Interestingly, when children who had repeated a grade were examined, the results indicated that a positive attitude to school, in the face of this school failure could still be protective. This suggests that the relationship that children have with their school can be protective beyond simply providing a venue for those with high intelligence to showcase their abilities and reap the resulting intrinsic and extrinsic rewards.

In addition to high academic achievement, low hyperactivity, a high likelihood of getting caught, low peer delinquency and having a good relationship with peers were all found to be risk-based protective factors. Only eight (out of a possible 23) variables were identified as independently protective and these tended to be individual and peer factors, suggesting that these should be key targets for interventions. However, in addition to the consistency of these risk-based protective factors, it is also important to note that different risk groups had different risk-based protective factors. These slight deviations have not been explored in much previous research, which has tended to combine various types of deprivation in order to identify the factors that provided overall 'resilience' to this package (e.g., Fergusson & Horwood, 2003; Werner & Smith, 1992). While that approach might be externally valid, as even in this study the risks were highly inter-correlated, it would not provide

insight into how best to intervene with those who possess specific risk factors.

The protective factors that would best reduce the likelihood of future violence depend on the specific risks of the individual and successful interventions would be those that are tailored to address these. A more complete understanding of promotive, risk-based and interactive protective factors for violence would assist in identifying who best to intervene with and how best to intervene. This would result in a movement away from a simplistic risk-focussed approach to a much more person and strength based approach. This is in line with recent calls for culturally-relevant interventions that can address risks and support strengths with knowledge about specific challenges faced by those from certain groups (e.g., Glynn, 2014).

Note

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References

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