Published in final edited form as:

Am J Prev Med. 2012 August ; 43(2 Suppl 1): S28–S40. doi:10.1016/j.amepre.2012.04.024.

Identifying Direct Protective Factors for Nonviolence

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Abstract

Background—The CDC recently organized a panel to examine whether a series of constructs consistently acted as risk and/or direct protective factors for youth violence across four longitudinal studies. Analyses first examined constructs commonly assessed across all four studies and then included constructs unique to each study.

Purpose—This paper describes findings from the Pittsburgh Youth Study (PYS) as part of this supplement to the *American Journal of Preventive Medicine* documenting the findings from the project.

Methods—Participants were boys in the youngest cohort of the PYS (N= 503), which was initiated in 1987–1988. Constructs measured at age 12 years were trichotomized to test whether they acted as risk and/or direct protective factors in predicting violence (i.e., assault, rape, robbery) across ages 13–14 years and 15–18 years.

Results—Multivariate logistic regressions with predictors present across studies indicated that depressed mood (OR=1.96) and low religious observance (OR=1.88) were risk factors for violence at ages 13–14 years, while peer delinquency acted as both a risk (OR=2.34) and direct protective factor (OR=0.44). Low peer delinquency was also a direct protective factor (OR=0.41) for violence at ages 15–18 years. Analyses including predictors specific to the PYS indicated that negative attitude toward delinquency (OR=0.50) was protective against violence at ages 13–14 years, while the risk factors of low perceived likelihood of being caught (OR=1.81) and high neighborhood disorder/crime (OR=1.77) predicted violence at ages 15–18 years.

Conclusions—Some factors may be best conceptualized as direct protective factors for nonviolence, whereas other constructs act primarily as risk factors that increase the probability of adolescent violence.

Background

Identifying consistent risk and direct protective factors for youth violence can help identify essential targets for violence-preventative programming. However, few longitudinal studies have examined the incremental utility of risk and direct protective factors measured across

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No financial disclosures were reported by the authors of this paper.

multiple domains in predicting later youth violence, or attempted to replicate the predictors of violence across multiple studies. Toward this end, the CDC organized a panel to examine risk and direct protective factors for youth violence across four longitudinal studies: the Pittsburgh Youth Study (PYS), the Chicago Youth Development Study, the Seattle Social Development Project, and the National Longitudinal Study of Adolescent Health (Add Health).

A similar set of constructs that have been implicated in the development of violence were identified across the studies. To maintain consistency, all potential risk and direct protective factors were assessed when the youth were aged ~12 years. In addition, later violence (i.e., assault, rape, robbery) was assessed across ages 13–14 years and ages 15–18 years to determine whether certain risk and direct protective factors predict proximal and/or distal violence.

This effort expands on previous studies by examining whether direct protective factors for nonviolence and risk factors for violence can be consistently identified across multiple longitudinal data sets. Each study also conducted more comprehensive follow-up analyses that examined a wider variety of potential risk and direct protective factors not commonly assessed across all four data sets. A paper by Lösel and Farrington¹ provides a detailed review of the relevant literature for this project. In addition, a detailed synthesis and discussion of the findings across studies is provided by Hall and colleagues.² The current paper is designed to overview prior investigations examining risk and direct protective factors using the PYS data set and then document new findings based on the collaborative panel organized by the CDC.

The PYS is an ongoing longitudinal investigation on the causes of delinquency in a high-risk sample of inner-city boys who have been followed from childhood to early adulthood. Prior analyses using the PYS data set have been conducted to identify the most-salient risk factors contributing to the prediction of later serious violence (i.e., aggravated assault, rape, robbery) and homicide in men/boys.³ This investigation identified 50 risk factors spanning individual, family, peer, school, and neighborhood domains that were associated with the onset of serious violence in boys. Regression analysis controlling for the overlap among these risk factors indicated that 11 independently predicted the onset of serious violence: low SES, family on public assistance, bad neighborhood, truancy, low school motivation, high parental stress, onset of delinquency before age 10 years, cruelty to people, depressed mood, minor physical fighting, and callous/unemotional behavior. Of those boys with four or more of these risk factors, 60.8% exhibited violent behavior later in life, whereas only 20.4% of boys with fewer than four of these risk factors engaged in subsequent violent behavior.

One limitation of the authors' earlier study was its focus on risk factors for violence rather than direct protective factors for nonviolence. Risk factors were created by dichotomizing variables at the extreme end of the distribution that represented high levels of environmental adversity or high levels of problem behaviors. Direct protective factors, on the other hand, have been identified in previous studies by trichotomizing variables using the opposite end of the distribution of scores, which represents elevated levels of positive environmental conditions or behaviors.^{4,5} While the examination of direct protective factors has received far less attention than risk factors in the literature, evidence suggests that they play an important role in understanding the development of antisocial behavior,^{5,6} and contribute to better predictions of delinquent behavior.⁴

Using the PYS data set, Stouthamer-Loeber and colleagues⁵ examined whether several child, school, family, and neighborhood characteristics acted as risk or direct protective

factors in terms of predicting persistent delinquent behavior. Findings indicated that less than half of all factors assessed exhibited both risk and direct protective effects, with most variables exhibiting either a risk effect only or a direct protective effect only. For example, boys with low levels of attention deficit–hyperactivity (ADH) were less likely to be persistent delinquents compared to those with moderate levels of ADH (a direct protective effect), but boys with high levels of ADH were not at greater risk for exhibiting persistent delinquency compared to those with moderate ADH (no risk effect).

The goal of the current study was to expand on prior analyses by identifying direct protective factors for nonviolence and risk factors for violence within the PYS data set as part of a larger project attempting to replicate findings across three other longitudinal data sets: Seattle Social Development Project, the Chicago Youth Development Study, and the National Longitudinal Study of Adolescent Health. Initial analyses focused on predictors in the PYS that were commonly assessed across all studies. Then, secondary analyses were conducted using a larger array of constructs measured in the PYS to more comprehensively examine potential risk and direct protective factors for violence across adolescence.

Methods

Participants are part of the youngest cohort of boys from the Pittsburgh Youth Study. This cohort was initially recruited for an ongoing longitudinal study from a list of names of boys in the 1st grade within Pittsburgh Public Schools in 1987–1988 provided by the Board of Public Education. From this pool, 849 boys were randomly selected to complete a screening that assessed each boy's antisocial behavior using a combination of parent, teacher, and self-report instruments. Boys who scored within the upper 30% on antisocial behavior on this aggregate screening measure ($n=256$), as well as an approximately equal number of boys randomly selected from the remainder ($n=247$), were then selected for longitudinal follow-up.

The 503 boys in the youngest cohort selected for longitudinal follow-up were not significantly different from the remaining boys in the screening sample on several demographic variables such as race, maternal and paternal education level and occupational status, the number of biological parents in the home, and reading skills assessed using the CUNY Assessment Test. Nearly all boys in the follow-up sample were either white (40.2%) or African-American (55.5%). In the sample, 16.9% of the maternal caregivers and 15.4% of the paternal caregivers in the home had not graduated from high school. In 45.3% of households there was no biological father or other paternal caregiver. At the first follow-up assessment, nearly half of the families (47.7%) reported receiving some form of public assistance. More details regarding the sample selection, study characteristics, and participants can be found elsewhere.^{4,7}

Procedures

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 self-administered questionnaires completed by the parents and teachers. Most interviews were conducted in the participants' homes. Prior to the assessment, informed written consent was obtained from the parents. The data collection procedures were approved by the IRB at the University of Pittsburgh.^{4,7}

The primary follow-up assessments of the youngest cohort took place every 6 months for the first eight assessments following screening, and then annually for the next nine assessments (17 assessments in total). Because the goal of the current CDC project was to replicate findings across divergent longitudinal studies that varied in assessment frequency and age

ranges, only a circumscribed number of these assessments were used in the current analysis. Consistent with the other studies, individual predictors were taken from the assessment phase when the participant was closest to age 12 years. Measures of violence were then assessed at subsequent phases that encompassed the periods in which the participants were aged 13–14 years and 15–18 years.

Measures

The predictor variables in the current study were derived from two sources. First, variables that were identified as measuring similar constructs to those measured in the other three longitudinal studies were selected for inclusion (these variables are marked by a “*” in the description below). Second, variables that have been found to be predictors of violence and persistent antisocial behavior in previous analyses using the Pittsburgh Youth Study were also included.^{3,4,6–9}

Consistent with the other studies in this section, the predictors were classified into the general domains of individual, family, school, peer, and community factors. Predictors indicative of early antisocial behavior (e.g., drug use, truancy, theft, vandalism) were not included. Consistent with several of the authors’ prior studies,^{3,4,6–8} parent and child ratings of similar parenting behaviors were combined by averaging scores across the informants. For multiple informant rating scales of externalizing/internalizing problems, ratings were combined by considering a behavior present if it was endorsed by any informant.

Individual Predictors

Attention-deficit hyperactivity (ADH) problems—This construct was created using 13 items from the Teacher Report Form (TRF).¹⁰ These items have been rated by clinicians as reflecting behaviors consistent with DSM-IV features of ADH disorder.¹¹ The internal consistency for this scale was $\alpha = 0.95$.

Depression—This construct was assessed using the self-report Recent Mood and Feelings Questionnaire.¹² The measure consists of 13 items associated with the diagnosis of major depression in children and adolescents according to DSM-III-R criteria. Participants rate how accurately the statement describes their own feelings and behaviors over the past 2 weeks (e.g., “You felt miserable or unhappy,” “You hated yourself,” “You felt lonely”). Each item is rated on a 3-point scale (0= “not true,” 1 = “sometimes true,” 2 = “always true”). The internal consistency for this scale was $\alpha = 0.84$.

Negative attitude toward school—This construct was assessed using seven items from self-report School/Religion/Resources Questionnaire.⁷ Items asked participants about their feelings regarding various aspects of school (e.g., “Do you think homework is a waste of time?” “Do you care what teachers think of you?”). The internal consistency for this scale was $\alpha = 0.62$.

Academic achievement—This construct combined information from the parent-reported Child Behavior Checklist¹³ (CBCL), the Teacher Report Form¹⁰ (TRF), and the Youth Self Report¹³ (YSR). All informants rated the boys’ performance in reading, math, writing, and spelling, while parents and youth also evaluated up to three other subjects. The construct was created by taking the mean of all ratings across informants. The internal consistency for this scale was $\alpha = 0.81$.

Religious observance—This construct was based on two questions asked of the youth as part of the School/Religion/Resources Questionnaire.⁷ The questions were: *Do you like going to religious services?* and *If you had to choose between going to a religious service or*

doing something else, which would you do? Youth who never attended religious services were assigned the least-religious score.

Victim of theft—This construct measured the total number of times the youth reported being a victim of theft during the assessment period. It is made from one question of the Victimization Questionnaire⁷: How many times in the past year has anything been stolen from you?

Serious injuries—This construct was made using data collected from the parent-report Family Health Questionnaire.⁷ The construct summed total number of severe cuts, severe burns, head injuries, internal injuries, and broken bones the youth sustained in the past year.

Interpersonal callousness—This construct was created using eight items from the parent-reported CBCL¹⁴ and the TRF.¹⁰ Parent and teacher ratings were combined by taking the higher of the two informant ratings.⁹ The scale was designed to assess many of the interpersonal and affective features associated with psychopathy in children and adolescents.^{9,15} The internal consistency for this scale was $\alpha=0.91$.

Anxiety—This construct was created using seven items from the parent (CBC¹⁴), eight items from the teacher (TRF¹⁰), and seven items from the youth (YSR¹³). A total of eight different behaviors associated with anxiety (e.g., “clings to adults,” “nervous, high-strung, or tense”) were rated. If any informant answered “sometimes” or “often”, the youth received a positive score for that item. The behaviors were then counted to create the final construct. The internal consistency for this scale was $\alpha=0.61$.

Shy/withdrawn—This construct included seven items from the parent (CBCL¹⁴), seven items from the teacher (TRF¹⁰), and seven items from the youth (YSR¹³). A total of seven different behaviors associated with being withdrawn and shy (e.g., “likes to be alone,” “refuses to talk”) were rated. If any informant answered “sometimes” or “often”, the youth received a positive score for that item. The behaviors were then counted to create the final construct. The internal consistency for this scale was $\alpha=0.61$.

Attitude toward delinquency—This construct was measured using 11 items from youth reports on the Attitude Toward Delinquency Questionnaire.⁷ The items asked youth to rate how “wrong” it was to engage in various behaviors using a 4-point scale. Items were summed to create the final construct. The internal consistency for this scale was $\alpha=0.91$.

Likelihood of getting caught—This construct was measured using 10 items from youth report on the Likelihood of Getting Caught Questionnaire.⁷ The items asked the youth to judge the likelihood that he would be caught by police if he committed specific delinquent acts. All items were summed to create the construct. The internal consistency for this scale was $\alpha=0.90$.

Family Predictors

Family involvement*—This construct was created using items from the parent and youth versions of the Supervision/Involvement Scale.⁷ Each informant rated four items asking about the degree to which the youth was involved in planning and participating in family activities. The construct was created by taking the mean of all ratings across informants. The internal consistency for this scale was $\alpha=0.70$.

Family SES*—A parent-report Demographic Questionnaire⁷ was used to collect information regarding family composition and parent characteristics. Information on

parents' educational attainment and current occupation was used to calculate the Hollingshead Index of SES.¹⁶ If two parents were living in the home, the higher SES of the two was selected.

Child maltreatment—This construct was created using official records collected from the Allegheny County Children and Youth Services. Child maltreatment was defined as the youth in the study having been the victim of a substantiated case of physical/sexual abuse or neglect according to these official records.

Family on public assistance—This construct was positive if the parent reported on the Financial Information Questionnaire⁷ that any adult in the youth's household had received financial public assistance (e.g., food stamps, unemployment compensation) during the past year.

Caretaker changes by age 10 years—This construct was created using parent-report information collected as part of the Caretaker History Questionnaire.⁷ This construct was positive if the parent reported more than one change in the people caring for the youth from birth until his tenth birthday.

House size—This construct was made from a single item from the parent-reported Financial Information Questionnaire.⁷ The parent was asked to indicate the number of rooms in the youth's home, including the kitchen and bathrooms.

Number of biological parents in home—Information for this construct came from the parent-reported Demographic Questionnaire.⁷ The parent was asked to indicate the youth's relationship to the adult(s) living in his home. Participants received a positive rating if both biological parents were living in the home.

Parental reinforcement—This construct combined parent and youth reports from the Positive Parenting Scale.⁷ The scale averaged nine items from the caretaker and seven items from the youth measuring the parent's tendency to reward the child using special privileges or compliments for good behavior. The internal consistency for this scale was $\alpha=0.84$.

Supervision—This construct combined parent and youth reports from the Supervision/Involvement Scale.⁷ The construct represents the average of four items administered to each informant related to the parent's ability to track the youth's activities outside of the home. The internal consistency for this scale was $\alpha=0.71$.

Age of mother at birth of first child—This construct was made using information collected as part of the parent-reported Demographic Questionnaire.⁷ The parent was asked to indicate the age of the youth's biological mother when her first child was born, regardless of whether or not this child was the participant.

Family size—This construct represents the youth's report of the total number of other minors (aged <18 years) living in his house at the time of the interview. It is made from one question on the Child's Relationship with Caretaker and Others Questionnaire.⁷

Housing quality—This construct was made from items on the Interviewer Impressions of Caretaker Questionnaire.⁷ This construct is the mean of eight items completed by the interviewer related to the structural condition of the youth's home, visible signs of deterioration, and cleanliness. The internal consistency for this scale was $\alpha=0.84$.

School Predictors

Repeated grade—This construct was created using information collected as part of the Teacher Report Form (TRF) and represents the number of grades repeated by the youth prior to the assessment at age 12 years. Youth aged >6 years in first grade when the screening took place were considered to have repeated one grade. For subsequent years, if the teacher gave an affirmative answer to the question *Is he repeating a grade this year?*, the construct's value increased by 1.

Peer Predictors

Peer delinquency*—The Peer Delinquency Scale (PDS⁷) was used to measure the tendency to affiliate with deviant peers. The PDS includes nine items assessing various delinquent acts such as physical fighting and stealing. Boys rated how many of their friends engaged in each of the acts described using a 4-point scale (0="none of them" to 4="all of them"). Items were summed to create a total score. The internal consistency for this scale was $\alpha=0.92$.

Relationship with peers—This construct is the mean of a single caretaker (CBCL¹⁴), a single teacher (TRF¹⁰), and a single youth (YSR¹³) item regarding the youth's tendency to get along with his peers.

Neighborhood Predictors

Neighborhood poverty/crime—This construct was made from 17 items included as part of the parent-reported Neighborhood Questionnaire.⁷ Parents were asked to rate the prevalence of various problems in their community including abandoned buildings, unemployment, racial tension, and various criminal activities. Items were summed to create a total score. The internal consistency for this scale was $\alpha=0.95$.

Ages 13–14 years and 15–18 years violence outcomes—These constructs were created using four separate items assessing physical violence in the past year on the Self-Report of Delinquency (SRD¹⁷). Specifically, participants were asked whether they engaged in each of the violent acts within the past year at six annual assessments between the ages of 13 and 18 years. Youth were classified as violent at each assessment if they reported any incidences of attacking someone with the intention of seriously hurting/killing them, robbing someone, or sexually assaulting someone in the past year, or if they reported hitting someone three or more times in the past year with the intention of hurting him/her. Two outcomes were then created based on the developmental period in which the violence occurred: Any violence between ages 13 and 14 years and any violence between ages 15 and 18 years. This was done to determine whether the risk and direct protective factors examined predicted relatively proximal and/or distal violent behavior across adolescence.

Data Analysis

Following procedures previously outlined for identifying risk and direct protective effects,^{5,18} predictor variables were trichotomized by categorizing participants as close as possible to the lower 25%, the middle 50%, and the upper 25% of the distribution. When higher levels of the predictor represented more adverse events, the test for direct protective effects was based on a comparison between participants who fell within the lower 25% of the distribution (i.e., the protective end) with those who fell within the middle 50% of the distribution, while the test for a risk effect was based on the comparison between participants who fell within the upper 25% of the distribution (i.e., the risk end) and those within the middle 50% of the distribution. When higher levels on the predictor represented positive events, the risk and direct protective ends were reversed. Because of low levels of

variability and natural dichotomies, seven variables were classified as having only a potential risk effect: victim of theft, serious injuries, child maltreatment, family on public assistance, number of caretaker changes by age 10 years, house size, and repeated a grade. Similarly, having two biological parents within the home was categorized as having only a potential direct protective effect.

Risk and direct protective effects were initially tested for each variable separately using contrast coding within a logistic regression model for the ages 13–14 years violence outcome. These analyses were then repeated for the ages 15–18 years violence outcomes. Next, risk and/or direct protective effects significant at the traditional $p < 0.05$ level were included in multivariate logistic regression models. The multivariate models were used to determine which of the risk and direct protective factors robustly predicted the two violence outcomes after controlling for their co-occurrence.

When only a risk effect or only a direct protective effect was found for a given variable in the bivariate analyses, a binary variable representing the contrast between participants who fell within the extreme 25% end of the distribution (either risk or direct protective) and participants falling within the other 75% of the distribution was entered into the model. However, when both the risk and direct protective ends of a variable were significant in the bivariate analysis, two contrast-coded variables were used so the regression coefficients represented the comparison between participants in both the upper and lower 25% of the distribution with participants in the middle 50%. Hierarchic logistic regression models were first run for the risk/direct protective variables common across studies. These models were run separately for the ages 13–14 years and 15–18 years violence outcomes. Next, the hierarchic logistical regression models were re-run using the core and study-specific risk and direct protective factors. Again, these models were run separately for the ages 13–14 years and age 15–18 years violence outcomes.

In all models, race and SES were entered in the first block as control variables. The remaining variables were entered in subsequent blocks according to domain: (1) individual, (2) family, (3) school, (4) peer and neighborhood. This was done to determine whether blocks of variables in each domain added to the prediction of violence above and beyond the other domain-specific predictors already included in the model.

Results

The prevalence of violence in the youngest cohort using the previously outlined definition was 22.7% for violence at ages 13–14 years and 27.5% for violence at ages 15–18 years. Youth who were violent at ages 13–14 years were more likely to be violent at ages 15–18 years, $\chi^2(1, n=465)=58.40, p < 0.001, OR=5.65$ [95% CI=3.53, 9.03]. The proportion of youth who exhibited violent behavior during both age ranges was 12.7%.

Common Variable Analyses

The findings from the bivariate logistic regression analyses examining the potential risk and direct protective effects for the violence prediction variables common across studies are presented in Table 1. For violence at ages 13–14 years, depression and low religious observance exhibited risk effects only, while peer delinquency exhibited both a risk and direct protective effect. No variables exhibited only direct protective effects for violence at ages 13–14 years. In contrast, analyses for the outcome of violence at ages 15–18 years indicated that low depressed mood and good academic achievement both showed direct protective effects, whereas negative attitude toward school had a risk effect. Attention-deficit hyperactivity problems and peer delinquency both exhibited risk and direct protective effects in predicting violence at ages 15–18 years.

Table 2 presents the results from the hierarchic logistic regression predicting violence at ages 13–14 years from the significant bivariate risk and direct protective variables common across studies. Neither race nor SES emerged as predictors in this model. However, the two risk-only variables (i.e., high depressed mood, low religious observance) and the risk and direct protective variable (i.e., high and low peer delinquency) identified as significant in bivariate analysis were all predictors in the final multivariate model.

Table 3 presents the logistic regression results predicting violence at ages 15–18 years from the significant risk and direct protective factors common across studies. Similar to the ages 13–14 years model, neither race nor SES emerged as a predictor of violence in the final models. While the individual factors of high ADH problems and high depressed mood were predictors of violence when first entered into the model at Block 2, the variables were not significant in the final model. A similar pattern was observed for the risk effect of negative attitude toward school, which also was reduced to nonsignificance in the final model. In fact, the only significant predictor of violence at ages 15–18 years was the direct protective factor of low peer delinquency.

Combined Study-Specific and Common-Variable Analyses

The logistic regression analyses examining the potential risk and direct protective effects for the study-specific variables predicting violence are presented in Table 4. For violence at ages 13–14 years, two of 13 direct protective effects examined reached significance ($p < 0.05$): negative attitude toward delinquency and low housing quality. None of the 19 risk factors tested reached significance for violence at ages 13–14 years. Analyses for ages 15–18 years violence indicated that eight of the 19 risk effects were significant: high victim of theft, high interpersonal callousness, positive attitude toward delinquency, low perceived likelihood of getting caught, family on public assistance, low parental reinforcement, poor relationship with peers, and high neighborhood poverty/crime. The direct protective effects for good parental supervision, older mother at birth of first child, and low housing quality were significant for violence at ages 15–18 years.

The logistic regression results predicting violence at ages 13–14 years using both the common and study-specific risk and direct protective variables are presented in Table 5. In the final model, all individual-level predictor variables remained significant, including two risk factors (high depressed mood, and low religious observance), and one direct protective factor (negative attitude toward delinquency). Low housing quality was significant when first entered into the model ($p = 0.020$), but became nonsignificant ($p = 0.088$) once the risk and direct protective effects of peer delinquency were entered. In the final model, high peer delinquency predicted violence at ages 13–14 years, but low peer delinquency did not ($p = 0.137$).

Table 6 provides the results of the logistic regression models predicting violence at ages 15–18 years using both common and study-specific risk and direct protective factors. Similar to the common variable analysis presented above, the direct protective effect of low peer delinquency was significant in the final model. However, two study-specific risk factors were also significant in the final model: low perceived likelihood of getting caught and high neighborhood poverty/crime. The direct protective effect of low housing quality and older mother at birth of first child were nonsignificant in the final model ($p = 0.074$ and 0.093 , respectively).

Influence of Participant Risk Status

Because half of the sample had elevated levels of conduct problems at study onset, an examination was made of whether this may have influenced the study results. Specifically,

all multivariate logistic regression models were re-run, including high conduct-problem status as a covariate, as well as adding the interaction between conduct-problem status and each risk/direct protective factor. The significant findings reported above remained unchanged with one exception. Specifically, an interaction effect indicated that the direct protective effect of low peer delinquency on violence at ages 13–14 years emerged for high conduct-problem youth only. Further details regarding these supplemental analyses are available from the authors on request.

Discussion

The current study was initiated as part of a panel organized by the CDC designed to examine whether a series of constructs consistently acted as risk and/or direct protective factors for youth violence across four longitudinal data sets: Pittsburgh Youth Study, Seattle Social Development Project, the Chicago Youth Development Study, and the National Longitudinal Study of Adolescent Health. The four studies identified a similar set of risk and direct protective factors measured when participants were closest to age 12 years, and violence outcomes measured when participants were ages 13–14 years and 15–18 years. Because a detailed synthesis and in-depth discussion of the findings across studies is provided by Hall and colleagues,² only a brief discussion of the findings specific to the Pittsburgh Youth Study is presented here.

In general, the results support the notion that it is useful to study direct protective factors as distinct from risk factors. Several direct protective factors were associated with a reduced probability of future violence, even after controlling for influence of various risk factors. For analyses involving both common and PYS-specific constructs, some factors (such as peer delinquency) varied in terms of their risk and direct protective effects based on the developmental timing of the violence assessment. For example, high peer delinquency acted as a risk factor in multivariate analyses predicting violence at ages 13–14 years, but low peer delinquency emerged as a protective factor in predicting violence at ages 15–18 years. This suggests that certain constructs may represent risk factors for more proximal violence, but act as direct protective factors for more distally measured adolescent violence (or vice versa). While beyond the scope of the current project, it will be important for future studies to further examine whether the influence of various risk and protective factors for violence may vary from childhood through adolescence.

Multivariate analyses that included PYS constructs that were not common across all of the studies in the special section showed that youth attitudes and beliefs about delinquency were particularly robust predictors of future violence. For example, having a negative attitude toward delinquency served as a direct protective factor against violent behavior at ages 13–14 years, while having a low perceived likelihood of being caught for delinquent acts was associated with an increased risk for violence at ages 15–18 years. This suggests that prevention programs that increase children's anti-delinquency attitudes and enhance their expectations that delinquent behavior will result in detection/punishment may be particularly effective in reducing violence across adolescence.

The results need to be considered in light of the study limitations. First, the findings are based on a sample of boys from the Pittsburgh Public Schools, half of whom exhibited elevated levels of conduct problems at the beginning of the study. As a result, the findings may not generalize to girls or samples recruited using alternative schemes (e.g., population-based samples). However, a primary goal of the current project was to replicate findings across longitudinal studies that varied in terms of demographic composition and sampling methods.

Also, the definition of violence used included fairly severe behaviors (i.e., assault, robbery, rape), rather than more-minor forms of violence such as verbal threats. In addition, some of the predictors had relatively modest levels of internal consistency or consisted of only a few items, which may have attenuated their associations with future violence. Some of the predictors were also derived from measures consisting of negatively worded items (e.g., peer delinquency), limiting the ability to assess the presence of positive influences (e.g., highly prosocial peers).

Although the regression results indicated that African-American boys were not at increased risk for violence after accounting for other risk/direct protective factors, it is still possible that the associations between certain risk/direct protective factors and violence may differ among racial groups. Lastly, although the current study examined multiple domains of risk/direct protective factors, the domains assessed were by no means exhaustive. For example, there are several neurocognitive and neurobiological factors that have been linked to violence in childhood and adolescence that were not assessed. It is possible that these unmeasured factors could account for the associations reported here.

Despite these limitations, this study has several advantages over previous investigations examining risk and direct protective factors related to violence. Specifically, the findings are based on analyses with a relatively large sample of boys who were assessed annually from ages 12–18 years. Moreover, several domains of risk and direct protective factors were assessed using multiple informants (i.e., child, parent, teacher, and interviewer reports). As discussed in detail in the concluding paper of this supplemental issue by Hall et al.,² the overall findings across the four longitudinal studies included in this supplement may prove useful for designing prevention programs that both reduce risk factors and enhance direct protective factors for youth violence.

Acknowledgments

This study is supported by grants awarded to Dr. Rolf Loeber from the National Institute on Drug Abuse (DA411018), National Institute on Mental Health (MH 48890, MH 50778), the Office of Juvenile Justice and Delinquency Prevention (96-MU-FX-0012), and the Pennsylvania Department of Health (SAP 4100043365). Preparation of this paper was supported by the CDC. The content is solely the responsibility of the authors and does not necessarily represent the official views of the funding agencies.

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Table 1
Bivariate logistic regressions examining risk and promotive effects for common variables predicting violence

Common predictors	Violence at ages 13–14 years			Violence at ages 15–18 years		
	B	OR	95% CI	B	OR	95% CI
<u>ADH problems</u>						
High	0.302	1.353	0.810, 2.259	0.608 [*]	1.836	1.141, 2.954
Low	−0.023	0.977	0.567, 1.683	−0.575 [*]	0.563	0.318, 0.994
<u>Depression</u>						
High	0.804 ^{**}	2.235	1.335, 3.741	0.353	1.423	0.875, 2.316
Low	−0.361	0.697	0.401, 1.211	−0.885 ^{**}	0.413	0.243, 0.700
<u>Attitude toward school</u>						
Negative	0.279	1.321	0.811, 2.152	0.627 ^{**}	1.872	1.18, 2.97
Positive	−0.308	0.735	0.400, 1.348	−0.226	0.797	0.448, 1.418
<u>Academic achievement</u>						
Poor	−0.066	0.936	0.556, 1.578	0.170	1.185	0.732, 1.921
Good	−0.280	0.756	0.439, 1.300	−0.583 [*]	0.558	0.325, 0.959
<u>Religious observance</u>						
Low	0.550 [*]	1.734	1.052, 2.857	0.428	1.534	0.935, 2.514
High	−0.380	0.684	0.375, 1.246	0.310	1.363	0.821, 2.265
<u>Peer delinquency</u>						
High	0.998 ^{**}	2.712	1.684, 4.366	0.657 ^{**}	1.930	1.220, 3.052
Low	−0.872 [*]	0.418	0.197, 0.887	−1.039 ^{**}	0.354	0.178, 0.704
<u>Family involvement</u>						
Low	−0.018	0.982	0.594, 1.625	0.355	1.427	0.896, 2.271
High	−0.223	0.800	0.447, 1.431	−0.360	0.698	0.391, 1.243
<u>Family SES</u>						
Low	−0.208	0.812	0.464, 1.424	0.311	1.365	0.831, 2.242
High	−0.116	0.891	0.531, 1.493	−0.272	0.762	0.456, 1.272

ADH, attention-deficit hyperactivity

$p < 0.001$ ***
 $p < 0.01$ **
 $p < 0.05$ *

Table 2

Hierarchic logistic regression using common variables to predict violence at ages 13–14 years

Predictors	<u>Model 1</u>			<u>Model 2</u>			<u>Model 3</u>		
	B	OR	95% CI	B	OR	95% CI	B	OR	95% CI
<u>Demographic Variables</u>									
African-American	0.240	1.272	0.811, 1.995	0.260	1.300	0.815, 2.072	0.020	1.021	0.626, 1.665
Family SES	0.006	1.006	0.987, 1.026	0.009	1.009	0.989, 1.029	0.011	1.011	0.990, 1.032
<u>Individual Factors</u>									
High Depressed Mood				0.951 ^{***}	2.588	1.615, 4.146	0.674 ^{**}	1.962	1.196, 3.219
Low Religious Observance				0.634 [*]	1.884	1.155, 3.076	0.632 [*]	1.882	1.138, 3.111
<u>Peer/Neighborhood Factors</u>									
High Peer Delinquency							0.852 ^{***}	2.343	1.408, 3.898
Low Peer Delinquency							−0.820 [*]	0.440	0.204, 0.948
Nagelkerke R ²	0.004			0.077			0.139		
−2 Log-Likelihood	498.435			475.540			454.915		
ΔX ² Block	1.302			22.895 ^{***}			20.625 ^{***}		

* $p < 0.05$

** $p < 0.01$

*** $p < 0.001$

Table 3

Hierarchical logistic regression using common variables to predict violence at ages 15–18 years

Predictors	Model 1			Model 2			Model 3			Model 4		
	B	OR	95% CI	B	OR	95% CI	B	OR	95% CI	B	OR	95% CI
<u>Demographics</u>												
African-American	0.253	1.288	0.842, 1.971	0.075	1.078	0.689, 1.685	0.129	1.138	0.722, 1.794	-0.031	0.969	0.604, 1.557
Family SES	-0.019	0.982	0.964, 1.000	-0.015	0.985	0.967, 1.004	-0.016	0.984	0.965, 1.003	-0.016	0.984	0.965, 1.004
<u>Individual Factors</u>												
High ADHD Problems				0.528 [*]	1.695	1.044, 2.753	0.449	1.566	0.957, 2.562	0.397	1.488	0.902, 2.456
Low ADHD Problems				-0.492 [*]	0.612	0.339, 1.104	-0.373	0.688	0.367, 1.291	-0.317	0.728	0.384, 1.381
High Depressed Mood				0.641 [*]	1.898	1.200, 3.000	0.572 [*]	1.771	1.114, 2.817	0.391	1.479	0.914, 2.393
<u>School Factors</u>												
Negative Attitude to School							0.584 [*]	1.793	1.135, 2.834	0.446	1.563	0.974, 2.508
Good Academic Achievement							-0.203	0.816	0.454, 1.468	-0.262	0.770	0.424, 1.397
<u>Peer/Neighborhood Factors</u>												
High Peer Delinquency										0.398	1.488	0.901, 2.458
Low Peer Delinquency										-0.903 [*]	0.406	0.200, 0.821
Nagelkerke R ²	0.019			0.077			0.097			0.132		
-2 Log-Likelihood	534.571			515.732			508.957			496.932		
ΔX^2 Block	6.215 [*]			18.839 ^{***}			6.775 [*]			12.024 ^{**}		

ADHD, attention-deficit hyperactivity

^{*} $p < 0.05$

^{**} $p < 0.01$

^{***} $p < 0.001$

Table 4

Bivariate logistic regressions examining risk and promotive effects for PYS variables predicting violence

PYS Specific Predictors	Violence at Ages 13–14 years			Violence at Ages 15–18 years		
	B	OR	95% CI	B	OR	95% CI
<i>Child Factors</i>						
High Victim of Theft	0.245	1.278	0.784, 2.083	0.568*	1.764	1.118, 2.783
High Serious Injuries	−0.024	0.976	0.533, 1.787	0.019	1.019	0.580, 1.789
High Interpersonal Callousness	0.427	1.533	0.917, 2.562	0.734**	2.084	1.283, 3.386
Low Interpersonal Callousness	0.006	1.006	0.588, 1.724	−0.143	0.867	0.513, 1.465
Low Anxiety	0.261	1.298	0.790, 2.132	0.303	1.354	0.841, 2.179
High Anxiety	−0.442	0.643	0.358, 1.156	−0.462	0.630	0.365, 1.087
Low Shy/Withdrawn	0.089	1.093	0.657, 1.821	0.435	1.545	0.967, 2.471
High Shy/Withdrawn	−0.053	0.948	0.539, 1.668	−0.294	0.746	0.423, 1.314
Positive Attitude to Delinquency	0.034	1.035	0.631, 1.695	0.580*	1.786	1.105, 2.884
Negative Attitude to Delinquency	−1.088*	0.337	0.179, 0.634	−0.116	0.890	0.529, 1.499
Low Perceived Likelihood of Getting Caught	0.425	1.530	0.916, 2.555	0.651*	1.917	1.172, 3.137
High Likelihood of Getting Caught	−0.267	0.766	0.437, 1.341	−0.047	0.954	0.570, 1.599
<i>Family Factors</i>						
Child Maltreatment	0.360	1.433	0.843, 2.436	0.233	1.262	0.759, 2.097
Family on Public Assistance	0.096	1.101	0.708, 1.711	0.466*	1.594	1.053, 2.413
High Number of Caretaker Changes by Age 10 years	0.252	1.286	0.815, 2.031	0.106	1.112	0.719, 1.722
Small House	−0.283	0.753	0.402, 1.410	0.054	1.055	0.606, 1.836
Two Biological Parents at Home	0.079	1.083	0.685, 1.710	−0.216	0.806	0.517, 1.257
Low Parental Reinforcement	0.226	1.253	0.748, 2.101	0.560*	1.751	1.071, 2.862
High Parental Reinforcement	−0.069	0.933	0.546, 1.596	0.239	1.270	0.769, 2.098
Poor Supervision	0.304	1.355	0.818, 2.244	0.214	1.239	0.765, 2.005
Good Supervision	−0.386	0.679	0.394, 1.172	−0.540*	0.583	0.347, 0.977
Younger Mother at Birth of First Child	0.098	1.103	0.640, 1.900	0.356	1.427	0.872, 2.334
Older Mother at Birth of First Child	0.023	1.023	0.600, 1.746	−0.645*	0.525	0.301, 0.915

PYS Specific Predictors	Violence at Ages 13–14 years			Violence at Ages 15–18 years		
	B	OR	95% CI	B	OR	95% CI
Large Family	0.163	0.850	0.494, 1.462	0.154	1.166	0.717, 1.897
Small Family	0.052	1.053	0.572, 1.940	−0.217	0.805	0.434, 1.493
High Housing Quality	0.222	1.248	0.728, 2.140	−0.010	0.990	0.589, 1.663
Low Housing Quality	−0.526 [*]	0.591	0.352, 0.993	−0.697 ^{**}	0.498	0.306, 0.810
<i>Peer Factors</i>						
Poor Relationship with Peers	−0.245	0.783	0.472, 1.299	0.616 [*]	1.852	1.152, 2.979
Good Relationship with Peers	−0.125	0.882	0.516, 1.509	−0.168	0.845	0.485, 1.473
<i>School Factors</i>						
Repeated Grade	0.302	1.353	0.873, 2.095	0.348	1.417	0.937, 2.142
<i>Neighborhood Factors</i>						
High Neighborhood Poverty/Crime	−0.192	0.825	0.481, 1.417	0.494 [*]	1.640	1.005, 2.674
Low Neighborhood Poverty/Crime	−0.204	0.816	0.488, 1.364	−0.150	0.861	0.519, 1.429

PYS, Pittsburgh Youth Study

^{*}
p < 0.05

^{**}
p < 0.01

Table 5

Hierarchic logistic regression using common and PYS variables to predict violence at ages 13–14 years

Predictors	Model 1				Model 2				Model 3				Model 4			
	B	OR	95% CI		B	OR	95% CI		B	OR	95% CI		B	OR	95% CI	
<u>Demographic Variables</u>																
African-American	0.264	1.303	0.827, 2.051		0.213	1.238	0.769, 1.991		0.143	1.153	0.712, 1.868		-0.026	0.975	0.591, 1.607	
Family SES	0.007	1.007	0.988, 1.027		0.008	1.008	0.988, 1.029		0.013	1.013	0.992, 1.035		0.014	1.014	0.992, 1.036	
<u>Individual Factors</u>																
High Depressed Mood					0.891***	2.437	1.504, 3.949		0.891***	2.437	1.499, 3.962		0.653*	1.921	1.155, 3.194	
Low Religious Observance					0.605*	1.831	1.108, 3.025		0.530*	1.699	1.022, 2.825		0.556*	1.744	1.040, 2.924	
Negative Attitude to Delinquency					-0.914**	0.401	0.216, 0.745		-0.921**	0.398	0.214, 0.742		-0.690*	0.502	0.264, 0.954	
<u>Family Factors</u>																
Low Housing Quality									-0.588*	0.556	0.338, 0.913		-0.443	0.642	0.387, 1.068	
<u>Peer/Neighborhood Factors</u>																
High Peer Delinquency													0.779**	2.179	1.289, 3.682	
Low Peer Delinquency													-0.598	0.550	0.250, 1.209	
Nagelkerke R ²	0.005				0.109				0.126				0.166			
-2 Log-Likelihood	491.012				458.607				453.051				439.667			
ΔX^2 Block	1.621				32.404***				5.557*				13.383**			

* $p < 0.05$

** $p < 0.01$

*** $p < 0.001$

Table 6

Hierarchic logistic regression using common and PYS variables to predict violence at ages 15–18 years

Predictors	Model 1			Model 2			Model 3			Model 4			Model 5		
	B	OR	95% CI	B	OR	95% CI	B	OR	95% CI	B	OR	95% CI	B	OR	95% CI
<u>Demographics</u>															
African-American	0.368	1.444	0.928, 2.248	0.129	1.138	0.711, 1.822	-0.028	0.972	0.579, 1.634	0.041	1.042	0.615, 1.765	-0.158	0.854	0.482, 1.512
Family SES	-0.017	0.983	0.964, 1.002	-0.011	0.989	0.969, 1.009	-0.005	0.995	0.973, 1.018	-0.006	0.994	0.971, 1.017	-0.003	0.997	0.973, 1.021
<u>Individual Factors</u>															
High ADH Problems		0.438			1.550	0.874, 2.749	0.426	1.532	0.849, 2.764	0.389	1.476	0.816, 2.670	0.229	1.258	0.677, 2.337
Low ADH Problems		-0.395			0.674	0.359, 1.264	-0.368	0.692	0.365, 1.314	-0.234	0.792	0.403, 1.554	-0.191	0.826	0.411, 1.661
High Depressed Mood		0.543 [*]			1.722	1.047, 2.832	0.496	1.642	0.991, 2.720	0.479	1.615	0.973, 2.680	0.337	1.400	0.824, 2.381
High Interpersonal Callousness		0.438			1.549	0.873, 2.750	0.372	1.450	0.806, 2.609	0.313	1.368	0.758, 2.470	0.226	1.254	0.679, 2.316
Positive Attitude to Delinquency		0.321			1.378	0.843, 2.255	0.281	1.325	0.801, 2.190	0.238	1.269	0.764, 2.107	0.159	1.172	0.687, 2.000
Low Perceived Likelihood of Getting Caught		0.525 [*]			1.690	1.008, 2.831	0.561 [*]	1.753	1.027, 2.993	0.559 [*]	1.749	1.020, 2.996	0.593 [*]	1.810	1.041, 3.146
<u>Family Factors</u>															
Family on Public Assistance					-0.210	0.473, 1.390	-0.230	0.795	0.462, 1.366	-0.258	0.773	0.442, 1.350			
Low Parental Reinforcement					0.234	0.747, 2.137	0.162	1.176	0.689, 2.009	0.187	1.205	0.695, 2.088			
Good Supervision					-0.345	0.410, 1.223	-0.285	0.708	0.410, 1.223	-0.285	0.752	0.432, 1.308	-0.114	0.892	0.501, 1.589
Old Age of Mother Low Housing Quality					-0.486	0.331, 1.142	-0.490	0.613	0.328, 1.143	-0.546	0.579	0.307, 1.094			
					-0.581 [*]	0.342, 0.915	-0.557 [*]	0.573	0.349, 0.941	-0.468	0.626	0.375, 1.046			
<u>School Factors</u>															
Negative Attitude to School					0.431			1.539	0.929, 2.549	0.318	1.374	0.812, 2.325			
Good Academic Achievement					-0.335			0.715	0.377, 1.356	-0.349	0.705	0.365, 1.364			
<u>Peer/Neighborhood Factors</u>															
High Peer Delinquency								0.253		0.253	1.288	0.732, 2.267			
Low Peer Delinquency								-0.812 [*]		-0.812 [*]	0.444	0.208, 0.949			
High Victim of Theft								0.283		0.283	1.328	0.776, 2.271			
Poor Relationship with Peers								0.365		0.365	1.441	0.856, 2.424			
High Neighborhood Poverty/Crime								0.569 [*]		0.569 [*]	1.766	1.020, 3.058			
Nagelkerke R ²	0.023			0.114			0.148			0.160			0.205		

Predictors	Model 1			Model 2			Model 3			Model 4			Model 5		
	B	OR	95% CI	B	OR	95% CI	B	OR	95% CI	B	OR	95% CI	B	OR	95% CI
−2 Log-Likelihood	493.869			465.842			454.945			450.955			435.900		
ΔX ² Block	6.833 [*]			28.027 ^{**}			10.897			3.990			15.055 [*]		

ADHD, attention-deficit hyperactivity

^{*} $p < 0.05$

^{**} $p < 0.01$