Risk and Promotive Effects in the Explanation of Persistent Serious Delinquency in Boys

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Risk and promotive effects were investigated as predictors of persistent serious delinquency in male participants of the Pittsburgh Youth Study (R. Loeber, D. P. Farrington, M. Stouthamer-Loeber, & W. B. van Kammen, 1998), living in different neighborhoods. Participants were studied over ages 13–19 years for the oldest sample and 7–13 years for the youngest sample. Risk and promotive effects were studied in 6 domains: child behavior, child attitudes, school and leisure activities, peer behaviors, family functioning, and demographics. Regression models improved when promotive effects were included with risk effects in predicting persistent serious delinquency. Disadvantaged neighborhoods, compared with better neighborhoods, had a higher prevalence of risk effects and a lower prevalence of promotive effects. However, predictive relations between risk and promotive effects and persistent serious delinquency were linear and similar across neighborhood socioeconomic status.

Although advances have been made in the study of predictors of serious delinquency (Hawkins et al., 1998; Lipsey & Derzon, 1998), little is known about predictors of *persistent* serious offending, which from a societal point of view is of particular concern. Most youth commit some delinquent acts in childhood or adolescence, but many of them desist and do not become a permanent danger or a burden to society. It is, therefore, important to focus on those offenders who commit the most serious crimes and persist in their delinquent behavior (Loeber, Farrington, & Washbush, 1998; Smith, Thornberry, Rivera, Huizinga, & Stouthamer-Loeber, 2000).

Reviews of empirical studies show a wide variety of predictors and correlates of delinquency in general that may function as risk or protective factors or both (Hawkins et al., 1998; Lipsey & Derzon, 1998; Loeber & Dishion, 1983; Loeber & Stouthamer-Loeber, 1986). These variables can be categorized as child characteristics (child problem behaviors, child attitudes), school achievement and leisure activities, and social factors such as peers, family factors, and neighborhood–demographic characteristics

(Bronfenbrenner, 1979; Dishion, Patterson, Stoolmiller, & Skinner 1991; R. Sampson & Laub, 1993; Tolan & Guerra, 1994). The framework that best accommodates the great variety of variables is that of Bronfenbrenner (1979) and of Tolan and Guerra (1994), which places child characteristics, family characteristics, demographics and neighborhood characteristics in nested contexts, with child characteristics being the most proximal influences on behavioral development. The more distal variables are presumed to exert part of their effect through the more proximal variables. In addition, the more distal contexts may come into play later in the child's development. The relation between risk or protective effects and a negative outcome may depend on when in a child's life these factors are measured. Many risk factors are fairly stable over time (Loeber et al., 2000; Sameroff, Bartko, Baldwin, Baldwin, & Seifer, 1998), thus older children may have been exposed to them for a longer time.

Ever since Bronfenbrenner (1979) included contextual factors in his theory of levels of influences on children, neighborhood factors have been increasingly taken into account in psychological studies of delinquency. It is well established that neighborhood variation in the prevalence of delinquency is related to neighborhood characteristics (Bursik & Grasmick, 1993; Loeber & Wikström, 1993; R. J. Sampson & Groves, 1989; Stouthamer-Loeber, Drinkwater, & Loeber, 1999; Wikström, 1991, 1998). However, few studies have explored the relationship between neighborhoods, risk and protective effects, and individual offending (but see Wikström & Loeber, 2000). It is important to establish whether risk and promotive effects have the same relation to persistent serious delinquency in different types of neighborhoods.

Research has uniformly shown that the larger the accumulation of risk factors, the higher the probability of a later negative outcome, such as juvenile delinquency (e.g., Fergusson & Lynskey, 1996; Rutter, 1979; Sameroff et al., 1998; Smith et al., 2000). It is not clear, however, whether the cumulative effect of risk

factors on outcomes is linear or exponential or whether a certain number of risk factors needs to be reached before the effect shows.

Advances made in the study of protective and risk factors over the past few decades (Garmezy, 1985; Masten, Best, & Garmezy, 1990; Rutter, 1979, 1985, 1990; Zimmerman & Arunkumar, 1994) have illustrated those areas in need of further conceptualization and research (Luthar, 1993; Masten & Wright, 1998; Stouthamer-Loeber et al., 1993). Protective and risk factors have been defined in a variety of ways, and their selection and uses are sometimes ambiguous. Some authors referred to variables as if they are either uniquely protective or uniquely risk related (e.g., Ferguson & Lynskey, 1996; Luthar, Cicchetti, & Becker, 2000; Pollard, Hawkins, & Arthur, 1999; Rae-Grant, Thomas, Offord, & Boyle, 1989). Others have emphasized that protective and risk factors are merely opposite ends of the same variable; whether a variable was called a protective or risk factor depended on which end of the continuum was emphasized (Kandel et al., 1988; White, Moffitt, & Silva, 1989). A refinement of this view is the recognition that the protective and risk ends of variables need not be just mirror images of each other but may differ in the magnitude of their relationship to an outcome, that is, the relationship may be nonlinear (Farrington, 1995; Stouthamer-Loeber et al., 1993). Finally, protective factors have been conceptualized as processes that interact with risk factors in reducing the probability of a negative outcome (Rutter, 1985, 1990; Rutter, Giller, & Hagell, 1998). This conceptualization focuses on interaction effects, and protective factors having compensatory or main effects are not considered (Fergusson & Lynskey, 1996; Luthar, 1993).

One issue that this article tries to address is the fact that variables used for analyses are often assigned by researchers as being either risk or protective (e.g., Fergusson & Lynsky, 1996; Werner & Smith, 1982, 1992). By insisting that the sets of risk and promotive variables are separate, we can never consider that a variable can act for one person as a risk and for another person as a promotive factor and for a third be neutral.

Analyses with continuous variables do not resolve the problem; they only establish an association between two variables. Such analyses do not indicate whether the association is linear or lodged on either end. Further, a regression strategy with continuous variables does not clarify strengths and weaknesses of individuals.

An alternative approach is to examine the effects of protective and risk factors as represented by opposite poles of the same variable, allowing a variable to have a risk effect for one participant and a protective effect for another, depending on whether a participant scores closer to one or the other pole on the variable. To capture this, Stouthamer-Loeber et al. (1993) proposed the trichotomization of a distribution that allows for the empirical testing of the relation of different parts of the distribution of an independent variable to the outcome. Participants with a negative score can be compared with those with a neutral score in the middle of the distribution; likewise, participants with a positive score can also be contrasted with those with a neutral score. Trichotomization brings the nature of the relationship between two variables into view, especially when it is nonlinear (Farrington & Loeber, 2000). It ensures that risks as well as protective effects can be considered. Some variables may have a risk effect but no protective effect, whereas other variables may have both (Stouthamer-Loeber et al., 1993). In addition, trichotomization allows for the use of unit weights for risk and protective effects, making a simple additive

model possible, which is easy to communicate to policy makers and practitioners (Newcomb & Felix-Ortiz, 1992; Wikström & Loeber, 2000). It also allows for the identification of participants scoring in the risk or the protective end of multiple domains, which may yield valuable information for prevention and intervention strategies.

The term *protective factor* has generally been used in conjunction with a model describing an interaction effect. Therefore, to prevent confusion, following the example of Sameroff et al. (1998), we will use the term *promotive* rather than protective for the positive end of an independent variable's distribution.

On the basis of the findings of the earlier article (Stouthamer-Loeber et al., 1993), the current study further explored the issue of promotive and risk factors by introducing three methodological improvements. First, the outcome variable of delinquency has been improved to prevent a classification from being based on a single delinquent event by taking persistence into account. Second, we have developed a cumulative promotive and risk summary score for the independent variables. Summary scores based on unit weights have previously been developed in criminology and mental health research. They have been used to provide a global picture, but mostly of risk only (Glueck & Glueck, 1950; Farrington & Tarling, 1985; Rutter, 1978). In addition, we have separated predictors and outcome temporally by measuring predictors in Year 1 and the outcome over the following 6 years.

The present article explored the following questions: (1) How prevalent is persistent serious delinquency? (2) How well do risk effects predict persistent serious delinquency, and is the prediction better if promotive effects are added? Are the predictions equally strong for the oldest as well as the youngest sample? We hypothesized that the prediction would be better if promotive effects were added. With regard to age, we expected that the predictions would be stronger for the oldest sample than for the youngest sample because of the cumulative impact of variables over time (Loeber et al., 2000; Sameroff et al., 1998). (3) What is the prevalence of persistent serious delinquency in different neighborhoods? (4) Do neighborhoods differ in the prevalence of risk and promotive effects? We expected fewer promotive effects and more risk effects in lower socioeconomic status (SES) neighborhoods compared with higher SES neighborhoods. (5) How well does an additive score of risk and promotive effects predict persistent serious delinquency in different neighborhoods? On the basis of Sameroff et al.'s (1998) findings, we expected that such a score would predict persistent serious delinquency equally well in higher and lower SES neighborhoods.

Method

Participants

The participants for this investigation were innercity adolescent boys who were participants of the Pittsburgh Youth Study (Loeber, Farrington, Stouthamer-Loeber, & van Kammen, 1998), an ongoing longitudinal study that began in 1987. Three samples of boys were randomly drawn from the first, fourth, and seventh grades of public schools. Of the 3,436 randomly selected ($N = 1,517$), 85% of the boys and their caretakers (93% of whom were biological mothers) consented to participate in a screening assessment. From each sample, the top 30% (about 250 from each grade) of boys with the highest rates of antisocial behavior were selected, along with an equal number of boys randomly selected from the remaining 70%. This resulted in three samples of about 500 boys each.

The present investigation focused on those boys who were drawn from the first and seventh grades, who are referred to as the youngest ($n = 503$) and the oldest ($n = 506$) samples, respectively.[1] At the first assessment, the participants in the youngest sample were an average of 7 years old, and the participants in the oldest sample were an average of 13 years old. About half of the boys were African American and half were Caucasian, reflecting the racial composition in Pittsburgh public schools. About 40% of the boys lived with a single parent, and about 40% of the caretakers received public assistance. More details about participant selection and demographics were described elsewhere (Loeber et al., 1998). The participants have been interviewed every 6 months for the first six follow-up assessments and yearly thereafter. For this article, data from the 6-month assessments were combined to reflect behaviors occurring in the past year. Information was also collected from caretakers and teachers. The present investigation covers the first 7 years of data, which, on average, reflect ages 7–13 years in the youngest sample and ages 13–19 years in the oldest sample. At the last data phase used, the participation rate was 93% for the youngest sample and 90% for the oldest sample, reflecting a low attrition rate.

Measures

The measures and variables have been described in earlier publications (Loeber et al., 1998; Stouthamer-Loeber et al., 1993), and more details are available on request. Because of the large numbers of measures, they are only briefly described here. The dependent variable was persistent serious delinquency over 6 years of follow-up assessments. Participants were classified as serious delinquents if they had ever engaged in any of a number of delinquent behaviors deemed to be serious on the basis of the work of Wolfgang, Figlio, Tracy, and Singer (1985). These behaviors, with the percentage of participants in the youngest (Y) and oldest (O) samples ever engaging in them, were auto theft or breaking and entering (Y, 10%; O, 22%), selling drugs (Y, 9%; O, 38%), strong-arming (robbery; Y, 39%; O, 21%), attack to seriously hurt or kill (Y, 10%; O, 25%), or rape-forced sex (Y, less than 1%; O, 4%). Persistence was defined as reporting one or more of the behavior categories for at least 2 of the 6 assessment years.

To give participants an equal chance of reporting persistence, we excluded those who were not classified as persisters and who missed one or more assessments, thus reducing the chance of false negative cases. In the youngest sample, 10% of participants ($n = 49$) did not have all 12 assessments, and in the oldest sample, 18% ($n = 89$) did not have all 10 assessments, leaving 454 and 417 participants in the youngest and oldest samples, respectively. The excluded participants did not differ significantly in terms of race, neighborhood, or high-risk status from the included participants.

The information on delinquent behaviors was based on the boys' Self-Reported Delinquency Scale (SRD; Elliott, Huizinga, & Ageton, 1985) and the Antisocial Behavior Scale (Loeber, Stouthamer-Loeber, van Kammen, & Farrington, 1989), the caretakers' Child Behavior Check List (CBCL; Achenbach, 1978; Achenbach & Edelbrock, 1979, 1983), and the teachers' Teacher Report Form (TRF; Edelbrock & Achenbach, 1984). For boys in the oldest sample, the Youth Self Report (YSR; Achenbach & Edelbrock, 1987) was also used. Several items were added to the parent and teacher forms to increase the common-item pool and to gain more information on delinquent behaviors.

The independent variables were measured in the 1st year (the screening and the first follow-up assessment) and were based on child, caretaker, and teacher reports. Forty-four independent variables for the oldest sample and 40 variables for the youngest sample were organized into six domains: child behaviors, child attitudes, school and leisure, peer, family, and demographic characteristics. There are fewer variables for the youngest sample because certain measures were not appropriate for 7-year-olds. The direction of the scoring of the independent variables linked high scores to a negative, less desirable connotation.

The child behaviors domain consisted of the following variables: The substance use classification score reflects the boys' self-reported involve-ment in smoking; drinking beer, wine, and hard liquor (except drinking alcohol with parental permission); and the use of marijuana and other drugs (oldest sample only) as measured with the Substance Use Scale (Elliott, et al., 1985). Cruel to people is based on 1 CBCL question for the caretaker and 1 TRF question for the teacher. Accountability refers to the extent to which boys provided more or less accurate information to adults about their actions and whereabouts. The construct consists of 5 behaviors, represented by 18 questions—12 for caretakers (CBCL), 2 for teachers (TRF), and 4 for boys (YSR). Trustworthiness, which is based on 7 behaviors relating to the trustworthiness of the boys' behavior, was measured through caretakers' (CBCL), teachers' (TRF), and the boys' (YSR) information. The 7 behaviors were represented for the youngest sample by 20 questions (22 questions for the oldest sample). Manipulative consists of 5 behaviors measuring manipulativeness, measured through the caretaker (CBCL) and the teacher (TRF). The 5 behaviors were represented by 16 questions. Ability to feel guilt concerns the lack of guilt displayed by the boys, measured by 1 question from caretakers (CBCL) and 1 question from teachers (TRF). Attention deficit–hyperactivity is based on the Diagnostic Interview Schedule for Children, Parent version (DISC–P), administered to caretakers (A. J. Costello, 1987, revised; E. J. Costello, Edelbrock, & Costello, 1985). The score is based on 28 questions covering 14 behaviors used in the diagnosis of attention deficit–hyperactivity. Oppositional defiant behavior is based on 13 questions, covering 9 problem behaviors used in the DISC–P diagnosis of oppositional defiant disorder. The depressed mood construct is the total score of 13 items of the Recent Mood and Feelings Questionnaire (E. J. Costello & Angold, 1988). The questions cover the symptoms necessary for making a revised *Diagnostic and Statistical Manual of Mental Disorders* (3rd ed., American Psychiatric Association, 1987) diagnosis of major depression. Internalizing problems (oldest sample only) is a measure of the boys' depression, anxiety, and withdrawal and combines 27 questions from caretakers (CBCL) and teachers (TRF).

The attitudes domain was composed of the following variables: attitude to delinquency captures the boys' opinions about 9 delinquent acts for the youngest sample and 11 for the oldest sample. Perception of antisocial behavior examines the boys' opinions on whether it is right to engage in various problem behaviors. Fifteen items are combined for the youngest sample and 18 items for the oldest sample. Attitude to school consists of 7 items (8 items for the oldest sample) about the boys' attitudes and behavior in school. School motivation was measured on the basis of teachers' reports of how hard the boys were working. Religiosity is based, for the youngest sample, on two questions about the boys' religious participation; for the oldest sample, three questions were combined.

The variables in the school and leisure domain were academic achievement, which combines judgments of caretakers (CBCL), teachers (TRF), and boys (YSR) on how well boys performed on a maximum of seven academic subjects. California Achievement Test scores consist of reading and math percentile scores obtained for boys who attended local public schools. Participation in organizations is based on information from the caretaker (CBCL) on the number of organizations, clubs, and teams the boys belonged to and on how active they were in these organizations. For the oldest sample, boys also provided this information. Jobs–chores uses information from the caretaker (CBCL) on the number of jobs and chores the boys had, as well as how well they were performed. Oldest sample boys also provided this information.

The peer domain consisted of the following variables: Peer delinquency summarizes the proportion of friends who engaged in 11 different forms of delinquency, corresponding to items in the SRD. For the youngest sample, the construct is based on nine items. Bad friends summarizes five questions for each of the caretakers and boys on the participants' association with bad

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[1] Data from the middle sample were not used because it had been followed up for seven assessment waves only.

friends. Conventional friends represents the proportion of peers who engaged in eight specified conventional activities. Number of friends is based on caretakers' and boys' information regarding how many close or special friends boys had.

The family domain consisted of the following variables. Supervision, which is based on boys' and caretakers' reports (4 questions each), reflected parental knowledge of the boys' whereabouts and activities. Parent–child activities combines 8 parent and 6 child questions about the amount of time the parent spent with the child. Talk about activities combines 4 caretaker and 5 child questions about parent–child interaction about the boy's activities. Countercontrol summarizes 11 items of the caretakers' reports about the interaction between the parents' attempts at discipline and the boys' counter moves to reduce these attempts. Physical punishment is a combined caretaker and child construct measuring the extent of physical punishment used by the caretaker. Persistence of discipline combines 4 caretaker and 5 child questions on persistence in disciplining (for the oldest sample). For the youngest sample, only the caretaker's report was available. Agreement on discipline consists of 2 questions for the caretaker and 1 question for boys (oldest sample only) measuring the agreement between parents on how to discipline the boy. Communication combines 30 caretaker and 28 boy (oldest sample only) questions on the Revised Parent–Adolescent Communication Form (based on Barnes & Olson, 1982) about boys' communication with parents' regarding emotions, disagreements, and problems. Relationship with caretakers consists of 13 items on the boys' perception of their relationship with their caretakers and 16 items on caretakers' perception of their relationship with the boys. Gets along with siblings combines caretakers' and boys' information about how well the boys did get along with siblings. Caretaker happiness with partner is an evaluation by the caretaker of the degree of happiness with her or his partner. Caretaker stress is based on 14 items measuring the caretaker's perceived stress and ability to handle problems.

Finally, the demographic domain contained the following variables: age of mother at birth of boy, as reported by the caretaker. Age of child is based on the caretakers' reports. Education of caretaker is based on the caretakers' reports. Number of children in the household is based on the boys' reports. SES is the caretakers' socioeconomic scores calculated according to Hollingshead (1975). If there were two caretakers in the family, the higher SES score was selected. Housing condition is based on an assessment by interviewers of the condition of the house. Neighborhood (Census) is a combination of the following U.S. Census information from 1980 (U.S. Department of Commerce, 1980): median household income, proportion of persons who were unemployed in 1979, proportion of families below poverty level, proportion of juvenile males aged 10–19 years in the population, proportion of households with children under age 18 headed by a single woman, proportion of separated or divorced persons of those aged 15 years and over. Neighborhood crime is based on 10 questions to the caretaker about the presence of crime in her or his neighborhood.

The neighborhood SES variable was created by factor analysis of nine variables from the 1990 census data (U.S. Department of Commerce, 1990; Wikström & Loeber, 2000). The strongest factor accounted for 58% of the variance; the variables loading on this factor were single-parent households, median income, families below the poverty line, families on public assistance, unemployed adults, and percentage who are African American. Neighborhoods with factor scores in the lowest quartile were classified as high SES, followed by medium-SES neighborhoods, which made up the middle 50%, and those in the upper quartile of factor scores were classified as low-SES neighborhoods. The low-SES group was split once more distinguishing low-SES neighborhoods predominated by public housing from low-SES nonpublic housing areas.

Analyses

Because higher risk boys were oversampled, the analyses were weighted to reflect the preselection sample distribution, which was taken randomly from the population of first- and seventh-grade boys attending Pittsburgh public schools.[2] The analytic process began by reducing, for each sample, the number of predictors. For the analysis of potential risk and promotive effects, the independent variables were trichotomized as closely as possible at the 25th and 75th percentiles to create potentially promotive, neutral, and risk categories, which were coded -1 if a *promotive effect* was established, 0 for the *neutral part* of the distribution, and 1 if a *risk effect* was established. We have used these cutoffs to identify the extremes of the distribution—but not so very extreme that it will only apply to rare cases. These cutpoints were based on our earlier work (Loeber, Farrington, Stouthamer-Loeber, & van Kammen, 1998; Stouthamer-Loeber et al., 1993). The pros and cons of continuous versus noncontinuous variables and the placing of cutoff points have been discussed extensively by Farrington and Loeber (2000). The trichotomization of the variables allowed for examination of their overall relationships with persistent serious delinquency in a 3×2 table (see Table 1). An overall contingency coefficient was calculated for the 3×2 table. If this relationship was significant, the variable was selected for further analyses. Because of the number of comparisons, we selected $p < .01$ rather than $p < .05$.

For the variables having a significant association with delinquency, the next step was to determine whether the effect was in the risk end, in the promotive end, or in both ends of the distribution. Thus, Table 1 is broken down into 2×2 comparisons of risk–neutral versus delinquency (cells C, D, E, and F) and promotive–neutral versus delinquency (cells A, B, C, and D). Chi-square tests of significance were performed, and odds ratios and 95% confidence intervals are reported. If the chi-square statistic for risk versus neutral was significant, then that variable was deemed to have a risk effect and a risk effect score of 1 was assigned to a person scoring in the risk range. If a chi square for promotive versus neutral was significant, then the variable was labeled as having a promotive effect, and a value of -1 was assigned to a person scoring in the promotive range. Thus, establishing empirically among individuals whether a variable had a risk effect, a promotive effect, or both. This information was used to form summary scores for each of the six domains. Within each domain, the variables for which the 2×2 comparison was significant at the $p < .05$ level were summed, adding the 1s to make a domain risk score and adding the -1s for the domain promotive score. Then, the risk score and the promotive score were combined to form a summary score for each domain. The domain summary score could range from a negative to a positive number on the basis of the number of variables that had promotive or risk effects in the 2×2 comparisons. Thus, the individual variables act as scale items for the domain scores.

As a next step, each of the six domain summary scores was trichotomized. The trichotomization was made as close as possible to the 25th and 75th percentiles, while maintaining the symmetry of the promotive–risk ends. Again, the categories were coded as -1, 0, and 1 to represent *promotive*, *neutral*, and *risk*. The summary scores of the -1s and 1s from each of the six domains formed the main variables for the bulk of the analyses. The number of risk effects score was determined by adding the number of domains for which a participant was coded a 1. Thus, the score for risk effects ranged from 0 to 6, with a score of 6 indicating risk in all six domains. Similarly, the promotive effects score was determined by adding the number of domains for which a participant was coded a -1 and ranged from -6 to 0. Last, an overall risk–promotive effects score was formed by summing the risk and promotive effects summary scores and ranged from -6 to 6, with the individual domain scores acting as scale items for the risk–promotive score. For the youngest sample, the score ranged from -5 to 5 because variables in only five domains were significant for risk and for promotive effects.

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[2] The weights were 0.80 for the risk group and 1.21 for the nonrisk group in the Y sample and 0.65 for the risk group and 1.36 for the nonrisk group in the O sample.

Table 1
Layout of Potential Relationship Between Independent and Dependent Variables

	Delinquency	
Independent variable	PS	Not PS
Promotive (25%)	A	B
Neutral (50%)	C	D
Risk (25%)	E	F

Note. Persistent serious (PS) sample percentages are 21.6% for the youngest and 37.2% for the oldest. Not persistent serious sample percentages are 78.4% for the youngest and 62.8% for the oldest.

The analyses addressed how well the scores for the number of risk effects or promotive effects predicted the rate of persistent serious delinquency. The prevalence of persistent serious delinquency was graphed for each value of the risk effects score, the promotive effects score, and the total risk–promotive effects score. This provided an illustration of whether the rate of persistent serious delinquency increased as the number of risk effects increased and whether it decreased as the number of promotive effects increased.

A hierarchical logistic regression determined whether the inclusion of promotive effects improved the prediction of persistent serious delinquency above that of the risk effects alone. Risk effects were entered first into the regression, and promotive effects were entered in the second step. The log-likelihood ratios were compared between having only risk effects in the model and having both risk and promotive effects in the model. A chi-square test of the difference between the two log-likelihood ratios determined whether the inclusion of promotive effects significantly improved the prediction model for persistent serious delinquency.

Risk and promotive effects were also examined in the context of neighborhood SES. To avoid confounding in these analyses, we removed the neighborhood census predictor variable from the demographics domain. First, the four types of neighborhoods were compared to see whether the frequency of risk and promotive effects varied by neighborhood SES. A one-way analysis of variance (ANOVA) determined whether the neighborhood levels differed significantly in the mean number of risk effects or promotive effects. In addition, the prevalence of risk and promotive effects was graphed for each neighborhood level.

The last set of analyses addressed whether there was neighborhood variation in the prediction of persistent serious delinquency. The inclusion of neighborhood into the risk–promotive versus delinquency comparison yielded small cell sizes. Therefore, the youngest and oldest samples were combined, and neighborhood level was collapsed into high–medium SES and low SES (with and without public housing).

Results

The first question concerned the prevalence of persistent serious delinquency in the two samples using participants' data from age 7 years to age 13 years for the youngest sample and from age 13 years to age 19 years for the oldest sample. The weighted prevalence was 22% for the youngest sample and 37% for the oldest sample. These rates show that many urban boys engage in persistent serious delinquency and that this occurs already at the elementary school age.

The second question dealt with how well risk effects predict persistent serious delinquency and whether the prediction would be improved if promotive factors were added. In the six domains of independent variables, we had 44 and 40 variables (for the

oldest and youngest samples, respectively). When we examined the number of significant contingency coefficients with a *p* value of less than .01 for all the 2 × 3 tables, there were 28 significant variables for the oldest sample and 17 for the youngest sample. The significant variables for the youngest sample were a subset of those for the oldest sample. The difference between the two samples was particularly striking in the family domain; for the oldest sample, six family variables reached significance, whereas there was only one for the youngest sample.[3] In the school and leisure domain, only school achievement variables were significant. Therefore, we have changed the name of the domain to the school domain.

Ten of the 28 significant variables for the oldest sample showed both a risk as well as a promotive effect (Table 2), whereas for the youngest sample 5 variables of the 17 significant ones had both effects (Table 3). In total, there were 19 variables with a risk effect for the oldest sample and 13 for the youngest sample. With regard to promotive effects, 19 variables showed such effects for the oldest sample and 9 for the youngest sample. The individual variables with odds ratios greater than 3 for risk were low school motivation, bad friends, and disadvantaged neighborhood for the oldest sample and cruel to people, manipulative, low ability to feel guilt, and low school motivation for the youngest sample.

Variables with a strong promotive effect (odds ratio greater than 3) were, for the oldest sample, high accountability and good relationship with parents. For the youngest sample, they were high accountability, trustworthiness, ability to feel guilt, school motivation, and a nondisadvantaged neighborhood. The odds ratios for promotive effects tended to be higher for the youngest sample than for the oldest sample on the same variables.

For the total summary scores, the domain risk and domain promotive effects were added. The resulting risk effects score ranged from 0 to 6, whereas the promotive effects score ranged from −6 to 0 for the oldest sample. For the youngest sample, the family domain did not yield a risk effect and the peer domain did not yield a promotive effect, thus the scores only ranged from 5 to −5, respectively. The correlations among the domain scores were moderate, ranging from .11 to .47 (*M* = .28) for the oldest sample and from .11 to .64 (*M* = .23) for the youngest sample. The correlations between the summary domain risk effects and promotive effects scores were .66 for the oldest sample and .56 for the youngest sample, both significant at the *p* < .01 level.

The distribution of risk and promotive scores is fairly similar for the oldest and youngest samples, taking into account that the range is only up to 5 for the youngest sample (Table 4). For each score, more than half of the samples have values of 0 or 1, and very few children reach a risk or promotive score of 5 or more (risk score:

[3] Variables that did not reach significance were for the O or Y samples: oppositional defiant behavior (Y), depressed mood (O), internalizing problems (O), attitude to delinquency (O,Y) perception of antisocial behavior (Y), attitude to school (Y), religiosity (O,Y), participation in organizations (O,Y), jobs–chores (O,Y) bad friends (Y), conventional friends (O,Y), number of friends (O,Y), supervision (Y), parent–child activities (Y), talk about activities (O,Y), countercontrol (Y), physical punishment (O,Y), persistence of discipline (Y), agreement on discipline (O), gets along with siblings (O,Y), caretaker happiness with partner (O,Y), caretaker stress (O,Y), caretaker education (Y), number of children (O,Y), SES (Y), housing condition (O,Y).

Table 2
Bivariate Assocations With Persistent Serious Delinquency for the Oldest Sample

| | Overall 3 × 2 table (2 *df*) | | | 2 × 2 tables (1 *df*) | |
| | | | | Risk vs. neutral | Promotive vs. neutral |
Variable	Contingency coefficient	*p*	*n*	OR (95% CI)	OR (95% CI)
Child behaviors					
Substance use	.17	.001	416	2.31 (1.39–3.84)	*ns*
Cruel to people	.21	<.001	376	*ns*	1.82 (1.13–2.93)
Accountability	.33	<.001	417	2.69 (1.71–4.25)	3.27 (1.69–6.33)
Trustworthiness	.26	<.001	417	2.04 (1.27–3.26)	2.50 (1.42–4.39)
Manipulative	.22	<.001	417	2.07 (1.30–3.30)	*ns*
Ability to feel guilt	.26	<.001	376	2.31 (1.43–3.73)	2.18 (1.16–4.10)
Attention deficit–hyperactivity	.16	.003	417	*ns*	1.89 (1.07–3.33)
Oppositional defiant behavior	.19	<.001	417	1.91 (1.19–3.06)	*ns*
Child attitudes					
Perception of antisocial behavior	.17	.002	417	2.05 (1.28–3.28)	*ns*
Attitude to school	.17	.002	416	*ns*	2.32 (1.36–3.96)
School motivation	.29	<.001	417	3.06 (1.84–5.07)	2.37 (1.32–4.29)
School					
Academic achievement	.22	<.001	416	2.08 (1.31–3.29)	1.78 (1.01–3.13)
CAT score, reading	.18	.001	383	*ns*	2.70 (1.46–5.01)
CAT score, math	.21	<.001	380	2.01 (1.24–3.27)	*ns*
Peers					
Peer delinquency	.21	<.001	388	*ns*	2.55 (1.36–4.81)
Bad friends	.26	<.001	412	3.14 (1.93–5.09)	*ns*
Family					
Supervision	.21	<.001	413	1.64 (1.04–2.58)	2.17 (1.23–3.83)
Parent–child activities	.20	<.001	411	1.88 (1.19–2.98)	1.97 (1.08–3.62)
Child's countercontrol	.16	.003	415	1.84 (1.12–3.02)	*ns*
Persistence of discipline	.16	.005	414	*ns*	1.84 (1.08–3.15)
Communication	.26	<.001	413	1.64 (1.03–2.60)	3.84 (2.00–7.35)
Relationship with parents	.25	<.001	412	*ns*	4.06 (2.23–7.40)
Demographic characteristics					
Age of mother at birth of child	.21	<.001	405	2.08 (1.26–3.43)	1.77 (1.05–2.99)
Age of child	.17	.003	415	*ns*	1.88 (1.10–3.19)
Education of caretaker	.19	.001	409	1.93 (1.20–3.10)	*ns*
SES	.16	.004	408	*ns*	1.95 (1.13–3.38)
Neighborhood (census)	.32	<.001	397	3.30 (1.84–5.93)	1.83 (1.11–3.03)
Neighborhood crime	.17	.003	412	2.23 (1.38–3.61)	*ns*

Note. OR = odds ratio; CI = confidence interval; CAT = California Achievement Test; SES = socioeconomic status.

6% for the oldest sample and 2% for the youngest sample; promotive score: 6% for the oldest sample and 3% for the youngest sample).

The two total risk effects and promotive effects scores made it possible to look at the cumulative impact of risk and promotive effects on the persistent serious-delinquent outcome. In other words, what are the chances of being a persistent serious delinquent at different levels of risk effects or promotive effects? Panel A of Figure 1 shows the relationship between risk scores and outcome, not taking into account the promotive score. It is clear that the higher the risk score, the greater the likelihood of persistent serious delinquency. In the oldest sample, about 10% with a zero-risk score were persistent serious delinquents, compared with 70% and 100% for those with a risk score of 5 or 6, respectively. It should be pointed out, however, that there were fewer than 5 cases who had a risk score of 6. For the youngest sample, about 2% with a zero-risk score were persistent serious delinquents, compared with 71% with a score of 5.

Panel B in Figure 1 shows the relationship of the number of promotive effects and persistent serious delinquency. None of those with a score of −5 or −6 became persistent serious delinquents, whereas of those with a promotive score of 0, 66% of those in the oldest sample and 41% of the youngest sample became persistent serious delinquents. The greater the promotive effect, the less the likelihood of persistent serious delinquency.

The promotive effects score was deducted from the risk effects score to form a risk–promotive effects score. This combination of risk and promotive scores yielded a shift in value for 40% of the participants; that is, 40% of the participants had both risk and promotive effects. The shift, by necessity, took place mainly around the middle part of the new distribution, which ran from −6 to 6.

Panel C of Figure 1 shows that the combined risk–promotive score had a linear relation with persistent serious delinquency. Participants with a predominantly promotive score ran almost no risk of becoming a persistent serious delinquent, particularly

Table 3
Bivariate Assocations With Persistent Serious Delinquency for the Youngest Sample

| | Overall 3 × 2 table (2 *df*) | | | 2 × 2 tables (1 *df*) | |
| | | | | Risk vs. neutral | Promotive vs. neutral |
Variable	Contingency coefficient	*p*	*n*	OR (95% CI)	OR (95% CI)
Child behaviors					
Cruel to people	.34	<.001	416	3.82 (1.91–7.63)	*ns*
Accountability	.29	<.001	454	2.26 (1.31–3.88)	5.94 (2.63–13.43)
Trustworthiness	.27	<.001	454	2.19 (1.31–3.67)	5.33 (2.22–12.77)
Manipulative	.26	<.001	455	3.31 (1.97–5.57)	*ns*
Ability to feel guilt	.34	<.001	416	3.39 (1.97–5.81)	5.26 (1.78–15.52)
Attention deficit–hyperactivity	.18	.001	454	*ns*	2.24 (1.23–4.10)
Depressed mood	.15	.007	451	2.15 (1.26–3.65)	*ns*
Child attitudes					
School motivation	.32	<.001	454	3.11 (1.91–5.08)	5.78 (2.00–16.66)
School					
Academic achievement	.25	<.001	453	2.23 (1.34–3.72)	2.59 (1.35–4.99)
CAT score, reading	.25	<.001	425	2.83 (1.65–4.88)	*ns*
CAT score, math	.18	.001	427	1.90 (1.10–3.29)	*ns*
Peers					
Peer delinquency	.20	<.001	433	2.44 (1.42–4.20)	*ns*
Family					
Relationship with parents	.17	.001	451	*ns*	2.40 (1.22–4.71)
Demographic characteristics					
Age of mother at birth of child	.17	.001	436	2.51 (1.47–4.28)	*ns*
Age of child	.21	<.001	452	2.87 (1.71–4.81)	*ns*
Neighborhood (census)	.28	<.001	390	*ns*	3.44 (1.76–6.72)
Neighborhood crime	.17	.001	452	*ns*	2.02 (1.10–3.73)

Note. OR = odds ratio; CI = confidence interval; CAT = California Achievement Test.

among those in the youngest sample.[4] In contrast, those with a predominantly risk score had quite a high chance of becoming persistent serious delinquent; that is, 75% of participants in the oldest sample with a combined risk–promotive effect score of 4 or more were classified as persistent serious delinquents.

Table 4
Distribution of Scores for Risk and Promotive Effects

| | Sample | |
Score	Oldest (%)	Youngest (%)
Risk		
0	28.64	34.51
1	21.24	27.69
2	18.14	17.58
3	15.51	12.53
4	10.02	6.15
5	5.49	1.54
6	0.95	—
Promotive		
0	31.73	28.79
−1	26.92	29.45
−2	15.14	18.46
−3	12.74	10.55
−4	7.69	9.45
−5	3.85	3.30
−6	1.92	—

Note. Dashes = data not available.

Does the strength of the prediction increase when the promotive score is added to the risk score? Table 5 shows the results of the logistic regressions using number of risk and number of promotive effects, with risk entered first. For both samples, adding the promotive score improved the prediction significantly, as is indicated by the change in the −2 log likelihood values, $\chi^2(1, N = 420) = 27.44$, $p = .00$, for the oldest sample; $\chi^2(1, N = 547) = 16.52$, $p = .00$, for the youngest sample. The full model with both risk and promotive effects correctly classified 72% of the cases for the oldest sample and 80% of the cases in the youngest sample. The chi-square values indicate the increase or decrease in likelihood of the outcome of persistent serious delinquency per unit of change in the scores.

The risk–promotive score can be used as a simple prediction instrument. The rate of persistent serious delinquency given a risk–promotive score of 1 or higher (i.e., a risk balance) was 43% in the youngest sample and 57% in the oldest sample. In comparison, the rate of persistent serious delinquency was smaller (6% and 17%, respectively) if a score was zero or had a minus value (i.e., a promotive balance). Dichotomizing the score in this fashion yielded an odds ratio for persistent serious delinquency of 11.24

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[4] In a hierarchical logistic regression with the two samples combined, a significant interaction was found for number of promotive effects by sample, indicating that in the Y sample the promotive effect had a stronger reductive relation to persistent serious delinquency than in the O sample (OR, 0.65).
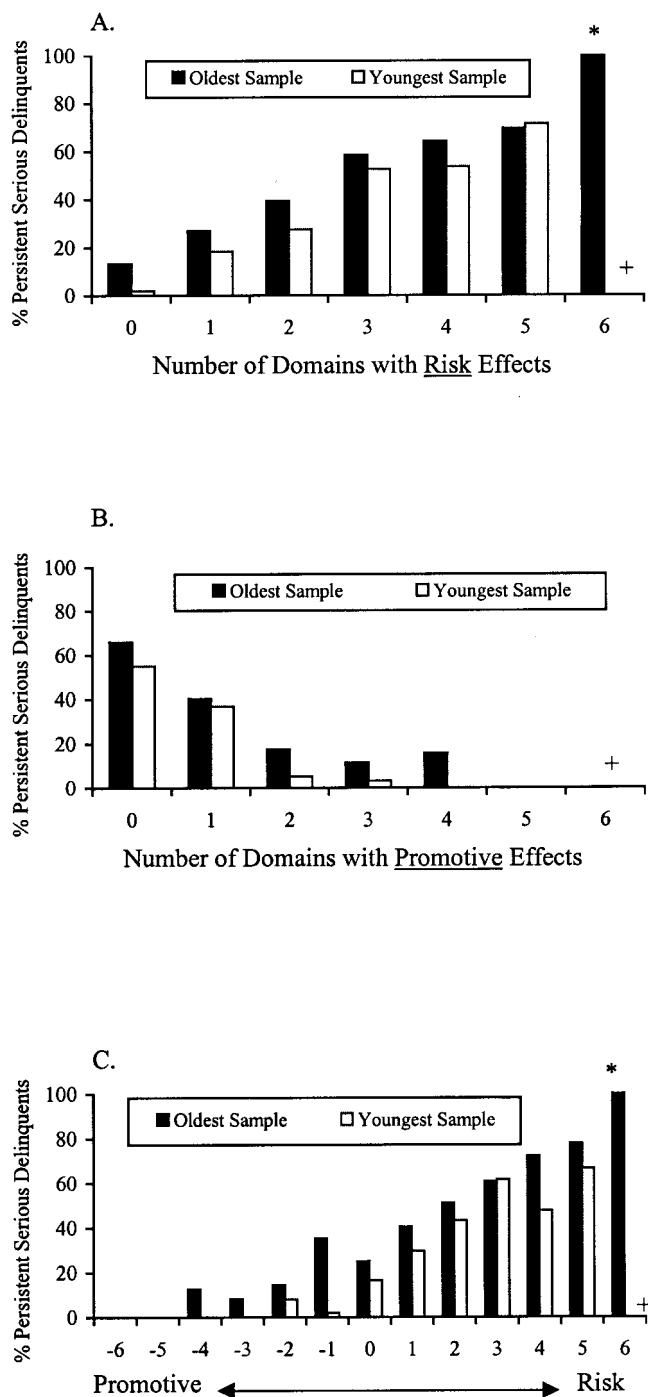
Figure 1. Prevalence of persistent serious delinquency by number of risk effects, by number of promotive effects, and by risk–promotive effects score. * *n* < 5 (oldest sample); + not available (youngest sample).

for the youngest sample and 6.47 for the oldest sample. The C panel of Figure 1 shows that very few of boys in the youngest sample with a predominant promotive score became persistent serious delinquents later; in contrast, this was somewhat higher for boys in the oldest sample.

We expected that both persistent serious delinquency and risk and promotive effects would not be evenly distributed across neighborhoods. Thus, we examined, first, the prevalence of persistent serious delinquency as well as the prevalence of risk and promotive effects in different neighborhoods.

Table 6 lists the percentages of the samples living in the different levels of neighborhood. The two lowest SES neighborhoods contained 30% and 35% of the oldest and youngest samples, respectively. The remainder lived mainly in the medium-SES neighborhoods, whereas only a small proportion of the samples lived in the high-SES neighborhoods (15% and 13% for the oldest and youngest samples, respectively). The youngest compared with the oldest sample tended to live in lower SES neighborhoods. The second set of columns in Table 6 list the percentages of boys with persistent serious delinquency in each of the four levels of neighborhood. The percentages increase steadily from high-SES neighborhood to public housing. In the oldest sample these percentages rise from 18% in the high-SES neighborhood to 69% in the public-housing areas. For the youngest sample the spread is somewhat smaller: from 8% in the high-SES neighborhood to 41% in the public-housing areas. The lower percentages of persistent serious delinquency are due to the fact that the sample is 6 years younger than the oldest sample. The contingency coefficients were .28 and .24 for the oldest and youngest samples, respectively, which were both significant at the $p < .001$ level.

The prevalence of risk and promotive effects also varied by neighborhood.[5] Panel A of Figure 2 shows the average number of risk effects by neighborhood for both samples, whereas Panel B depicts the average number of promotive effects. The four ANOVA tests examining differences across neighborhoods were all highly significant ($p < .001$), ranging from $F(3, 466) = 9.69$ for risk effects in the oldest sample to $F(3, 453) = 24.84$ for promotive effects in the youngest sample. For both samples, as neighborhood SES decreased, the average number of risk effects increased and the average number of promotive effects decreased.

All post hoc comparisons among neighborhoods were significant at the $p < .05$ level, except for the oldest sample, in which there were no differences in the average number of risk or promotive effects between public housing and nonpublic housing in the low-SES areas. For the youngest sample, medium- and low-SES neighborhoods had similar rates of risk and promotive effects. Thus, in general, lower SES neighborhoods were clearly disadvantaged areas for participants in terms of having more factors that put boys at risk for persistent serious delinquency and fewer factors that would reduce that risk.

The final question examined whether the factors initially identified as having risk and promotive effects on persistent serious delinquency predicted persistent serious delinquency equally well in different neighborhoods. To ensure an adequate sample size, we combined the neighborhoods in high–medium SES and low SES–public housing. Also, the oldest and youngest samples were combined because of the similarities of the results.

Figure 3 shows the prevalence of persistent serious delinquents at each value of the risk–promotive score by the two types of neighborhoods. Although the number of risk and promotive effects

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[5] The neighborhood census variable was removed from the demographic characteristics domain.

Table 5
Hierarchical Logistic Regression Entering Number of Risk Effects Then Number of Promotive Effects

Number of effects	B	p	OR (95% CI)	−2 log likelihood
Oldest sample (*n* = 420)				
Risk	0.31	.00	1.37 (1.14–1.65)	470.79
Promotive	0.59	.00	1.81 (1.42–2.31)	443.35
Youngest sample (*n* = 547)				
Risk	0.63	.00	1.88 (1.51–2.36)	379.48
Promotive	0.60	.00	1.82 (1.33–2.50)	362.96

Note. Odds ratios (OR) are per increasing number of risk effects and decreasing number of promotive effects. CI = confidence interval.

differed greatly by neighborhood, at each level of risk and promotive effects the proportion of participants being persistent serious delinquents is only slightly higher in the low-SES neighborhoods. This suggests that the numbers of risk and promotive effects and persistent serious delinquency are similarly related in different types of neighborhood.

Logistic regressions for each of the two neighborhood types showed similar results (Table 7). Again, as shown by the change in the −2 log likelihood values, the addition of the number of promotive effects significantly improved the prediction compared with that of the risk effects alone, $\chi^2(1, N = 554) = 16.53$, $p = .00$, for high–medium-SES neighborhoods; $\chi^2(1, N = 281) = 6.72$, $p = .01$, for low-SES–public housing neighborhoods. The regression classified more cases correctly in the high–medium neighborhoods than in the low–public housing areas (80% versus 67%, respectively). The proportion of participants becoming persistent serious delinquents given a risk–promotive score of 1 or higher (i.e., a risk balance) was 47% in the high–medium-SES neighborhoods and 57% in the low-SES neighborhoods. In comparison, rates of persistent serious delinquency were 10% and 22% for scores of zero or less (i.e., a promotive balance). Dichotomizing the score in this fashion yielded an odds ratio of 8.82 for the high–medium-SES neighborhoods and 5.11 for the low-SES neighborhoods. Note that in the low-SES neighborhoods, boys with a promotive balance still have a sizeable risk of becoming persistent serious delinquents.

Table 6
Distribution of the Samples in Various Neighborhoods and the Prevalence of Persistent Serious Delinquency in the Various Types of Neighborhoods

Neighborhood	Distribution of samples		Prevalence of persistent serious delinquency	
	Oldest (%)	Youngest (%)	Oldest (%)	Youngest (%)
High SES	15.20	12.53	17.74	7.55
Medium SES	55.15	52.25	32.44	18.10
Low SES	17.65	18.44	41.67	29.49
Low SES (public housing)	12.01	16.78	69.39	40.85

Note. SES = socioeconomic status.

Discussion

The overarching purpose of the study was to explore the cumulative impact of the effects of risk and promotive domain on later persistent serious delinquency. We examined this in two different age groups and in different neighborhoods. The innercity sample studied yielded a large proportion of persistent serious delinquents: More than one third of the oldest sample at age 19 years and one fifth of the youngest sample at age 13 years were classified as such. One of the main questions we explored was whether the knowledge of promotive effects improved the prediction of persistent serious delinquency over and above knowledge of risk domains. The risk score and the promotive score each contributed independently to the prediction of persistent serious offending.
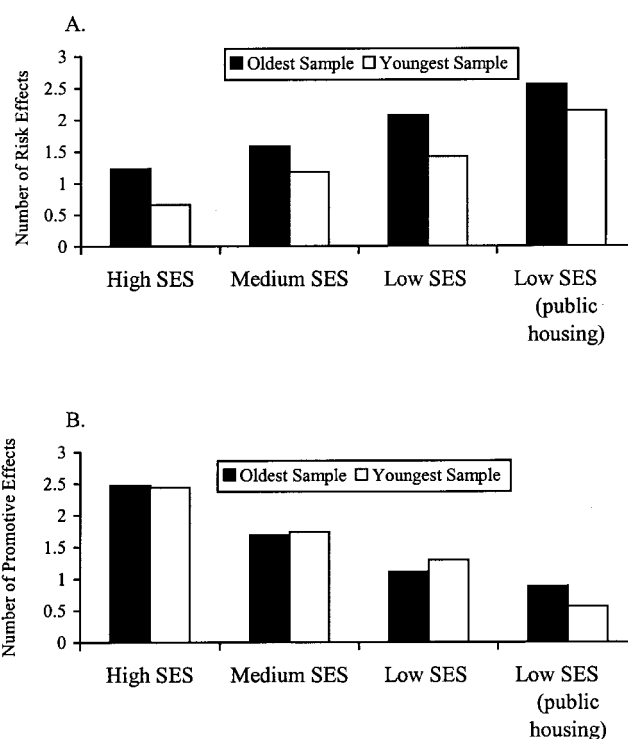

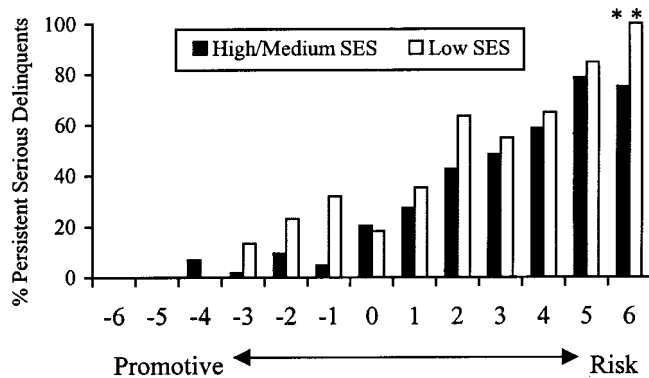*Figure 2.* Mean number of risk effects and promotive effects by neighborhood socioeconomic status (SES).

Figure 3. Prevalence of persistent serious delinquency by total risk–promotive effect score by neighborhood (oldest and youngest samples combined). * *n* < 5. SES = socioeconomic status.

These results are much in line with recent findings reported by Pollard et al. (1999), showing an additive effect of risk and promotive factors in predicting delinquency. In contrast with their findings, the current findings show a generally linear rather than a curvilinear positive accelerating relationship between risk domains and delinquency. However, the results in the Pollard et al. study concerned specific variables compared with domains in the present study. It should be noted that boys in the oldest sample who had a combined risk–promotive score in the promotive end still had a fairly high risk of becoming a persistent serious delinquent (17%). As mentioned, the promotive effects we measured may be more appropriate for the youngest sample; we may have missed out on variables particularly important in adolescence.

The present study showed that when the balance between risk and promotive domains leaned toward one or more risk domains, this signified a high risk of later persistent serious offending, with an odds ratio of 11.24 for the youngest sample and 6.47 for the oldest sample. These findings support the notion that exposure to risk domains in the relative absence of promotive domains dramatically increases the risk of later persistent serious offending. This was particularly the case for boys in the youngest compared with the oldest sample and may reflect the generally observed fact that early onset of offending is associated with later more persis-

tent, violent, and serious delinquency (Loeber & Farrington, 2001).

In general, the data suggest that the risk and promotive domains studied are of importance throughout middle childhood and early adolescence. However, we found some evidence that risk and promotive effects may change during development, with significant variables for the youngest sample being a subset of those significant for the oldest sample. The strongest risk factors in the youngest sample show a strong resemblance to the callousness construct discussed by Frick and Ellis (1999), which is analogous to a conceptualization of adult psychopathy. Thus, as children grow into adolescents, it appears that they are exposed to new risk factors, but also to new promotive factors. The reason for more variables being related to the outcome in the oldest sample may be that the impact of risk and promotive effects for the older boys accumulated over a longer period, as could be the case with conditions within the family. This is all the more likely because major shifts in promotive or risk factors over time occur for few children (Loeber et al., 2000; Sameroff et al., 1998).

The magnitude of promotive effects varied with age. We found that the odds ratios for promotive effects tended to be higher for the youngest compared with the oldest sample on the same variables. This was also observed by Smith et al. (2000) and is intriguing. It may indicate that many children enter middle and late childhood with a healthy dose of promotive factors, but over time, such factors either may diminish or disappear, or may lose in the balance with emerging risk factors. Alternatively, the finding may indicate that different, unmeasured variables have a protective effect in adolescence, such as friendships with or mentorships by an adult other than a parent.

When do processes activate persistent serious delinquency? Data on the age of onset of persisting serious delinquency (based on prospective and retrospective information) in the oldest sample, published elsewhere (Loeber, Farrington, & Washbush, 1998), showed that half of the persistent offenders already had emerged by age 12 and over 80% by age 14. This demonstrates that some of the processes that presumably activate offending may have been in place prior to the first assessment of the risk and promotive factors in the oldest sample (average age 13.51 years). This could be a potential weakness in the current study, which did not have access to risk or promotive factors prior to that age. However, on

Table 7

Hierarchical Logistic Regression for Each Neighborhood Level Entering Number of Risk Effects Then Number of Promotive Effects

Number of effects	B	*p*	OR (95% CI)	−2 log likelihood
High/medium-SES neighborhood (*n* = 554)				
Risk	0.53	.00	1.70 (1.41–2.06)	487.12
Promotive	0.47	.00	1.61 (1.26–2.05)	470.58
Low-SES neighborhood (*n* = 281)				
Risk	0.43	.00	1.54 (1.24–1.92)	325.14
Promotive	0.39	.01	1.47 (1.08–2.01)	318.41

Note. Oldest and youngest samples are combined. Odds ratios (OR) are per increasing number of risk effects and decreasing number of promotive effects. CI = confidence interval.

the positive side, we know that risk factors in children's lives often are quite stable, as children are exposed to similar child rearing practices (see e.g., Loeber et al., 2000) and to similar types of neighborhood influences. We are on somewhat firmer ground with the youngest sample, for whom risk and promotive effects were first measured at age 7.52 years, well before the onset of persistent serious offending. Of course, this still leaves the possibility that some risk and promotive factors might have operated prior to that age.

Serious delinquency is concentrated in the lowest SES neighborhoods of cities (e.g., Bursik & Grasmick, 1993), which is also found in the present study. In the public housing areas, almost 70% of the 19-year-olds and 41% of the 13-year-olds were persistent serious delinquents. The causal mechanisms of neighborhood situational influences on delinquency and on the development of individual characteristics that may promote offending is, however, not well understood. Previous studies on community influences using data from the Pittsburgh Youth Study (Loeber & Wikström, 1993; Wikström & Loeber, 2000) that were based on different variables, assessment phases, and samples than the current study revealed that (a) juveniles in more disadvantaged neighborhoods tended to offend more than others and were more likely to engage in serious delinquency and (b) the impact of neighborhood disadvantage in adolescence tended to be greater for boys with few risk factors compared with boys with high numbers of risk factors. Boys with many risk factors offended at the same level regardless of neighborhood context.

The present study expands on these findings by examining how risk and promotive effects may vary with neighborhood setting. The results show that the prevalence of risk and promotive factors varied by neighborhood. The average number of risk effects decreased as the SES of the neighborhood became higher. With regard to the promotive effects, the average number increased as the neighborhood SES increased. These findings show the importance of the ecology of juvenile offending in terms of neighborhood setting and how settings may differ in the presence of risk and promotive effects in individuals.

The findings suggest that broad underlying processes relevant to serious juvenile offending may be quite similar in different neighborhoods. On the level of the summary of risk and promotive domains, the relationship with persistent serious offending was very similar across the disadvantaged and advantaged neighborhoods. Thus, despite major differences among neighborhoods in the prevalence of risk and promotive factors and differences in the prevalence of persistent serious delinquency, the results indicate that risk and promotive factors were related to individual's disposition to commit serious delinquency similarly across the two categories of neighborhoods. However, with the oldest sample, a risk–promotive score with a promotive balance did not protect entirely against a negative outcome in the low-SES neighborhoods. Over 22% of the boys with such a score were classified as persistent serious delinquents. We are not certain why this is the case. It may be that the risk effects in low-SES neighborhoods are of a longer duration and a larger magnitude and thereby overwhelm the promotive effects, particularly in adolescence (Wikström & Loeber, 2000). The finding that the risk–protective score has a similar relation to persistent serious delinquency in low- as well as high–medium-SES neighborhoods does not mean that there

are no differences on the level of individual variables (Beyers, Loeber, Wikström, & Stouthamer–Loeber 2001).

The study has several limitations. Analyses on the youngest sample were hampered by the fact that participants were only 13 years old at the last wave in this study, which means that they had not gone yet through the full risk period of offending. On the other hand, having two samples allowed for replication of findings and examination of age differences in the results.

It may be seen as a limitation that we did not extensively review the association between specific risk and promotive factors with the outcome. We are not making a case that it would not be useful to study the specific effects. However, because there are so many variables that influence the outcome of delinquency, the study of all the possible combinations of potential risk and promotive effects may not necessarily lead to a clear picture. The issue for this article is that domains can compensate for each other.

A final limitation was that we did not quantify duration and stability of the independent variables. The current article is a step toward a more challenging, dynamic model in which the development of delinquency over time as well as the duration (or frequency of independent variables) can be taken into account. This is particularly important because the current results suggest that the mixture of risk and promotive effects may change from childhood through adolescence. These speculations are currently based on the differences between two samples and need to be investigated longitudinally.

The general conclusion that the number of risk and promotive domain effects combined with the fact that risk and promotive effects can balance each other is important. This finding has direct policy implications for programming to reduce persistent serious juvenile delinquency. Risk and promotive factors can both become targets of interventions to improve the risk–promotive balance. It may not always be possible to remove or reduce certain risk effects, but the outcome may be improved by strengthening promotive effects. Especially in the worst neighborhoods, such as public housing, there is a scarcity of promotive factors to offset the risk factors in those settings. At the same time, we advocate reductions in risk factors. As Sameroff et al. (1998) suggested, there is no simplistic proposal that by changing one thing in society we change serious outcomes. Reductions of different risks and increases of different promotive factors in several domains are more likely to reduce serious delinquency than is such a strategy that is based on changes in a single domain (Loeber, Farrington, & Washbush, 1998). Multidomain interventions, therefore, are the most likely to substantially reduce population levels of serious juvenile delinquency (Henggeler, Melton, & Smith, 1992, 1993).

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