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Collateral Consequences of Violence in Disadvantaged Neighborhoods

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Abstract

Using data from Addhealth, this study investigates the role of neighborhood violence in mediating the effects of neighborhood disadvantage on high school graduation and teenage pregnancy. Results show that neighborhood violence is a strong predictor of both outcomes, net of individual, family, community, and school controls. Neighborhood violence accounts for almost half the conditional association between neighborhood disadvantage and high school graduation among males and almost all of the association among females. Violence also accounts for about one fifth of the conditional association between disadvantage and teenage pregnancy among adolescents of both genders. Violence is a critical social characteristic of disadvantaged neighborhoods, one that explains a sizable portion of the effects of growing up in such neighborhoods.

Rising rates of concentrated poverty and persistently high racial segregation during the latter half of the twentieth century have focused sociological attention on the role of neighborhood context in explaining individual behavior, particularly child and adolescent development (Wilson 1987, Brooks-Gunn et al. 1997). While much quantitative research has investigated the existence and magnitude of the effects of neighborhood context on youth, social scientists have only begun to understand the processes that produce these effects. Many studies have established relationships between the structural characteristics of neighborhoods, such as high rates of poverty, welfare receipt, or joblessness, and the outcomes of residents – particularly children and adolescents – such as educational attainment or sexual behavior (e.g. Aaronson 1998, Brooks-Gunn et al. 1993, Brewster 1994a,b, Crane 1991, Harding 2003, South and Crowder 1999, Sucoff and Upchurch 1998). Yet we know considerably less about the mechanisms underlying these effects, the social and cultural processes that connect structural characteristics of neighborhoods to individual outcomes.

This paper investigates one potential mechanism of neighborhood effects, neighborhood violence, and two adolescent outcomes, high school graduation and teenage pregnancy. Violence is spatially clustered in urban areas (Morenoff, Sampson, and Raudenbush 2001), and youth from poor neighborhoods are exposed to high rates of crime and violence (American Academy of Pediatrics 2000). Considerable research has examined the relationships between structural neighborhood characteristics and violence, crime, and disorder (Sampson and Groves 1989, Sampson, Raudenbush, and Earls 1997). There are strong theoretical reasons to hypothesize that violence plays a role in neighborhood effects, both through its impact on the social and cultural organization of neighborhoods and through the direct effects of exposure to a violent environment, particularly for children. However, no study has examined the "spillover" effects of neighborhood violence on adolescent outcomes in seemingly unrelated domains, such as education and fertility.

Drawing on data from the National Longitudinal Study of Adolescent Health, this paper finds that neighborhood violence plays an important role in neighborhood effects. It argues that the effects of violence are of sufficient magnitude that violence should be considered one of the primary mechanisms through which neighborhood disadvantage affects adolescent outcomes. I estimate that neighborhood violence accounts for almost half the conditional association between neighborhood disadvantage and high school graduation among males and almost all of the association among females. Neighborhood violence accounts for about one fifth of the conditional association between disadvantage and teenage pregnancy among adolescents of both genders.

Neighborhood Disadvantage and Neighborhood Violence

A long line of research documents the relationship between structural neighborhood characteristics and violence, crime, and disorder. Social organization theory argues that low neighborhood socioeconomic status, ethnic or racial heterogeneity, and population turnover prevent communities from establishing and maintaining order, leading to higher rates of violence and crime. These disadvantages lead to fewer social ties and therefore diminished social control, the ability of a community to regulate the behavior of its members (Park and Burgess 1925, Shaw 1929). Communities with denser social networks are better able to enforce common norms and values. Structurally disadvantaged neighborhoods are also often characterized by weaker local institutions and diminished access to external resources (Bursik and Grasmick 1993, Wilson 1987). Bursik and Grasmick (1993) argue that local formal and informal institutions affect the ability of neighbors to maintain social control by influencing norms and expectations and providing contexts within which norm-enforcing social ties are created. External institutions, such as governments and markets, affect the resources available for formal and informal social control.

Collective efficacy, also a form of social organization, has been shown to mediate the relationship between concentrated structural disadvantages and crime rates (Sampson et al. 1997). Collective efficacy specifies that neighborhood social organization matters because of its influence on residents' perceptions of their neighbors' willingness to act together to regulate public behavior. Though initially collective efficacy was developed to understand crime, Browning, Leventhal, and Brooks-Gunn (2005) find that neighborhood collective efficacy also affects sexual behavior, increasing the time to sexual initiation among youth with low levels of parental monitoring.

Neighborhood Violence and Adolescent Outcomes

While the theory and empirical evidence linking neighborhood structural disadvantages to high rates of violence are generally well established, the consequences of neighborhood violence in other domains remains relatively understudied. In this section, I review and synthesize multiple theoretical perspectives that predict that living in a neighborhood with high rates of violence and victimization has consequences for adolescent outcomes such as educational attainment and fertility-related behaviors. (Though adjudicating between them is beyond the scope of this paper, I review these theoretical perspectives as motivation for studying the effects of neighborhood violence.)

Linking neighborhood violence to high school graduation and teenage pregnancy requires understanding the proximate causes of these outcomes. School dropout is “the final stage in a dynamic and cumulative process of disengagement from school” (Rumberger 2004: 133). School engagement can be academic or social, and social engagement can involve either peers or extra-curricular activities (Rumberger 2004). When asked why they dropped out, dropouts reasons included employment, parenthood, helping their family, or school failure (Bridgeland, DiIulio, and Morison 2006). Students with lower grades and test scores, with

behavior problems, and who have been held back are more likely to drop out (Cairns, Cairns, and Neckerman 1989, Ensminger and Slasarcick 1992, Rumberger 1987), suggesting these are important predictors of academic and social disengagement. Carter (2005) argues that students can become alienated from teachers when their cultural practices are not respected, and Dance (2002) shows how teachers who fail to understand urban violence have trouble connecting with students. These studies suggest that if neighborhood violence is to affect high school dropout, it must play a role in academic or social disengagement from school.

The proximate causes of teenage pregnancy, sexual activity without effective contraception, are more straightforward. Ethnographic research on teenage pregnancy and early childbearing in poor communities emphasizes why poor teenagers intentionally get pregnant or fail to prevent pregnancy, focusing on the meanings of parenthood and the costs and benefits of parenthood, including forgone educational and employment opportunities. Anderson (1999) highlights the peer group status that accrues to males who have multiple sexual partners or who father a child. Girls seek the attentions of boys, use sex to secure committed relationships, and covet the status that comes with motherhood. Edin and Kefalas (2005) emphasize the purpose, validation, and companionship that a baby is expected to provide, particularly for young mothers. As young couples look toward a marriage for which they may never be financially prepared, a baby provides a way to strengthen a relationship. Finally, adolescents subject to less family and community-based monitoring are at greater risk of early sexual activity (Browning et al. 2005, Hogan and Kitagawa 1985).

Four theoretical perspectives suggest links between neighborhood violence and these proximate causes of school dropout and teenage pregnancy:

Community Social Organization

As discussed above, neighborhood violence can be understood as a consequence of low social organization in disadvantaged neighborhoods, which limits residents' capacity to maintain order. However, violence itself may also affect the social organization of local communities, as individuals respond to fear of victimization and engage in adaptive behaviors (Skogan 1992, Venkatesh 2000). For example, in a violent neighborhood, individuals are often cautious about intervening in conflicts or monitoring children for fear of retribution. Residents keep to themselves rather than interacting with neighbors, resulting in more sparse networks and weaker capacity for cooperative behavior. Violence engulfs public spaces, depriving residents of the opportunity to socialize with neighbors and thereby build social networks (Anderson 1999, Venkatesh 2000). As a result, residents find it increasingly hard to monitor and control the behavior of community members, especially youth. Community norms regarding school attendance or sexual behavior may weaken, and parents may be less likely to help one another monitor youth behavior, leading to greater likelihood of school dropout and teenage pregnancy.

Biosocial Pathways

A second theoretical perspective emphasizes the developmental or psychological consequences of neighborhood violence. Violence has been linked to post traumatic stress disorder, anxiety, depression, and aggressive behavior, and is thought to disrupt the developmental trajectories of children (Aneshensel and Sucoff 1996, Garbarino, Kostelny, and Dubrow 1991, Moglin and Gordis 2000). Recurring episodes of violence lead to heightened arousal or hyper vigilance, as well as perceptions that the adolescent is not worthy of being kept safe. The result may be slowed cognitive development, poor academic achievement, or trouble forming relationships with peers and others (Moglin and Gordis 2000), all risk factors for school dropout.

Massey (2004) draws upon research on physiological responses to stressors such as violence to develop a biosocial model of racial stratification. Socioeconomic inequality combined with residential segregation leads to geographically concentrated poverty, which in turn concentrates social problems, particularly crime and violence. Long-term experience of chronic stress created by threat of victimization can have physiological consequences, one of which is "allostatic load," persistently high levels of adrenaline and cortisol. In addition to long-term physical health effects, allostatic load can impair cognitive functioning by inhibiting the formation of connections between neurons in the brain and by impairing memory. It can also lead to greater aggressiveness, impulsivity, anger, and susceptibility to substance use (Massey 2004). The stresses of a violent neighborhood can extend beyond the immediate threat of victimization, as negative experiences of family members cause further stress (Charles, Dinwiddie, and Massey 2004). These biosocial consequences of violence – poor cognitive development, risk-taking, and substance use – may in turn increase school dropout or teenage pregnancy

Socialization and Peer Networks

Less well-developed but potentially just as important are theoretical perspectives emphasizing the consequences of neighborhood violence for socialization and peer networks. For males, who most often perpetuate and are most often victimized by violence, neighborhood violence has the potential to change status hierarchies and affect peer groupings and interactions. The gang literature emphasizes the role of violence in structuring leadership and status hierarchies (Sanchez-Jankowski 1991, Short and Strodtbeck 1965). Violence may also increase the status of individuals whose "street" experience allows them to navigate a neighborhood's dangers (Anderson 1999). Because of their position in the local street culture, others seek them out for protection. These individuals are often isolated from mainstream institutions such as school, church, and the labor market and may thus socialize adolescents into alternative or "oppositional" views regarding schooling or sexual relationships that are more permissive of dropout, unprotected sex, or early parenthood (Anderson 1999, Harding 2008). Because violent behavior and victimization on the streets are more common among males, these processes may be specific to boys, though violence may be increasing among girls (Ness 2004).

Rational Choice

A violent environment may affect adolescent decision-making by changing the perceived costs and benefits of schooling or sexual activity. A rational choice perspective suggests that when individuals feel their lives may be cut short, they are less likely to invest in schooling and more likely to engage in risky behaviors such as unprotected sex. For adolescents, the constant threat of victimization also signifies that social institutions do not serve the interests of individuals like them, and they may infer that other institutions, such as schools or the health care system, are not effective either (Harding 2008), further reinforcing "oppositional" or "ghetto-specific" cultural ideas (Anderson 1999, Fordham and Ogbu 1986, Massey and Denton 1993). The result can be disengagement from school or risky behaviors. Finally, in a violent neighborhood, youth and parents may evaluate their own success using local comparisons. Those who are not involved in violence, have not resorted to drug dealing, and have not been incarcerated appear successful relative to neighborhood peers, even if they fare poorly in school, engage in risky sexual behavior, or become teen parents (Harding 2008).

Together, these theoretical perspectives suggest that neighborhood violence should at least partially explain the effect of neighborhood disadvantage on education and fertility outcomes among adolescents.

Data and Methods

I use data from the National Longitudinal Survey of Adolescent Health (Addhealth; Harris et al. 2003). Addhealth sampled high schools and their feeder schools, resulting in about 150 middle schools, high schools, and junior high schools clustered one or two to a community. The first wave of data collection was in 1994-1995, the second wave in 1996, and the third wave in 2001-2002. Students were in grades 7 to 12 in wave one. The first wave includes a school administrator questionnaire, an in-school questionnaire completed by almost every eligible student in the sample schools, and longer in-home student and parent interviews with a subsample of about 20,000 students. Wave two followed the in-home students and includes another in-home student interview and another administrator questionnaire. Wave three includes an in-home student questionnaire. Structural neighborhood characteristics from the 1990 census are available for in-home respondents in waves 1 and 2. This analysis uses the in-home sample followed through wave 3 and measures neighborhood characteristics at wave 1, resulting in temporal ordering of key variables: structural neighborhood characteristics (1990), neighborhood violence (1994-1995), and outcomes (2001-2002).[1]

Models predict high school graduation and teenage pregnancy. The primary independent variables are neighborhood disadvantage and neighborhood violence. Because the outcomes are binary, I estimate multi-level logit models. In these data, students are nested within neighborhoods which are nested within communities (defined by the sampled high schools and their feeder schools).

One goal of this analysis is to determine the extent to which neighborhood violence explains the conditional association between neighborhood disadvantage and the two adolescent outcomes: high school graduation and teenage pregnancy (net of individual, family, and community/school characteristics). A common strategy for determining the extent to which a mediating variable, Z, is a mechanism for the effect of X on Y in a regression analysis is to estimate two models, the first predicting Y with X and the second predicting Y with X and Z. One then compares the coefficient on X in the two models. The degree to which the coefficient on X is reduced when controlling for Z provides a measure of the extent to which Z explains the relationship between X and Y. This is a reasonable procedure for models in which Y is normally distributed, but can lead to false conclusions with nonlinear models (Mroz and Zayats 2005), such as the logit models used here. Coefficients from nested nonlinear models are not comparable in this way.

A technical explanation is beyond the scope of this paper, but some intuition can be provided. Logit models restrict the variance of the error term, and most software packages fix the error variance at $\pi^2/3$. However, adding another predictor to the model should reduce the error variance. In an ordinary least squares model the error variance is allowed to change, but in a logit model it is fixed by the software. The coefficient on X must change to accommodate the new regressor, Z, because the error variance cannot. In some very simple situations, an appropriate “inflation factor” can be calculated to allow the X coefficients to be comparable across models, but when there are many control variables and nonzero covariances between regressors, these inflation factors are extremely complicated (Mroz and Zayats 2005).

[1]This form of temporal ordering does not ensure that estimates are causal. For example, the effect of neighborhood disadvantage on violence could still be spurious if pre-1990 violence were a common cause. The sensitivity analysis in Appendix C addresses selection bias.

For these reasons I employ path models (Bollen 1989) to estimate the proportion of the effect of X on Y that is explained by Z. I construct recursive path models[2] from the equations estimated in the models below and then decompose the effects for the paths connecting X and Y. The proportion of the total effect of neighborhood disadvantage on the outcome that operates through the intervening Z variable, neighborhood violence, provides a measure of the role of Z as a mechanism.

Multi-level Logit Models

I use multi-level logit models to examine the relationships between each outcome (*Y*) and neighborhood disadvantage and neighborhood violence net of individual, family, neighborhood, and school community controls. Indexing individuals with *i*, neighborhoods with *j*, and school communities with *k*, we can write a three-level model (Raudenbush and Bryk 2002). The individual level equation is:

$$\text{logit}\left(Y_{ijk}\right)=\pi_{0jk}+\pi_{1jk}X_{ijk}$$

X is a set of control variables measuring individual and family characteristics (and π_1 is a vector of coefficients). There is one neighborhood level equation:

$$\pi_{0jk}=\beta_{00k}+\beta_{01k}D_{jk}+\beta_{02k}V_{jk}+\beta_{03k}W_{jk}+r_{jk}$$

This equation models the intercept from the individual level equation as a function of neighborhood disadvantage (*D*), neighborhood violence (*V*) and a vector of neighborhood control variables (*W*) including intergenerational closure and social cohesion (described below). β_{02k} is the coefficient of interest here, as it captures the conditional association between neighborhood violence and the outcome. Finally, a school level equation controls for school characteristics, *Z*:

$$\beta_{00k}=\gamma_{000}+\gamma_{001}Z_k+u_k$$

Though schools are not of analytical interest, school is included as a level in the model because of the data structure and to allow school control variables. Models are estimated using maximum likelihood in HLM 6.2 (Raudenbush et al. 2004)

Variables

Structural Neighborhood Disadvantage—Neighborhoods are measured as census tracts. As is the convention in neighborhood effects research (e.g. Sampson et al. 1997), neighborhood disadvantage is measured by a scale constructed from a series of highly correlated neighborhood characteristics. Here the neighborhood disadvantage scale is the mean of the following standardized items: the census tract's family poverty rate, percent single mother households, percent youth, male unemployment rate, percent black, percent of those over 25 who are college graduates, percent of workers in managerial or professional occupations, and percent affluent families (income above $75,000 per year), with the last three reversed in polarity. These data come from the 1990 census. An individual's census tract is that of her residence at the wave one in-home interview, which was conducted in

[2]Such models assume that the error terms of the equations are independent of one another. Given the number of controls in the models, this is not an unreasonable assumption.

spring or summer 1995. The average inter-item correlation for this scale is 0.52, and Cronbach's alpha is 0.90.

The Structural Neighborhood Disadvantage Scale (hereafter, Neighborhood Disadvantage) measures the economic and social characteristics of the neighborhood's families that are thought to lead to negative outcomes for youth. Five of these variables (poverty, single mothers, percent youth, unemployment, and percent black) indicate the presence of disadvantaged families. Percent youth captures the number of adults per child to supervise or monitor youth. Percent black captures the degree of segregation and, as previous research (Massey and Denton 1993) suggests, is strongly correlated with other neighborhood disadvantage measures. The remaining three variables (college graduates, managerial/ professional workers, affluent families) indicate the absence of middle class families since their polarity is reversed. While some researchers argue that the absence of middle class families is more important than the presence of disadvantaged families, there are high inter-item correlations across all eight variables in these data. This suggests that these measures capture the same underlying neighborhood concept but simply focus on the presence of families at opposite ends of the SES distribution.[3]

High School Graduation—Whether a respondent graduated from high school is measured at wave three (conducted in 2001-2002, when the respondents were age 18 to 25).[4] Because of attrition between waves one and three, 14,668 cases are available for analysis in models of high school graduation.[5]

Teenage Pregnancy—Teenage pregnancy is measured by whether the adolescent became pregnant (for females) or impregnated a sexual partner (for males) before age 20 and while the respondent was unmarried. Data on pregnancies were collected in wave three. Individuals who had already experienced a pregnancy before wave 1 were excluded from the analysis to avoid reverse causality. Due to attrition, 13,975 cases are available for analysis of teenage pregnancy.[6]

Violence Scales—The neighborhood violence scale measures violence in a census tract by aggregating multiple survey responses from Addhealth respondents who live in the same tract.[7] The individual violence scale uses multiple measures of one's own violent behavior aggregated to the individual level. Without a control for individual violence, a spurious association between neighborhood violence and outcomes could upwardly bias the results if individuals who engage in violence cause neighbors to report more neighborhood violence, and if their own violent behavior also affects their outcomes. On the other hand, if

[3]Inter-tem correlations for the scale items are available in a supplementary document on the author's website: http://www-personal.umich.edu/~dharding.

[4]100 students still enrolled in high school during wave three are omitted from the analysis. An alternative analysis of high school graduation using only those respondents age 20 or higher in wave 3 produced almost identical results among males and slightly smaller effects of neighborhood violence among females, for whom violence explained 75 percent of the effect of neighborhood disadvantage on graduation.

[5]Most of the dropped cases are due to survey design rather than panel attrition. These include all students who were seniors in wave 1 (3356 cases) and members of some subsamples (disabled students sample of 471 cases and siblings of twins sample of 162 cases). To assess the impact of panel attrition, two additional sets of models were estimated. One set used the Addhealth wave 3 longitudinal weights. The second set used imputed values for cases with missing values at wave 3 using multiple imputation methods described below, as recommended in Davey, Shanahan, and Schafer (2001). Both supplemental analyses produced estimates consistent with the presented results.

[6]An alternative outcome is live births, which may be more accurately measured, particularly for males, but which are also the product of additional social and cultural processes that may produce neighborhood differences in abortion or fetal loss. An additional analysis examined live birth by counting only those pregnancies that resulted in a live birth (results not shown), producing almost identical results to the teenage pregnancy analysis. Among males, violence accounted for 19 percent of the effect of disadvantage on live birth, while it accounted for 13 percent of the effect among females.

[7]Administrative crime data are not available at the census tract level for Addhealth.

neighborhood disadvantage or neighborhood violence were causes of individual violent behavior, controlling for individual violence would remove one of the pathways through which neighborhood effects operate, biasing results downward. I choose the more cautious approach and control for individual violence, with the understanding that the neighborhood effects presented may be conservative. The results section also briefly reports estimates from models that do not control for individual violence.

The individual and neighborhood violence scales are constructed using "ecometric" methods (Raudenbush and Sampson 1999). The individual violence scale includes seven self-reported measures of one's own violent behavior: fighting, pulling a knife or gun on someone, shooting or stabbing someone, a serious physical fight, injuring someone severely enough to require medical treatment, using or threatening to use a weapon, and participating in a group fight. The neighborhood violence scale includes six reports of violence observed or experienced by the respondent: witnessing a shooting or stabbing, being threatened with a weapon, being shot, being stabbed, being jumped and being injured in a fight; and three subjective safety measures: whether the neighborhood is safe, the chances one will be killed, and the parent's assessment of whether the neighborhood has problems with drugs. In each scale, items are weighted by their severity, the inverse of their frequency among all respondents, and adjusted for respondent age and gender. Both violence scales are standardized to have mean zero and standard deviation one.[8]

Neighborhood Intergenerational Closure and Social Cohesion—The Intergenerational Closure scale measures the degree to which neighborhood parents act collectively to monitor and communicate with one another about children, based on reports from Addhealth parents. It is based on three measures converted to a five-point scale: (1) if the respondent saw a neighbor's child getting into trouble, would she tell the neighbor, (2) if a neighbor saw the respondent's child getting into trouble, would the neighbor tell the respondent, and (3) the number of parents of the adolescent's friends the parent has talked to in the last four weeks. The Social Cohesion scale measures the degree to which neighborhood residents know one another and look out for one another, based on reports from Addhealth adolescents. It is based on three true/false measures: (1) "You know most people in the neighborhood," (2) "In the past month, you have stopped on the street to talk with someone who lives in your neighborhood," and (3) "People in this neighborhood look out for each other." These scales are also constructed using ecometric methods. These scales eliminate spurious associations between violence and the outcomes due to neighborhood intergenerational closure (Coleman 1988) or neighborhood social cohesion (Sampson et al. 1997). If either variable predicts both neighborhood violence and the outcome, failing to control for it would upwardly bias the neighborhood violence effects.

Individual/Family Controls—Measured at wave one, these controls include race and ethnicity indicators, age, gender, adolescent immigrant status, language spoken at home, log family income, single parent household, step-parent or other household, mother's age at birth, low birth weight, and for the primary parent (mother or female caregiver if available, father or male caregiver if not) nativity, education, professional/managerial occupation, disability, and welfare receipt. These variables are described in Appendix A.

Community/School Controls—These controls include indicators for private school, Catholic school, and urbanicity, and measures of school size, as well as percent of students in a college preparatory program and the cumulative dropout rate. For students attending

[8]More information on construction and reliability of these scales is available on the author's website: http://www-personal.umich.edu/~dharding.

middle or junior high school during wave 1, characteristics of the high school into which their current school feeds are used. These variables are also described in Appendix A.

Several control variables have missing values. Rather than drop cases with missing values, I impute missing values using multiple imputation (Acock 2005, Allison 2002, Little and Rubin 2002). Multiple imputation involves creating multiple full datasets via MICE (multiple imputation by chained equations), estimating a model using each full dataset, and then combining results across datasets taking into account the variance in imputed values across datasets.[9] I use ten imputed datasets.

Continuous variables are grand mean centered in the multi-level models.

Results

Table 1 shows bivariate relationships between neighborhood disadvantage, neighborhood violence, and the outcomes (high school graduation and teenage pregnancy). Means are displayed by gender and quintiles of the neighborhood disadvantage scale (neighborhoods in the first quintile are most advantaged). These descriptive statistics show strong associations between neighborhood disadvantage and all these measures. On average, more disadvantaged neighborhoods are considerably more violent. Both males and females in more disadvantaged neighborhoods have lower rates of high school graduation and higher rates of teenage pregnancy. In addition, while the neighborhood gradient in pregnancy appears similar across genders, females report higher rates of pregnancy than males. This may be the result of females partnering with somewhat older males (Darroch, Landry, and Oslak 1999;Kaestle, Morisky, and Wiley 2002) who do not appear in this sample. It also may be due to lower pregnancy reporting by males. An adolescent male may not know of some pregnancies or may not admit he is the father. To the extent that underreporting by males is greater in disadvantaged neighborhoods, this measurement error may attenuate coefficients in the teenage pregnancy models, leading to underestimation of neighborhood effects for males.

High School Graduation

Table 2 displays descriptive statistics for the high school graduation analysis, and Table 3 displays multi-level logit models of high school graduation. The primary predictors are neighborhood disadvantage and violence. These models also control for individual, family, neighborhood, and school characteristics (control variable coefficients are reported in Appendix B). Models 1 and 2 are estimated on the entire sample, Models 3 and 4 on males, and Models 5 and 6 on females. Model 1 shows a strong and statistically significant relationship between neighborhood disadvantage and graduation, corresponding to an odds ratio of approximately 0.87 ($e^{-0.142}$= 0.868). When neighborhood violence is added to the equation in Model 2, the association between disadvantage and graduation falls considerably, and the coefficient on violence is large and statistically significant. It corresponds to an odds ratio of approximately 0.86 ($e^{-0.152}$= 0.859), implying that a one standard deviation increase in neighborhood violence multiples the odds of high school graduation by 0.86. These results suggest that neighborhood violence is an important mediator of the relationship between neighborhood disadvantage and high school graduation. In the gender specific models the impact of disadvantage is slightly higher for males and the impact of violence slightly larger for females, however these gender differences are not statistically significant.

[9] I use Royston's (2004) “ice” command in Stata to generate the imputed datasets and HLM6's multiple imputation capabilities to combine results.

As discussed above, comparing coefficients across logit models can sometimes be deceiving. To estimate the extent to which violence is a mediator of neighborhood disadvantage, I use the estimates in Table 3 and the association between neighborhood disadvantage and neighborhood violence to decompose the association between neighborhood violence and high school graduation into the part that operates through neighborhood violence and the part that operates through the direct effect of neighborhood disadvantage.[10] Table 4 shows this decomposition separately by gender based on the coefficients from Model 4 (for males) and Model 6 (for females) in Table 3. Among males, neighborhood violence accounts for about 44 percent of the conditional association between neighborhood disadvantage and high school graduation while violence accounts for about 90 percent of the conditional association among females.[11] This gender difference is not due to differences in the pathway through violence but rather to the difference in the remaining "direct effect" of disadvantage. The pathway through violence is similar across genders, but the direct pathway is larger for males. This result is also evident from Table 3, which shows large gender differences in the coefficients for disadvantage but small gender differences in the coefficients for violence.

These analyses control for individual violence in all models under the assumption that none of the effects of neighborhood characteristics operate through individual violence, so they are lower bound estimates. If we instead make the opposite assumption that individual violence is entirely a product of neighborhood violence, then individual violence should not be controlled. In supplemental analyses, I remove the individual violence control from the models (results not shown). These models estimate even larger neighborhood violence effects. Among boys about 65% of the effect of neighborhood disadvantage on high school dropout is accounted for by neighborhood violence and among girls the entire effect of disadvantage is explained by violence. These are upper bounds.

Teenage Pregnancy

Table 5 displays descriptive statistics for the teenage pregnancy analysis, and Table 6 displays multi-level logit models of teenage pregnancy. Model 1 of Table 6 shows a strong conditional association between neighborhood disadvantage and teenage pregnancy in the combined sample. The coefficient indicates that a one standard deviation increase in neighborhood disadvantage multiplies the odds of pregnancy by 1.21 ($e^{0.187}$= 1.206). When neighborhood violence is added in Model 2, the disadvantage coefficient falls considerably, and the violence coefficient is large and statistically significant. It indicates that a one standard deviation increase in neighborhood violence multiplies the odds of pregnancy by 1.08 ($e^{0.073}$= 1.076), suggesting that neighborhood violence is a mediator of the relationship between neighborhood disadvantage and teenage pregnancy. The gender-specific models show that the associations between neighborhood disadvantage and pregnancy and between violence and pregnancy are slightly larger for males than females, although again these differences are not statistically significant.

Again one can use these estimates to calculate the proportion of the association between neighborhood disadvantage and teenage pregnancy accounted for by neighborhood violence. Table 7 shows this decomposition by gender. Among both genders, neighborhood violence accounts for about one-fifth of the conditional association between disadvantage and

[10]An OLS regression predicting neighborhood violence with disadvantage among all neighborhoods in which there are wave 1 respondents produces the following estimates: *Violence* = 0.0 + 0.367**Disadvantage* (n = 2,449; SE(β) = 0.019; $p < 0.001$). Since these variables are standardized using *z*-scores, 0.367 is also their correlation coefficient, and the R^2 from this model is 0.367^2 = .135.

[11]Conventionally the sum of the direct and indirect paths is called the "total effect." I use the term "sum" because the sums of the direct and indirect paths calculated from Models 4 and 6 in Table 3 do not match the "total effect" of neighborhood disadvantage captured by the coefficient in Models 3 and 5, due to the non-comparability of coefficients across logit models.

pregnancy. As in the graduation analysis, the models that produce these estimates control for individual violence. I also estimated supplemental models that did not control for individual violence. These models produced slightly larger estimates of neighborhood violence effects, with neighborhood violence accounting for 26 percent of the disadvantage effect among boys and 23 percent of the effect among girls. Again, these are upper bounds.

Sensitivity Analyses

Estimates of the role of neighborhood violence in mediating the effects of neighborhood disadvantage on high school graduation and teenage pregnancy may be inflated by failure to control for other neighborhood characteristics that affect both neighborhood violence and these outcomes (net of the control variables). One such unobserved confounder is collective efficacy, a predictor of a neighborhood's murder rate (Sampson et al. 1997). Sensitivity analyses, presented in Appendix C, indicate that the graduation results are largely robust to the influences of an unobserved confounder. An unobserved confounder would have to be a strong cause of both neighborhood violence and graduation to change our conclusions about the importance of neighborhood violence for graduation. However, the teenage pregnancy estimates are fairly sensitive to an unobserved confounder, due largely to their smaller magnitudes. Strong causal inferences regarding the effects of neighborhood violence on pregnancy await data in which more neighborhood controls are available.

Conclusion

Urban poverty researchers have long been concerned with the impact of neighborhood context on individual outcomes, and recently the focus has turned to the social and cultural processes that produce such neighborhood effects. This paper proposes that neighborhood violence plays an important role in the effects of neighborhood disadvantage on adolescent outcomes. Though violence is highly spatially clustered, and though the causes of neighborhood violence have been extensively studied, the consequences of growing up in a violent neighborhood have received considerably less attention. This paper shows that neighborhood violence is a strong predictor of high school graduation and teenage pregnancy for both males and females. Furthermore, it shows that neighborhood violence is an important mediator of the association between growing up in a disadvantaged neighborhood and these outcomes. Among males, neighborhood violence accounts for almost half the association between neighborhood disadvantage and high school graduation and about one-fifth of the association between disadvantage and teenage pregnancy. Among females, violence accounts for almost all the association between disadvantage and graduation and almost one-fifth of the association between disadvantage and pregnancy.

From a theoretical perspective, these results suggest that neighborhood social organization may be even more important than previously thought. Social organization is usually invoked to understand crime and disorder as a consequence of low capacity for social control in disadvantaged neighborhoods. The results presented here indicate that there are “spillover” effects of social organization in seemingly unrelated domains such as education and fertility, effects that operate through neighborhood violence. To the extent that social organization is a determinant of neighborhood violence, these results suggest that social organization effects extend to other domains.

More broadly, these findings indicate that violence is a critical social characteristic of disadvantaged neighborhoods, explaining a sizable portion of the effects of such neighborhoods. To the extent that disadvantaged neighborhoods structure the life chances of youth, these findings suggest that neighborhood violence plays a role in the intergenerational transmission of economic and social disadvantage. The findings presented here demonstrate

the need for an expanded sociological research agenda on the social effects of violence on youth, in the neighborhood and in other contexts.

This study has only examined the magnitude of the effects of neighborhood violence. Though the psychological effects of neighborhood violence on youth are well-documented, sociological research is needed to understand the social and cultural processes by which neighborhood violence affects adolescent decision-making and behavior. Qualitative research has begun to analyze the importance of violence in structuring the everyday lives of adolescents in poor, urban neighborhoods (e.g. Anderson 1999, Dance 2002, Harding 2008). Yet further qualitative and quantitative research is required to fully understand the potential effects of growing up in a violent environment.

The above synthesis of theoretical perspectives proposes four pathways through which neighborhood violence may affect adolescents: (1) Violence reduces community social organization, affecting community capacity for social control and monitoring. (2) Through biosocial effects on cognitive development and functioning, prolonged exposure to the stress of a violent environment interferes with school performance and decision-making regarding risky behaviors. (3) Through its effect on status hierarchies and the composition of peer networks, violence may affect the salience of alternative or “oppositional” cultural ideas regarding schooling and sexual behavior. And (4) the risk of violent victimization may alter the cost-benefit calculations involved in rational decision-making by altering the perceived costs of risky behaviors or the benefits of schooling.

From a policy perspective, these results indicate that successful efforts to permanently reduce violence in disadvantaged neighborhoods will produce benefits not just for safety, emotional wellbeing, and health, but also potentially in other domains. In evaluating violence reduction programs, the collateral consequences of violence on education and fertility should be taken into account. Considering the social costs of school dropout and teenage pregnancy, to which violence contributes, may make anti-violence programs even more cost effective.

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Appendix A: Descriptions of Individual, Family, and School Control Variables (All measured at Wave 1)

Individual Characteristics

Race/Ethnicity

Indicator variables for the adolescent's self-identified race and ethnicity. The adolescent can self identify with one or more categories, including White, Black, Native American, Asian, or Other. White is the omitted category. I also include an indicator for adolescents who choose multiple categories. The adolescent also chooses whether to identify as Hispanic/ Latino.

Immigrant

Born outside the United States.

Low Birth Weight

Weighing less than 88 ounces (5.5 lbs.) at birth.

Mother's Age at Birth

Mother's age in years at the adolescent's birth.

Family Characteristics

Home Language not English

An indicator for adolescents whose family does not speak English at home.

Household Size

Number of persons living in the household.

Household Type

Indicator variables for family type: Married, Single Parent, and Other (including step parent). Married is the omitted category.

Primary parent variables are based on the parent who completed the parent questionnaire, usually the biological mother but sometimes the father or other caretaker.

Parent Immigrant

Primary parent not born in the US.

Parent Education

Indicator variables for the primary parent's level of education: less than High School, High School Graduate, Some College or Trade School, and College Graduate. Less than high school is the omitted category.

Parent Professional Occupation

Primary parent currently works in a managerial or professional occupation.

Parent Disabled

Primary parent mentally or physically handicapped.

Parent Welfare Receipt

Primary parent currently receives welfare for self or child.

Log Family Income

The natural logarithm of the household's total income in thousands of dollars, as reported by the parent.

Community/School Characteristics

Urbanicity

Indicator variables for the location of the community: Urban, Suburban, or Rural. Suburban is the omitted category.

School Size

Indicator variables for the number of high school students, Small (< 400), Medium (400-1000), and Large (> 1000). Medium is the omitted category.

Cumulative Dropout Rate

Proportion of students who begin the high school in its lowest grade and complete its highest grade.

Percent College Prep Program

Proportion of 12th graders enrolled in an academic or college prep program.

Catholic School

Indicator for Catholic schools.

Private School

Indicator for all other non-public schools.

Appendix B: Control Variable Coefficients for Models in Tables 3 and 6

Appendix C: Sensitivity Analysis

The estimated role of neighborhood violence in mediating the effect of neighborhood disadvantage on the outcomes may be threatened by an unobserved confounding variable that is a common cause of both neighborhood violence and an outcome. If some of the association between violence and an outcome is due to a third variable, then the effect of violence may be overstated and its role as a neighborhood effects mechanism smaller than estimated above. One confounder candidate is neighborhood collective efficacy, a strong predictor of neighborhood violence (Sampson et al 1997) that predicts age of sexual initiation among youth with low parental monitoring (Browning et al. 2005). While collective efficacy is related to the neighborhood control variables used in this analysis (social cohesion and intergenerational closure) it cannot be measured using these data. (Typically, collective efficacy scales include items measuring social cohesion, trust, and informal social control [Sampson et al. 1997] or social cohesion, trust, and intergenerational closure [Browning et al 2005]). This section presents calculations based on Frank (2000) that assess the sensitivity of results to the presence of an unobserved confounder.

Consider an unobserved variable, *U*, that affects both neighborhood violence and the outcome. The degree to which *U* is the source of the association between violence, *V*, and

the outcome, *Y*, depends on both the effect of *U* on *V* and the effect of *U* on *Y*. The sensitivity analysis presents alternative estimates under various assumptions about these two magnitudes. To simplify calculations, I shift from logit models predicting *Y* to linear probability models. Table C1 displays the decomposition of the effects of neighborhood disadvantage on graduation and pregnancy by gender when linear probability models are used (paralleling the estimates in Tables 4 and 7). The proportion of these effects attributable to neighborhood violence is similar using linear probability models. Only for high school graduation among males is there a significant difference; the linear model attributes a greater proportion of the effect to violence (61% vs. 44%).

Suppose *U* is a standardized variable (var(*U*) = 1) that is uncorrelated with other variables in the model except for *V* and *Y* (or alternatively, suppose that *U* has been purged of its associations with the control variables, such that its associations with *V* and *Y* are net of the control variables). We can also think of *Y* and *V* as having been purged of their associations with the control variables in the same way, so that we need only express relationships in terms of *Y*, *V*, and *U*. This sensitivity analysis can be understood in the classic framework of omitted variable bias in OLS regression. Suppose the true model is:

$$Y=\alpha+\beta_{YV}V+\beta_{YU}U+e$$

β_{YV} estimates the effect of violence on *Y* (net of *U*) and is the coefficient of interest. Given that *U* is unobserved, the estimated model is:

$$Y=\alpha+\beta_{YV}V+w$$

$\hat{\beta}_{YV}$, the estimate of β_{YV} from the simpler model, is equal to the true β_{YV} plus a bias term:

$$\widehat{\beta}_{YV}=\beta_{YV}+\beta_{VU}\beta_{YU}$$

Where β_{VU} is the coefficient from a bivariate regression of *V* on *U*. Since both *V* and *U* are standardized (variance = 1), $\beta_{VU} = r_{VU}$ (correlation between *V* and *U*), and the above equation can be rewritten as:

$$\widehat{\beta}_{YV}=\beta_{YV}+r_{VU}\beta_{YU}$$

Rearranging, define the true effect in terms of the estimated effect when *U* was ignored and the bias term which is the product of the correlation between *V* and *U* and the effect of *U* on *Y* net of *V*:

$$\beta_{YV}=\widehat{\beta}_{YV}-r_{VU}\beta_{YU}$$

Recall that these relationships are all net of the control variables. The sensitivity analysis calculates β_{YV} for various hypothetical values of r_{VU} and β_{YU}.

Table C2 presents the sensitivity analysis for high school graduation among males. In the linear probability model (excluding *U*), $\beta_{YV} = -0.0212$ (SE = .0050; $p < 0.001$), indicating that when *U* is not controlled, a one standard deviation increase in neighborhood violence reduces the probability of graduation by one and a half percentage points (model not shown). Ideally we would select the values of β_{YU} and r_{VU} based on prior studies of the

impact of possible *U* variables, such as collective efficacy, on the outcomes and on neighborhood violence. Unfortunately, no prior studies estimate the impact of collective efficacy on either of the outcomes or on the type of violence measured here, but we can rely on heuristic comparisons. The sensitivity analysis considers values of β_{YU} ranging from 0 to 0.05, for which a one standard deviation increase in *U* increases the probability of graduation by five percentage points. This represents an effect of *U* on *Y* that is about two and half times the neighborhood violence effect. The sensitivity analysis considers values of r_{VU} that range from 0 to −0.25. A conditional correlation between *V* and *U* of −0.25 net of the three measured neighborhood characteristics (disadvantage, social cohesion, and intergenerational closure) is also large.

Each cell's top number is the effect of *V* on *Y* net of *U*. As a rough cut at statistical significance, we can compare the coefficient to the SE from the estimated model. When the coefficient is greater than twice this standard error ($2 \times 0.005 = 0.01$), we can assume it would be statistically significant at the 0.05 level if *U* were also included in the model. (This is a conservative estimate given that the standard error on β_{YU} should shrink when *U* is added to the model and the residual variance shrinks.) Coefficients that remain statistically significant according to this metric are marked with asterisks. Each cell's bottom number recalculates the proportion of the effect of neighborhood disadvantage on *Y* that is due to *V* given the new estimated effect of *V* on *Y*, holding constant the total effect of disadvantage on *Y*. When either r_{VU} or β_{YU} is zero, the original estimate is recovered, as *U* is not a common cause of *V* and *Y*.

Table C2 suggests that the role of neighborhood violence in explaining the effect of neighborhood disadvantage on high school graduation among males is robust to an omitted confounder. Even when $\beta_{YU} = 0.04$ and $r_{VU} = -0.20$ the effect of violence on graduation is statistically significant and comparable in magnitude to the original estimate, and the proportion of the effect of disadvantage that operates through violence is still over half the original estimate. *U* would have to have fairly large effects on both *Y* and *V* to reduce the effect of *V* on *Y* or to reduce the proportion of the effect of disadvantage on *Y* attributable to *V* to a substantively small magnitude.

Tables C3, C4 and C5 display parallel sensitivity analyses for graduation among females, teenage pregnancy among males, and pregnancy among females. Table C3 shows robustness for female high school graduation similar to that for males. The sensitivity analysis for pregnancy is less robust to an omitted confounder, as seen in Table C4 (males) and Table C5 (females). Because the original estimates of the effects of neighborhood violence on pregnancy are about two-thirds those of the education estimates, the effects of violence on pregnancy are less robust. Nevertheless, Table C4 shows that even when $\beta_{YU} = 0.02$ and $r_{VU} = -0.05$, the effect of violence on pregnancy remains statistically significant, and violence accounts for almost one-fifth of the relationship between disadvantage and pregnancy among males.

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Table 1

Means of Key Variables By Quintiles of Neighborhood Disadvantage

Neighborhood Disadvantage Quintiles	Neighborhood Violence Scale	High School Graduation		Teenage Pregnancy	
		Males	Females	Males	Females
1st (least)	−.44	.89	.91	.05	.10
2nd	−.27	.85	.88	.07	.14
3rd	−.13	.81	.85	.07	.16
4th	.27	.75	.83	.09	.18
5th (most)	.57	.73	.76	.14	.27
All	0	.81	.85	.08	.17

Table 2

Descriptive Statistics for High School Graduation Models

	Mean	*SD*	*Min*	*Max*	*Percent Imputed*
Individual Variables (*n* = 14,668)					
Graduated High School	.83	--	0	1	--
Female	.53	--	0	1	--
Individual Violence Scale	0	1	−1.89	4.79	.55%
Age	15.64	1.73	11	21	--
Hispanic	.16	--	0	1	--
Black	.22	--	0	1	--
Native American	.04	--	0	1	--
Asian	.08	--	0	1	--
Other Race	.09	--	0	1	--
Multi Racial	.05	--	0	1	--
Home Language not English	.10	--	0	1	.03%
Immigrant	.08	--	0	1	.03%
Household Size	4.61	1.65	1	21	--
Single Parent Household	.23	--	0	1	--
Other Household Type	.21	--	0	1	--
Parent Immigrant	.19	--	0	1	.72%
Parent Education: High School Grad	.30	--	0	1	1.17%
Parent Education: Some College	.28	--	0	1	1.17%
Parent Education: College Grad	.25	--	0	1	1.17%
Parent Professional Occupation	.34	--	0	1	2.02%
Parent Disabled	.05	--	0	1	1.90%
Parent Welfare Receipt	.09	--	0	1	2.61%
Log Family Income	3.56	.84	0	6.91	24.26%
Low Birth Weight	.10	--	0	1	17.78%
Mother's Age at Birth	25.91	5.35	12	53	26.50%
Neighborhood Variables (*n* = 2,013)					
Neighborhood Violence Scale	0	1	−4.16	4.76	--

	Mean	*SD*	*Min*	*Max*	*Percent Imputed*
Neighborhood Disadvantage Scale	0	1	−5.19	5.10	--
Neighborhood Intergenerational Closure Scale	0	1	−4.25	4.41	6.01%
Neighborhood Social Cohesion Scale	0	1	−3.60	5.00	.30%
Community/School Variables (*n* = 89)					
Urban	.31	--	0	1	--
Rural	.16	--	0	1	--
Small School Size (< 400)	.16	--	0	1	--
Large School Size (> 1000)	.47	--	0	1	--
Cumulative Dropout Rate	11.29	12.13	0	68.52	--
% College Prep Program	57.63	27.35	0	100	5.62%
Catholic School	.04	--	0	1	5.62%
Private School	.04	--	0	1	5.62%

Note: See variable descriptions in Appendix A

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Table 3

Multi-Level Logit Models Predicting High School Graduation

	Combined		***Males***		***Females***	
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Neighborhood Disadvantage Scale	−.142* (2.582)	−.036 (.654)	−.176* (.060)	−.068 (1.115)	−.128 (1.855)	−.007 (.096)
Neighborhood Violence Scale	--	−.152* (4.343)	--	−.149* (4.139)	--	−.169* (4.024)
Constant	1.042* (8.141)	.936* (7.038)	1.115* (7.637)	1.045* (6.967)	1.320* (8.919)	1.209* (7.954)
Variance Components:						
School	.142	.129	.041	.039	.160	.149
Neighborhood	.064	.035	.035	.004	.115	.088
N individuals	14,668	14,668	6,936	6,936	7,732	7,732

Notes:

All models include Individual Violence Scale, Neighborhood Social Cohesion and Intergenerational Closure Scales, and Individual, Family, and School Controls. Coefficients on these control variables available in Appendix B.

Absolute value of t-ratios in parentheses.

Multiple Imputation with 10 imputations used to impute missing values on control variables.

* $p < .05$

Table 4

Decomposition of Effects of Neighborhood Disadvantage on High School Graduation

	Males		***Females***	
	Effect	**%**	**Effect**	**%**
N'hood Dis.→ HS Grad	−.068	56%	−.007	10%
N'hood Dis.→ N'Hood Viol. → HS Grad	−.055	44%	−.062	90%
Sum	−.121	100%	−.069	100%

Note: Effect metric is logit of High School Graduation.

Table 5

Descriptive Statistics for Teenage Pregnancy Models

	Mean	*SD*	*Min*	*Max*	*Percent Imputed*
Individual Variables (*n* = 13,975)					
Teenage Pregnancy	.13	--	0	1	--
Female	.52	--	0	1	--
Individual Violence Scale	0	1	−1.9	4.79	.57%
Age	15.57	--	11	21	--
Hispanic	.16	--	0	1	--
Black	.22	--	0	1	--
Native American	.04	--	0	1	--
Asian	.08	--	0	1	--
Other Race	.09	--	0	1	--
Multi Racial	.05	--	0	1	--
Home Language not English	.11	--	0	1	.03%
Immigrant	.08	--	0	1	.03%
Household Size	4.61	1.63	1	21	--
Single Parent Household	.23	--	0	1	--
Other Household Type	.20	--	0	1	--
Parent Immigrant	.19	--	0	1	.52%
Parent Education: High School Grad	.30	--	0	1	.91%
Parent Education: Some College	.28	--	0	1	.91%
Parent Education: College Grad	.25	--	0	1	.91%
Parent Professional Occupation	.35	--	0	1	1.52%
Parent Disabled	.05	--	0	1	1.40%
Parent Welfare Receipt	.09	--	0	1	2.13%
Log Family Income	3.56	.84	0	6.91	23.89%
Low Birth Weight	.10	--	0	1	17.29%
Mother's Age at Birth	25.99	5.33	12	53	26.07%
Neighborhood Variables (*n* = 1,955)					
Neighborhood Violence Scale	0	1	−4.16	4.76	--

	Mean	*SD*	*Min*	*Max*	*Percent Imputed*
Neighborhood Disadvantage Scale	0	1	−5.19	5.10	--
Neighborhood Intergenerational Closure Scale	0	1	−4.45	4.26	5.36%
Neighborhood Social Cohesion Scale	0	1	−3.59	4.97	.31%
Community/School Variables (*n* = 89)					
Urban	.31	--	0	1	--
Rural	.16	--	0	1	--
Small School Size (< 400)	.16	--	0	1	--
Large School Size (> 1000)	.47	--	0	1	--
Cumulative Dropout Rate	11.29	12.13	0	68.52	--
% College Prep Program	57.63	27.35	0	100	5.62%
Catholic School	.04	--	0	1	5.62%
Private School	.04	--	0	1	5.62%

Note: See variable descriptions in Appendix A

Table 6

Multi-Level Logit Models Predicting Teenage Pregnancy

	Combined		***Males***		***Females***	
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Neighborhood Disadvantage Scale	.187* (3.979)	.138* (2.875)	.218* (2.535)	.148 (1.701)	.175* (3.500)	.130* (2.500)
Neighborhood Violence Scale	--	.073* (2.607)	--	.101* (2.971)	--	.067* (2.030)
Constant	−2.660* (21.626)	−2.600* (20.800)	−2.632* (15.040)	−2.554* (14.594)	−1.882* (13.941)	−1.831* (13.664)
Variance Components:						
School	.038	.031	.005	.003	.044	.040
Neighborhood	.014	.009	.019	.012	.039	.035
N individuals	13,975	13,975	6,771	6,771	7,204	7,204

Notes:

All models include Individual Violence Scale, Neighborhood Social Cohesion and Intergenerational Closure Scales, and Individual, Family, and School Controls. Coefficients on these control variables available in Appendix B.

Absolute value of t-ratios in parentheses.

Multiple Imputation with 10 imputations used to impute missing values on control variables.

* $p < .05$

Table 7

Decomposition of Effects of Neighborhood Disadvantage on Teenage Pregnancy

	Males		***Females***	
	Effect	**%**	**Effect**	**%**
N'hood Dis.→ Pregnancy	.148	80%	.130	84%
N'hood Dis.→ N'Hood Viol. → Pregnancy	.037	20%	.025	16%
Sum	.185	100%	.155	100%

Note: Effect metric is logit of Teenage Pregnancy.

Table B1

Control Variable Coefficients from High School Graduation Models in Table 3

	Combined		***Males***		***Females***	
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Individual/Family Level Variables						
Female	.383	.384	--	--	--	--
	(6.964)	(6.982)				
Individual Violence Scale	−.361	−.353	−.360	−.355	−.370	−.359
	(15.696)	(15.348)	(12.857)	(12.679)	(10.571)	(9.972)
Age	.036	.037	.047	.049	.023	.024
	(2.250)	(2.313)	(2.350)	(2.579)	(.920)	(.960)
Hispanic	−.136	−.116	−.09	−.058	−.178	−.150
	(1.360)	(1.126)	(.672)	(.420)	(1.391)	(1.136)
Black	.488	.528	.283	.355	.632	.697
	(6.100)	(6.519)	(3.011)	(3.817)	(5.311)	(5.760)
Native American	−.158	−.126	−.025	.052	−.265	−.22
	(1.188)	(.906)	(.108)	(.214)	(1.221)	(1.014)
Asian	.278	.291	.195	.221	.382	.401
	(2.527)	(2.598)	(1.466)	(1.535)	(2.043)	(2.191)
Other Race	.097	.114	−.015	.021	.184	.208
	(1.293)	(1.520)	(.134)	(.186)	(1.546)	(1.748)
Multi Race	.003	−.009	.117	.082	−.107	−.133
	(.023)	(.067)	(.557)	(.387)	(.471)	(.591)
Home Language Not English	.241	.238	.232	.222	.271	.275
	(2.591)	(2.479)	(1.871)	(1.748)	(1.760)	(1.797)
Immigrant	.071	.066	.088	.069	.024	.029
	(.717)	(.667)	(.615)	(.479)	(.148)	(.174)
Household Size	−.032	−.033	−.038	−.038	−.035	−.034
	(1.882)	(1.941)	(1.900)	(1.900)	(1.522)	(1.478)
Single Parent Household	−.337	−.327	−.45	−.437	−.247	−.234
	(4.554)	(4.419)	(5.172)	(5.023)	(2.495)	(2.364)
Other Household Type	−.419	−.413	−.402	−.389	−.450	−.445

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	Combined		***Males***		***Females***	
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
	(5.513)	(5.364)	(4.902)	(4.744)	(3.947)	(3.904)
Parent Immigrant	.093	.094	.153	.167	.033	.030
	(1.120)	(1.133)	(1.286)	(1.358)	(.236)	(.221)
Parent Education – HS Grad	.428	.419	.398	.385	.477	.464
	(4.864)	(4.816)	(3.373)	(3.291)	(4.259)	(4.143)
Parent Education – Some College	.717	.710	.625	.610	.838	.833
	(7.967)	(7.978)	(5.342)	(5.304)	(7.759)	(7.713)
Parent Education -- College	.911	.902	.808	.796	1.071	1.058
	(7.230)	(7.274)	(4.539)	(4.523)	(7.542)	(7.451)
Parent Professional/Managerial Occ	.371	.376	.542	.550	.166	.170
	(5.984)	(5.968)	(6.775)	(6.790)	(1.824)	(1.889)
Parent Disabled	−.184	−.182	−.2	−.182	−.208	−.211
	(2.022)	(2.000)	(1.527)	(1.400)	(1.600)	(1.611)
Family Welfare Receipt	−.190	−.189	−.074	−.064	−.318	−.317
	(2.603)	(2.589)	(.740)	(.634)	(3.087)	(3.078)
Log Family Income	.214	.210	.241	.238	.18	.174
	(5.220)	(5.122)	(4.085)	(4.103)	(3.000)	(2.900)
Low Birth Weight	−.010	−.009	−.082	−.083	.047	.050
	(.127)	(.115)	(.701)	(.716)	(.392)	(.420)
Mother's Age at Birth	.022	.023	.028	.029	.016	.017
	(3.667)	(3.833)	(4.000)	(4.143)	(2.000)	(2.125)
Neighborhood Level Variables						
Intergenerational Closure	.020	.001	.026	.008	−.010	−.029
	(.909)	(.045)	(.963)	(.320)	(.313)	(.879)
Social Cohesion	.032	.026	.040	.033	.041	.035
	(1.032)	(.897)	(1.176)	(1.000)	(1.079)	(.946)
School/Community Level Variables						
Urban	.049	.134	.062	.131	.033	.121
	(.405)	(1.145)	(.633)	(1.323)	(.213)	(.807)
Rural	.035	.014	−.090	−.115	.128	.092

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	Combined		***Males***		***Females***	
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
	(.200)	(.084)	(.652)	(.878)	(.692)	(.508)
Small	−.178	−.139	.022	.068	−.242	−.198
	(.695)	(.565)	(.128)	(.402)	(.807)	(.669)
Large	−.125	−.113	−.195	−.179	−.065	−.054
	(1.126)	(1.046)	(1.711)	(1.570)	(.492)	(.415)
Cumulative Dropout Rate	−.005	−.003	−.002	.000	−.008	−.006
	(1.000)	(.600)	(.400)	(.000)	(1.333)	(1.200)
Percent in College Prep Program	.003	.003	.002	.001	.003	.002
	(1.000)	(1.000)	(1.000)	(.500)	(.750)	(.500)
Catholic School	.898	1.054	1.157	1.303	.676	.832
	(5.720)	(7.475)	(9.723)	(11.430)	(3.431)	(4.701)
Private School	.063	−.046	.116	.002	−.035	−.134
	(.339)	(.254)	(.627)	(.009)	(.110)	(.475)

Table B2

Control Variable Coefficients from Teenage Pregnancy Models in Table 6

	Combined		***Males***		***Females***	
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Individual/Family Level Variables						
Female	.797	.797	--	--	--	--
	(13.508)	(13.508)				
Individual Violence Scale	.286	.282	.329	.323	.262	.257
	(9.226)	(9.400)	(7.311)	(7.178)	(7.939)	(8.031)
Age	−.226	−.227	−.238	−.241	−.221	−.222
	(14.125)	(13.353)	(10.348)	(10.042)	(11.050)	(11.100)
Hispanic	.342	.327	.300	.275	.364	.350
	(2.714)	(2.595)	(2.013)	(1.858)	(2.443)	(2.349)
Black	.391	.351	.508	.434	.332	.295
	(4.600)	(3.857)	(4.536)	(3.647)	(2.862)	(2.379)
Native American	.042	.016	.619	.547	−.227	−.252
	(.212)	(.084)	(1.864)	(1.765)	(.873)	(.977)
Asian	−.110	−.117	−.221	−.256	−.081	−.087
	(.647)	(.661)	(.948)	(1.099)	(.405)	(.414)
Other Race	.265	.252	.191	.151	.310	.298
	(1.743)	(1.658)	(1.032)	(.803)	(1.658)	(1.602)
Multi Race	.148	.165	−.458	−.424	.430	.448
	(.892)	(1.006)	(1.553)	(1.483)	(2.299)	(2.422)
Home Language Not English	−.542	−.545	−.504	−.504	−.588	−.590
	(5.262)	(5.240)	(2.377)	(2.377)	(4.200)	(4.245)
Immigrant	−.036	−.032	−.134	−.116	.040	.041
	(.250)	(.222)	(.601)	(.525)	(.248)	(.255)
Household Size	−.002	−.002	−.052	−.053	.021	.021
	(.143)	(.143)	(1.529)	(1.559)	(1.400)	(1.400)
Single Parent Household	.149	.142	−.056	−.068	.265	.258
	(1.987)	(1.893)	(.434)	(.535)	(3.081)	(3.000)
Other Household Type	.395	.390	.297	.288	.446	.441

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	Combined		***Males***		***Females***	
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
	(6.270)	(6.290)	(2.560)	(2.504)	(5.868)	(5.880)
Parent Immigrant	−.083	−.092	.216	.198	−.265	−.273
	(.822)	(.929)	(1.376)	(1.277)	(2.304)	(2.395)
Parent Education – HS Grad	−.064	−.057	−.158	−.148	−.016	−.009
	(.627)	(.553)	(1.000)	(.937)	(.130)	(.073)
Parent Education – Some College	−.165	−.159	−.188	−.173	−.164	−.159
	(1.701)	(1.622)	(1.160)	(1.068)	(1.378)	(1.336)
Parent Education -- College	−.348	−.342	−.351	−.340	−.352	−.344
	(2.784)	(2.736)	(1.838)	(1.780)	(2.362)	(2.293)
Parent Professional/Managerial Occ	−.095	−.098	.067	.065	−.187	−.189
	(1.508)	(1.556)	(.644)	(.631)	(2.174)	(2.198)
Parent Disabled	.152	.148	.119	.104	.167	.168
	(1.394)	(1.358)	(.610)	(.536)	(1.237)	(1.244)
Family Welfare Receipt	.021	.017	.188	.180	−.070	−.074
	(.221)	(.181)	(1.297)	(1.259)	(.609)	(.649)
Log Family Income	−.054	−.051	−.040	−.037	−.052	−.049
	(1.174)	(1.109)	(.571)	(.529)	(.912)	(.845)
Low Birth Weight	−.072	−.072	−.076	−.070	−.077	−.077
	(.791)	(.791)	(.490)	(.449)	(.720)	(.720)
Mother's Age at Birth	−.021	−.021	−.025	−.026	−.018	−.019
	(2.625)	(2.625)	(2.083)	(2.167)	(2.000)	(2.111)
Neighborhood Level Variables						
Intergenerational Closure	.003	.011	−.009	.001	.016	.023
	(.130)	(.500)	(.237)	(.026)	(.533)	(.767)
Social Cohesion	−.009	−.008	−.020	−.019	−.007	−.007
	(.310)	(.276)	(.541)	(.514)	(.194)	(.194)
School/Community Level Variables						
Urban	−.118	−.154	.020	−.005	−.193	−.226
	(1.326)	(1.770)	(.179)	(.046)	(1.771)	(2.093)
Rural	−.051	−.038	.119	.147	−.129	−.114

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	Combined		Males		Females	
	(1)	(2)	(3)	(4)	(5)	(6)
	(.520)	(.400)	(.850)	(1.073)	(1.057)	(.934)
Small	.030	.014	−.170	−.208	.115	.100
	(.214)	(.103)	(1.172)	(1.507)	(.676)	(.592)
Large	.131	.124	−.034	−.054	.241	.236
	(1.472)	(1.442)	(.296)	(.474)	(2.191)	(2.185)
Cumulative Dropout Rate	−.001	−.002	−.011	−.012	.001	.000
	(.333)	(.667)	(2.200)	(2.400)	(.250)	(.000)
Percent in College Prep Program	.000	.000	.000	.001	−.001	.000
	(.000)	(.000)	(.000)	(.500)	(.500)	(.000)
Catholic School	.555	.483	.354	.251	.707	.644
	(4.269)	(3.715)	(2.185)	(1.521)	(3.304)	(3.126)
Private School	−.980	−.950	−.833	−.782	−1.033	−1.004
	(2.925)	(3.084)	(5.142)	(4.888)	(1.858)	(1.891)

Table C1

Decomposition of Effects of Neighborhood Disadvantage on High School Graduation and Teenage Pregnancy (based on linear probability models)

	Males		***Females***	
High School Graduation	**Effect**	**%**	**Effect**	**%**
N'hood Dis.→ HS Grad	−.0049	39%	−.0007	9%
N'hood Dis.→ N'Hood Viol. → HS Grad	−.0078	61%	−.0073	91%
Sum	−.0127	100%	−.0080	100%
	Males		***Females***	
Teenage Pregnancy	Effect	%	Effect	%
N'hood Dis.→ Pregnancy	.0109	79%	.0174	84%
N'hood Dis.→ N'Hood Viol. → Pregnancy	.0029	21%	.0033	16%
Sum	.0138	100%	.0207	100%

Table C2

Sensitivity Analysis for Role of Neighborhood Violence in Explaining the Effect of Neighborhood Disadvantage on High School Graduation (males)

	β_{YU}					
r_{VU}	**.00**	**.01**	**.02**	**.03**	**.04**	**.05**
.00	−.0212*	−.0212*	−.0212*	−.0212*	−.0212*	−.0212*
	61%	*61%*	*61%*	*61%*	*61%*	*61%*
−.05	−.0212*	−.0207*	−.0202*	−.0197*	−.0192*	−.0187*
	61%	*55%*	*54%*	*53%*	*51%*	*50%*
−.10	−.0212*	−.0202*	−.0192*	−.0182*	−.0172*	−.0162*
	61%	*54%*	*51%*	*49%*	*46%*	*43%*
−.15	−.0212*	−.0197*	−.0182*	−.0167*	−.0152*	−.0137
	61%	*53%*	*49%*	*45%*	*41%*	*37%*
−.20	−.0212*	−.0192*	−.0172*	−.0152*	−.0132*	−.0112*
	61%	*51%*	*46%*	*41%*	*35%*	*30%*
−.25	−.0212*	−.0187*	−.0162*	−.0137*	−.0112*	−.0087
	61%	*50%*	*43%*	*37%*	*30%*	*23%*

Notes:

β_{YU} is hypothetical coefficient on standardized unobserved variable in linear probability model predicting graduation from high school and controlling for all other control variables.

r_{VU} is hypothetical partial correlation between standardized unobserved variable and violence scale.

In each cell, the top number is the expected coefficient on the violence scale variable if the unobserved variable where included in the linear probability model predicting graduation from high school, and the bottom number is the resulting proportion of the neighborhood disadvantage effect accounted for by neighborhood violence.

Note: 2 X SE of β on violence coefficient in linear probability model predicting high school graduation =0.01

* coefficient on violence scale would remain statistically significant

Table C3

Sensitivity Analysis for Role of Neighborhood Violence in Explaining the Effect of Neighborhood Disadvantage on High School Graduation (females)

	β_{YU}					
r_{VU}	**.00**	**.01**	**.02**	**.03**	**.04**	**.05**
.00	−.0199*	−.0199*	−.0199*	−.0199*	−.0199*	−.0199*
	91%	*91%*	*91%*	*91%*	*91%*	*91%*
−.05	−.0199*	−.0194*	−.0189*	−.0184*	−.0179*	−.0174*
	91%	*89%*	*87%*	*84%*	*82%*	*80%*
−.10	−.0199*	−.0189*	−.0179*	−.0169*	−.0159*	−.0149*
	91%	*87%*	*82%*	*78%*	*73%*	*68%*
−.15	−.0199*	−.0184*	−.0169*	−.0154*	−.0139*	−.0124*
	91%	*84%*	*78%*	*71%*	*64%*	*57%*
−.20	−.0199*	−.0179*	−.0159*	−.0139*	−.0119*	−.0099*
	91%	*82%*	*73%*	*64%*	*55%*	*45%*
−.25	−.0199*	−.0174*	−.0149*	−.0124*	−.0099*	−.0074
	91%	*80%*	*68%*	*57%*	*45%*	*34%*

Notes:

β_{YU} is hypothetical coefficient on standardized unobserved variable in linear probability model predicting graduation from high school and controlling for all other control variables.

r_{VU} is hypothetical partial correlation between standardized unobserved variable and violence scale.

In each cell, the top number is the expected coefficient on the violence scale variable if the unobserved variable where included in the linear probability model predicting graduation from high school, and the bottom number is the resulting proportion of the neighborhood disadvantage effect accounted for by neighborhood violence.

Note: 2 X SE of β on violence coefficient in linear probability model predicting high school graduation = 0.0096

* coefficient on violence scale would remain statistically significant

Table C4

Sensitivity Analysis for Role of Neighborhood Violence in Explaining the Effect of Neighborhood Disadvantage on Teenage Pregnancy (males)

	β_{YU}					
r_{VU}	**.00**	**.01**	**.02**	**.03**	**.04**	**.05**
.00	.0079*	.0079*	.0079*	.0079*	.0079*	.0079*
	21%	*21%*	*21%*	*21%*	*21%*	*21%*
.05	.0079*	.0074*	.0069*	.0064	.0059	.0054
	21%	*20%*	*18%*	*17%*	*16%*	*14%*
.10	.0079*	.0069*	.0059	.0049	.0039	.0029
	21%	*18%*	*16%*	*13%*	*10%*	*8%*
.15	.0079*	.0064	.0049	.0034	.0019	.0004
	21%	*17%*	*13%*	*9%*	*5%*	*1%*
.20	.0079*	.0059	.0039	.0019	--	--
	21%	*16%*	*10%*	*5%*		
.25	.0079*	.0054	.0029	.0004	--	--
	21%	*14%*	*8%*	*1%*		

Notes:

β_{YU} is hypothetical coefficient on standardized unobserved variable in linear probability model predicting teenage pregnancy and controlling for all other control variables.

r_{VU} is hypothetical partial correlation between standardized unobserved variable and violence scale.

In each cell, the top number is the expected coefficient on the violence scale variable if the unobserved variable where included in the linear probability model predicting teenage pregnancy, and the bottom number is the resulting proportion of the neighborhood disadvantage effect accounted for by neighborhood violence.

Note: 2 X SE of β on violence coefficient in linear probability model predicting teenage pregnancy = 0.0068

* coefficient on violence scale would remain statistically significant

Table C5

Sensitivity Analysis for Role of Neighborhood Violence in Explaining the Effect of Neighborhood Disadvantage on Teenage Pregnancy (females)

	β_{YU}					
r_{VU}	**.00**	**.01**	**.02**	**.03**	**.04**	**.05**
.00	.0091	.0091	.0091	.0091	.0091	.0091
	16%	*16%*	*16%*	*16%*	*16%*	*16%*
.05	.0091	.0086	.0081	.0076	.0071	.0066
	16%	*15%*	*14%*	*13%*	*13%*	*12%*
.10	.0091	.0081	.0071	.0061	.0051	.0041
	16%	*14%*	*13%*	*11%*	*9%*	*7%*
.15	.0091	.0076	.0061	.0046	.0031	.0016
	16%	*13%*	*11%*	*8%*	*5%*	*3%*
.20	.0091	.0071	.0051	.0031	.0011	--
	16%	*13%*	*9%*	*5%*	*2%*	
.25	.0091	.0066	.0041	.0016	--	--
	16%	*12%*	*7%*	*3%*		

Notes:

β_{YU} is hypothetical coefficient on standardized unobserved variable in linear probability model predicting teenage pregnancy and controlling for all other control variables.

r_{VU} is hypothetical partial correlation between standardized unobserved variable and violence scale.

In each cell, the top number is the expected coefficient on the violence scale variable if the unobserved variable where included in the linear probability model predicting teenage pregnancy, and the bottom number is the resulting proportion of the neighborhood disadvantage effect accounted for by neighborhood violence.

Note: 2 X SE of β on violence coefficient in linear probability model predicting teenage pregnancy = 0.0093

* coefficient on violence scale would remain statistically significant