

# Social Anatomy of Racial and Ethnic Disparities in Violence

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We analyzed key individual, family, and neighborhood factors to assess competing hypotheses regarding racial/ethnic gaps in perpetrating violence. From 1995 to 2002, we collected 3 waves of data on 2974 participants aged 8 to 25 years living in 180 Chicago neighborhoods, augmented by a separate community survey of 8782 Chicago residents.

The odds of perpetrating violence were 85% higher for Blacks compared with Whites, whereas Latino-perpetrated violence was 10% lower. Yet the majority of the Black–White gap (over 60%) and the entire Latino–White gap were explained primarily by the marital status of parents, immigrant generation, and dimensions of neighborhood social context. The results imply that generic interventions to improve neighborhood conditions and support families may reduce racial gaps in violence. (*Am J Public Health*. 2005;95:224–232. doi: 10.2105/AJPH.2004.037705)

The public health of the United States has long been compromised by inequality in the burden of personal violence. Blacks are 6 times more likely than Whites to die by homicide,<sup>1</sup> a crime that is overwhelmingly intraracial in nature.<sup>2</sup> Homicide is the leading cause of death among young Blacks,<sup>3</sup> and both police records and self-reported surveys show disproportionate involvement in serious violence among Blacks.<sup>4,5</sup> Surprisingly, however, Latinos experience lower rates of violence overall than Blacks despite being generally poorer; Latino rates have been converging with those of Whites in recent years.<sup>6</sup>

These disparities remain a puzzle because scant empirical evidence bears directly on the explanation of differences in personal violence by race and ethnicity. Aggregate studies based on police statistics show that rates of violent crime are highest in disadvantaged communities that contain large concentrations of minority groups,<sup>5</sup> but disparities in official crime may reflect biases in the way criminal justice institutions treat different racial and ethnic groups rather than differences in actual offending.<sup>7</sup> More important, aggregate and even multilevel studies typically do not account for correlated family or individual constitutional differences that might explain racial and ethnic disparities in violence.<sup>8,9</sup>

By contrast, individual-level studies tend to focus on characteristics of the offender while neglecting racial and ethnic differences

associated with neighborhood contexts.<sup>4,10,11</sup> Individual-level surveys of self-reported violence also underrepresent Latino Americans even though they are now the largest minority group in the United States.<sup>12</sup> Blacks residing outside inner-city poverty areas tend to be underrepresented as well, even though there is a thriving and growing middle-class Black population.<sup>13</sup>

Recognizing these limitations, 2 panels from the National Research Council and other major research groups called for new studies of racial and ethnic disparities in violent crime that integrate individual-level differences with a sample design that captures a variety of socioeconomic conditions and neighborhood contexts.<sup>5,14,15</sup> We accomplish this objective in the Project on Human Development in Chicago Neighborhoods (PHDCN), a multilevel longitudinal cohort study that was conducted between 1995 and 2002. The study drew samples that capture the 3 major racial/ethnic groups in American society today—Whites, Blacks, and Latinos—and that vary across a diverse set of environments, from highly segregated to very integrated neighborhoods. The analysis in this article focuses on violent offending among participants aged 8 to 25 years. We also conducted an independent survey of the respondents' neighborhoods, which, when supplemented with data from the US Census Bureau and the Chicago Police Department, provide a broad assessment of neighborhood

characteristics to complement individual and family predictors.

## COMPETING EXPLANATIONS

Our theoretical framework does not view “race” or “ethnicity” as holding distinct scientific credibility as causes of violence.<sup>16</sup> Rather, we argue they are markers for a constellation of external and malleable social contexts that are differentially allocated by racial/ethnic status in American society. We hypothesize that segregation by these social contexts in turn differentially exposes members of racial/ethnic minority groups to key violence-inducing or violence-protecting conditions.<sup>17</sup> We adjudicate empirically among 3 major contextual perspectives that we derive from a synthesis of prior research.

First, the higher rate of violence among Blacks is often attributed to a matriarchal pattern of family structure; specifically, the prevalence of single-parent, female-headed families in the Black community.<sup>18,19</sup> Some have augmented this view by arguing that female-headed families are a response to structural conditions of poverty, especially the reduced pool of employed Black men that could adequately support a family.<sup>20</sup>

A second view focuses on racial differences in family socioeconomic context. Many social scientists have posited that socioeconomic inequality—not family structure—is the root cause of violence.<sup>21,22</sup> Black female-headed families are spuriously linked to violence, by this logic, because of their lack of financial resources relative to 2-parent families.

A third perspective is that racial and ethnic minority groups in the United States are differentially exposed to salient neighborhood conditions, such as the geographic concentration of poverty and reduced informal community controls, that cannot be explained by personal or family circumstances.<sup>17</sup> Prior research indicates that Blacks and, to a lesser extent, Latinos, are highly segregated residentially.<sup>23</sup> Although never tested directly, the implication is

that neighborhood segregation may explain individual racial/ethnic gaps in violence.<sup>24</sup>

A prominent alternative to our approach highlights “constitutional” differences between individuals in impulsivity and intelligence (measured as IQ).<sup>25–28</sup> Although low IQ and impulsivity may be sturdy predictors of violence,<sup>5,26</sup> their potential to explain racial/ethnic disparities has rarely, if ever, been examined.<sup>5,6</sup> We thus assess the constitutional hypothesis that racial/ethnic differences in measured intelligence and impulsivity, more than economic, family, or neighborhood social context, stand as explanations of the observed racial/ethnic gaps in violence.

## DATA AND MEASURES

The PHDCN employed a multistage sampling procedure whereby neighborhoods, families, and individual children were studied simultaneously. In the first stage, all 825 Chicago census tracts were stratified by racial/ethnic composition (7 categories) and socioeconomic status (high, medium, and low), producing 21 strata. A total of 180 tracts were selected randomly within strata. At the second stage, over 35 000 dwelling units were enumerated (or “listed”) in person by our research team within each area. In most instances, all dwelling units were listed, but in particularly large tracts, the probability of a census block being listed was proportional to its size. Within each listed block, replicates (random groups of equal size) were created for all listings, and within them dwelling units were selected systematically (every *n*th unit) after an initial random draw. All households were then enumerated within selected dwelling units and age-eligible participants were selected with certainty. To be age eligible, a household member must have had an age within 12 months of 1 of 7 ages: 0 (or prenatal), 3, 6, 9, 12, 15, and 18 years. Respondents and caregivers were interviewed in person up to 3 times from 1995 to 2002 in intervals of about 2.5 years.

We studied the 2974 respondents from the 9-, 12-, 15-, and 18-year-old cohorts who completed the baseline interview (“wave 1” of the study). The initial response rate was 78%. Of the 2974 wave 1 participants, 85% were interviewed again at wave 2 and 77% were

interviewed at wave 3. We found no evidence that the association between race/ethnicity and violence at the initial interview varied as a function of future attrition ( $\chi^2_5=1.38$ ,  $P>.500$ ). All analyses in this article nonetheless control for attrition.

Under a guarantee of confidentiality, all subjects were asked at each interview whether, during the last year, they had (a) hit someone outside of the house; (b) thrown objects such as rocks or bottles at people; (c) carried a hidden weapon; (d) maliciously set fire to a building, property, or car; (e) snatched a purse or picked a pocket; (f) attacked someone with a weapon; (g) used a weapon to rob someone; or (h) been in a gang fight. Self-reported measures of violence have the major advantage of being independent of the biases of the criminal justice system (e.g., arrests). In addition, a body of research supports the reliability and validity across racial groups of the self-reported violence items included in our survey questionnaire.<sup>29,30</sup>

Measures of subjects’ race/ethnicity come from the primary caregiver interview for age cohorts 9, 12, and 15 years and from the subject interview for cohort 18 years. We first identified subjects as Latino or non-Latino and then categorized Latinos by country of ancestry as Mexican, Puerto Rican, or other Latino. We collapsed Puerto Ricans and other Latinos into a single category because of their relatively small sample sizes and similarity regarding sociodemographic characteristics and levels of violence. For non-Latinos, we then categorized race as being either White, Black, or other. If the parents were of different races, the subject’s race was coded as the race of the mother. During the wave 2 interviews, all subjects were asked to self-identify their racial and ethnic backgrounds. Approximately 90% of subjects whom we identified as White, Black, or Latino at wave 1 self-reported the same classification at wave 2, validating our measurement scheme. In most cases where there was a discrepancy, the subject self-identified as being of mixed race/ethnicity at wave 2.

To assess racial/ethnic disparities, we selected a set of risk factors that tap the core concepts derived from our theoretical framework and that are exogenous to violent behavior, meaning that they are determined

prior to the onset of violence and are unlikely to be affected by violent offending. We thus proceed conservatively and do not control for mediating factors that might be outgrowths of participation in crime, such as drug use, affiliating with delinquent peers, or being a gang member. Research using such factors to explain racial disparities in violence begs the question of causal direction and confounds the “explainer” with the outcome.

The following sociodemographic and family background factors (listed in Table 1) were measured at the initial interview: age, sex, socioeconomic status (standardized scale of parent’s income, education, and occupational status), length of residence at address, immigrant generational status (first, second, third, or higher), whether adult extended kin live in household, number of children in household, 4 indicators of family structure, and the marital status of parent(s).

To capture individual differences in IQ, we measured verbal/reading ability from the average score of 9- to 15-year-olds on the widely used Wechsler Intelligence Scale for Children vocabulary test and the Wide Range Achievement Test for reading.<sup>31</sup> The 18-year-old cohort received the Wechsler Adult Intelligence Scale vocabulary test (or its Spanish version).

We combined the vocabulary and reading scores using principal factor estimation and regression scoring. We then normalized the resulting scale to a mean of 100 and a standard deviation of 15. We constructed a standardized scale of impulsivity (or hyperactivity) from the Achenbach Child-Behavior Checklist; these are based on reports of the primary caregiver for cohorts 9 through 15 years and self-reports for cohort 18 years.<sup>32</sup> Drawing on a large body of research linking impulsivity to crime,<sup>26,28</sup> we averaged the following standardized items: impulsive, acts without thinking; trouble concentrating or paying attention; cannot get mind off certain thoughts; cannot sit still, restless, hyperactive; confused or seems to be in a fog; demands a lot of attention; gets hurt a lot/accident-prone; nervous, high-strung, or tense; nervous movements or twitching; repeats certain acts over and over. These items produce a scale with a reliability of  $\alpha=.78$ .

Using 1990 census data and drawing on past work,<sup>10</sup> we constructed 3 neighborhood

**TABLE 1—Descriptive Statistics, by Race/Ethnicity: Project on Human Development in Chicago Neighborhoods (PHDCN) Waves 1 Through 3, Age Cohorts 9 Through 18**

	White (n = 445), Mean (SD)	Black (n = 1067), Mean (SD)	Mexican American (n = 976), Mean (SD)
<b>Individual/family level</b>			
Male, %	52 (50)	48 (50)	50 (50)
Age at wave 1, y	13.66 (3.41)	13.40 (3.33)	12.80 (3.31)
Immigrant generation, %			
First	14 (35)	2 (14)	28 (45)
Second	11 (32)	2 (15)	56 (50)
Third or higher (reference category)	75 (43)	96 (20)	16 (37)
Family structure, %			
2 parents, both biological	65 (48)	23 (42)	71 (45)
2 parents, one/both nonbiological	13 (34)	24 (43)	12 (33)
1 parent, nonbiological	2 (13)	12 (32)	2 (15)
1 parent, biological (reference category)	21 (41)	42 (49)	15 (36)
Married parents, %	66 (47)	29 (45)	70 (46)
Adult extended family, %	13 (33)	27 (45)	16 (37)
No. of children	2.75 (1.50)	3.33 (1.94)	3.78 (1.69)
Socioeconomic status	0.90 (1.36)	0.22 (1.23)	-0.59 (1.14)
Years living at same address	7.13 (5.40)	5.59 (4.92)	5.02 (4.23)
Verbal/reading ability	109.08 (15.39)	98.55 (14.09)	97.33 (14.63)
Impulsivity/hyperactivity	-0.04 (0.58)	0.06 (0.60)	-0.06 (0.55)
<b>Neighborhood level</b>			
Black, %	7.54 (16.69)	78.11 (25.43)	12.96 (21.01)
Mexican American, %	24.65 (17.97)	11.86 (16.45)	58.37 (25.84)
First-generation immigrant, %	15.17 (13.38)	5.81 (9.37)	23.23 (14.30)
Professional/managerial worker, %	25.80 (11.32)	19.87 (8.63)	15.55 (7.97)
Concentrated disadvantage <sup>a</sup>	-0.78 (0.51)	0.42 (0.95)	-0.27 (0.53)
Residential stability <sup>b</sup>	0.25 (0.98)	0.61 (1.20)	-0.06 (0.69)
Moral/legal cynicism <sup>c</sup>	-0.26 (0.69)	0.31 (0.79)	0.26 (0.73)
Collective efficacy <sup>d</sup>	0.61 (0.99)	-0.14 (0.80)	-0.24 (0.80)
Friend/kin ties <sup>e</sup>	0.23 (0.81)	-0.11 (0.69)	-0.01 (0.80)
Organizations/youth services <sup>f</sup>	0.00 (0.66)	0.00 (0.81)	-0.30 (0.68)
Natural log of violent crime rate, 1993 <sup>g</sup>	7.93 (0.65)	8.91 (0.44)	8.41 (0.48)

<sup>a</sup>Standardized average of following variables from 1990 census: percentage of poor families, percentage of single-parent families, percentage of families on welfare, unemployment rate.

<sup>b</sup>Standardized average of following variables from 1990 census: percentage of residents who have lived in the same location for 5 years or more, percentage of homes that are owner occupied.

<sup>c</sup>Scale from PHDCN Community Survey based on agreement (on 5-point scale) with following items: laws were made to be broken; it's OK to do anything you want as long as you don't hurt anyone; to make money, there are no right or wrong ways anymore, only easy ways and hard ways; fighting between friends or within families is nobody else's business; nowadays a person has to live pretty much for today and let tomorrow take care of itself.

<sup>d</sup>Combination of following 2 scales from PHDCN Community Survey. *Social control*—assessment of how likely it is (on 5-point scale) that neighbors could be counted on to “do something” if they encountered the following situations: a group of neighborhood children skipping school; children spray-painting graffiti; a child showing disrespect to an adult; a fight in which someone was being beaten or threatened; the city was going to close down local fire station. *Social cohesion*—level of agreement (on 5-point scale) with following items: neighborhood is close-knit; neighbors trust each other; neighbors get along with each other; neighbors share same values; people are willing to help their neighbors.

<sup>e</sup>Average number of friends and relatives that respondents to PHDCN Community Survey reported to be living in the neighborhood, based on following values: 0 = none; 1 = 1 or 2; 2 = 3 to 5; 3 = 6 to 9; 4 = 10 or more.

<sup>f</sup>Combination of following 2 scales from PHDCN Community Survey. *Neighborhood organizations*—inventory of whether the following are present in respondent's neighborhood: block group/tenant association, crime prevention program/neighborhood watch, family health service, alcohol/drug treatment program, family planning clinic, mental health center, park/playground, community newspaper/newsletter. *Youth services*—inventory of whether following are present in respondent's neighborhood: youth center, recreational programs, after-school programs mentoring/counseling services, mental health services, crisis intervention.

<sup>g</sup>Incident-based reports of murder, rape, robbery, and aggravated assault from 1993 Chicago Police Department data; population data (per 100 000) from 1990 census.

characteristics for each census tract: concentrated disadvantage, residential stability, and percentage professional/managerial workers (Table 1). We also examined neighborhood differences in racial/ethnic composition and immigrant concentration as measured in 1995 by aggregating the cohort samples; 1990 census data yielded similar results because of stability over time at the neighborhood level. To measure neighborhood social organization, we incorporated a separate PHDCN community survey that yielded a representative probability sample of 8782 Chicago residents in 1995, permitting construction of reliable between-neighborhood measures based on aggregating individual responses within the 180 neighborhoods that contain cohort respondents. Building on prior work, we examined validated measures of collective efficacy,<sup>33</sup> organizational services, social ties,<sup>34</sup> and moral/legal cynicism<sup>35</sup> (Table 1). We also examined the neighborhood's prior violent crime rate, which we constructed from incident-based records of the Chicago Police Department on murder, robbery, rape, and aggravated assault in 1993.

## STATISTICAL METHODS

We formulated a multilevel logistic regression model that represents the odds that a given person living in a given neighborhood will commit a specific violent offense. This approach enabled us to combine information on all 58 700 item responses to the violence questions generated by the 2 925 participants living in 180 Chicago neighborhoods who were interviewed in at least 1 of 3 waves of data collection and who responded to at least 1 violence item. Our method takes into account (a) the fact that some violent offenses are rarer than others, (b) changes over time within subjects in propensity to violence, and (c) the dependence of violence on individual, family, and neighborhood characteristics. Specifically, let  $t$  denote the wave of data collection ( $t = 1, 2, 3$ ) and let  $i$  denote the specific violent offense of interest, where  $i = 0, 1, 2, \dots, 7$ , with item 0 denoted as the “reference item.” Define  $Y_{ijk} = 1$  if participant  $j$  living in neighborhood  $k$  reported committing offense  $i$  at wave  $t$ , while  $Y_{ijk} = 0$  if participant did not. We are inter-

ested in the probability of such an offense,  $\text{Prob}(Y_{ijk} = 1) = \phi_{ijk}$ . Rather than directly modeling the probability, we model  $\eta_{ijk} = \log[\phi_{ijk}/(1 - \phi_{ijk})]$ , the natural logarithm of the odds ratio.

The model begins with a personal trajectory of violent behavior:

$$(1) \quad \eta_{ijk} = \pi_{0jk} + \pi_{1jk}d_{ijk} + \pi_{2jk}d_{ijk}^2 + \alpha_i$$

where  $d_{ijk}$  is the age of person  $jk$  at wave  $t$ , centered about that person's mean age over the 3 waves of data collection. According to equation 1, the log-odds that a participant will commit a given offense changes as a quadratic function of age, where  $\alpha_i$  is a fixed effect for each item  $i$ . Thus, coefficients ( $\pi_{0jk}$ ,  $\pi_{1jk}$ ,  $\pi_{2jk}$ ) are person-specific parameters of change; knowing the value of these 3 coefficients for a given person would tell us the trajectory of that person's log-odds of committing the reference offense over the course of study. Also, our model allows that when a subject has missing data due either to sample attrition or survey nonresponse, all available information on that subject is still used in the analysis.

In this article, we focus mainly on a person's log-odds of committing the reference violent offense at that person's mean age during the study. For simplicity, we refer to this quantity,  $\pi_{0jk}$ , as person  $jk$ 's overall "propensity to violence." We model this propensity with the form

$$(2) \quad \pi_{0jk} = \mu + X_{jk}\beta + W_k\gamma$$

where  $X_{jk}$  is a vector of person and family background characteristics of participant  $j$  in neighborhood  $k$  and  $W_k$  is a vector of neighborhood characteristics. The components of  $\beta$  characterize partial associations between person or family characteristics and the propensity to offend, while the components of  $\gamma$  characterize partial associations between neighborhood characteristics and the propensity to offend;  $\mu$  is a model intercept. We also test a similar model for  $\pi_{1jk}$ , which captures within-person change in the log-odds of violent offending:

$$(3) \quad \pi_{1jk} = \mu_1 + X_{jk}\beta_1 + W_k\gamma_1$$

In this model, the coefficients  $\beta_1$  and  $\gamma_1$  characterize the partial association between covariates and the rate of change in propensity to violence.

All models were estimated simultaneously by means of generalized estimating equations with robust standard errors, allowing for underdispersion of level-1 variance and taking into account the dependence between observations that arises from the clustering of item responses within persons and persons within neighborhoods.<sup>36</sup> We first estimated a 3-level random effects model and then used the results to compute a working covariance structure for  $Y_{ijk}$ .<sup>37</sup> Estimates and standard errors of the coefficients take this covariance structure into account.

A key assumption of the model is that the association between predictors and the log-odds of offending is invariant across items apart from the item fixed effects,  $\alpha_i$ , in equation 1. We tested this assumption and found it to be supported,<sup>38</sup> consistent with past research showing that violent offenses tend to cluster together and share similar correlates.<sup>5,8,28</sup> We also verified that the explained reductions in racial/ethnic gaps were replicated across individual items. Other key assumptions are identical to those in standard logistic regression; namely, that the logarithm of the odds ratio is linearly associated with covariates, and that the effects of covariates are not biased by omitted variables. In results not shown here, we assessed sensitivity to the linearity assumption by testing interactions and quadratic effects of covariates; we assessed sensitivity to omitted variable bias by comparing results across a series of models.

Our analysis proceeds as follows. First, we describe the differential exposure to individual, family, and neighborhood risk factors as a function of race/ethnicity. Second, we estimate racial/ethnic disparities in the propensity to violent behavior and then consider how much these disparities are explained by immigrant status, family background, constitutional differences, and neighborhood racial/ethnic composition. Third, we investigate the mechanisms that may account for the association between neighborhood racial segregation and violence. Fourth, we consider correlates of change in the propensity to violence over the course of study.

## RESULTS

Table 1 presents summary statistics for the 3 major racial/ethnic groups in our study: Whites, Blacks, and Mexican Americans. Immigrant status varies as expected: Mexican Americans are comparatively more likely to be first- or second-generation immigrants, while Blacks are least likely to be immigrants. Family structure shows an expected pattern as well: Mexican American adolescents are likely to live with 2 biological parents and their parents are likely to be married, whereas Black adolescents are much more likely to live with a single, unmarried parent. Family socioeconomic status is highest among Whites and lowest among Mexican Americans in our sample. Whites also have longer residential tenure, on average, than do Blacks or Mexican Americans. In terms of individual differences, Whites score higher on verbal/reading ability tests than Blacks or Mexican Americans. Whites and Blacks are not statistically distinguishable in terms of impulsivity, but Blacks display higher impulsivity, on average, than Mexican Americans.

Racial/ethnic differences in neighborhood characteristics are pronounced. For example, a typical Black in Chicago lives in a neighborhood that is 78% Black, whereas Whites and Mexican Americans live in neighborhoods that are more mixed but that are still predominantly (over 85%) non-Black. Blacks are also more likely than Whites or Mexican Americans to live in neighborhoods characterized by concentrated disadvantage, high legal/moral cynicism, and low collective efficacy.

### Explaining Disparities in Violence

Although 3431 violent offenses were reported, personal violence is still relatively rare overall, with the prevalence of robbery (0.3%), purse snatching (0.3%), arson (0.4%), attacking with a weapon (2.3%), and gang fighting (3.9%) all less than 5% averaged across the 3 waves of data collection. Even the most common item, hitting someone (18.7%), is reported by fewer than 20% of subjects. Carrying a hidden weapon (7.6%) and throwing objects at another person (8.2%) are in the middle. These prevalence estimates comport with national norms.<sup>39</sup>



**TABLE 2—Social Anatomy of Racial/Ethnic Disparities in Violence: Project on Human Development in Chicago Neighborhoods Waves 1–3, Age Cohorts 9–18<sup>a</sup>**

	Model 1, Coefficient (SE)	Model 2, Coefficient (SE)	Model 3, Coefficient (SE)	Model 4, Coefficient (SE)	Model 5, Coefficient (SE)
Intercept	-1.178 (0.036)**	-1.022 (0.360)**	-1.033 (0.356)**	-1.020 (0.361)**	-1.023 (0.043)**
Race/ethnicity					
Black	0.614 (0.043)**	0.528 (0.044)**	0.401 (0.046)**	0.368 (0.047)**	0.247 (0.087)**
Mexican American	-0.101 (0.042)*	0.123 (0.052)*	0.066 (0.056)	0.065 (0.055)	0.034 (0.058)
Puerto Rican/other Latino	0.229 (0.063)**	0.228 (0.124)	0.116 (0.117)	0.100 (0.113)	0.074 (0.115)
Other race	0.190 (0.095)*	0.287 (0.093)**	0.236 (0.088)**	0.210 (0.089)*	0.139 (0.105)
Gender/age					
Male	0.495 (0.030)**	0.501 (0.030)**	0.520 (0.029)**	0.502 (0.029)**	0.507 (0.032)**
Linear age <sup>b</sup>	0.060 (0.004)**	0.065 (0.004)**	0.069 (0.004)**	0.059 (0.005)**	0.060 (0.005)**
Quadratic age <sup>c</sup>	-0.020 (0.002)**	-0.020 (0.002)**	-0.020 (0.001)**	-0.022 (0.001)**	-0.022 (0.001)**
Immigrant status					
1st-generation immigrant		-0.636 (0.052)**	-0.644 (0.056)**	-0.588 (0.056)**	-0.585 (0.057)**
Puerto Rican/other Latino <sup>d</sup>		0.588 (0.189)**	0.539 (0.180)**	0.449 (0.170)**	0.455 (0.145)**
2nd-generation immigrant		-0.266 (0.049)**	-0.234 (0.049)**	-0.248 (0.049)**	-0.242 (0.053)**
Puerto Rican/other Latino <sup>e</sup>		0.129 (0.144)	0.111 (0.138)	0.101 (0.135)	0.104 (0.116)
Family structure					
2 parents, both biological			-0.055 (0.056)	-0.029 (0.056)	-0.030 (0.057)
2 parents, 1/both not biological			0.020 (0.048)	0.023 (0.047)	0.021 (0.049)
1 parent, not biological			-0.032 (0.081)	-0.045 (0.082)	-0.050 (0.078)
Married parents			-0.215 (0.050)**	-0.203 (0.050)**	-0.204 (0.049)**
Adult extended family			0.020 (0.037)	0.013 (0.037)	0.008 (0.032)
No. of children			0.002 (0.009)	0.001 (0.009)	-0.001 (0.009)
SES/residential context					
SES			-0.019 (0.014)	-0.014 (0.014)	-0.014 (0.015)
Years at same address			-0.015 (0.003)**	-0.014 (0.003)**	-0.016 (0.004)**
Individual differences					
Verbal/reading ability				-0.004 (0.001)**	-0.004 (0.002)*
1st-generation immigrant <sup>f</sup>				0.017 (0.003)**	0.016 (0.003)**
2nd-generation immigrant <sup>g</sup>				0.009 (0.002)**	0.009 (0.002)**
Impulsivity/hyperactivity				0.280 (0.025)**	0.281 (0.025)**
Neighborhood characteristics					
% African American <sup>h</sup>					0.224 (0.106)*
% Mexican American <sup>h</sup>					0.093 (0.108)
% Puerto Rican/other Latino <sup>h</sup>					0.026 (0.174)
% other race <sup>h</sup>					0.375 (0.255)

Note. SES = socioeconomic status. Coefficients are derived from equation 2 in “Statistical Methods” section.

<sup>a</sup>n = 58 700 item responses (level 1), 2925 persons (level 2), 180 census tracts (level 3).

<sup>b</sup>Linear age is defined as the mean age of each subject averaged over 3 waves of data collection.

<sup>c</sup>Quadratic age is defined as the square of linear age.

<sup>d</sup>Interaction between first-generation immigrant and Puerto Rican/other Latino.

<sup>e</sup>Interaction between second-generation immigrant and Puerto Rican/other Latino.

<sup>f</sup>Interaction between verbal/reading ability and first-generation immigrant.

<sup>g</sup>Interaction between verbal/reading ability and second-generation immigrant.

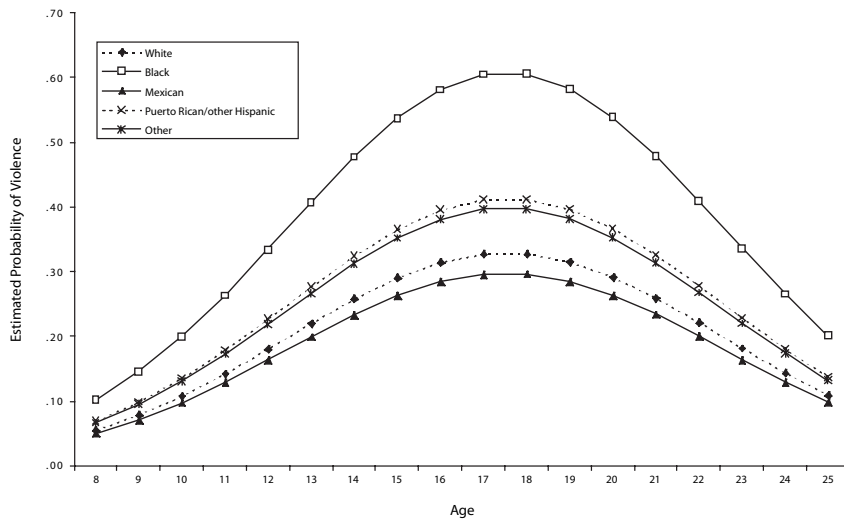
<sup>h</sup>Coefficients and standard errors have been multiplied by 100.

\*P < .05; \*\*P < .01.

Table 2 presents coefficient estimates from equation 2 for individual- and neighborhood-level predictors. Model 1 estimates racial/ethnic disparities in violence, controlling only for age

and sex, providing a baseline of comparison to subsequent models that add other explanatory variables. Exponentiating the log-odds coefficient, we see that Blacks’ odds of engag-

ing in violence are  $\exp(0.614) = 1.85$  those of Whites, on average (95% confidence interval [CI] for relative odds = 1.70, 2.01). Puerto Ricans’ odds are 1.26 those of Whites (95% CI =



**FIGURE 1—Male age-violence curves, by race/ethnicity: Project on Human Development in Chicago Neighborhoods Waves 1–3, Age Cohorts 9–18.**

1.11, 1.42), and the odds of violence for Mexican Americans are 0.90 those of Whites (95% CI=0.83, 0.98). The results also indicate that violence is 1.64 times higher among males than females (95% CI=1.55, 1.74) and that violence is related to age in a curvilinear fashion.

To further clarify the relationship between age, race/ethnicity, and crime, we used the coefficients from model 1 to produce age-crime curves of violent offending from ages 8 to 25 for males of each race and ethnic group, graphically displayed in Figure 1. The curves show that the probability of violence accelerates in early adolescence for all groups, reaching a peak between the ages of 17 and 18 and then declining precipitously thereafter. The height of the curves is determined by the frequency of the reference item (hitting someone you do not know with intent to harm them), but the shape of the curves is nonetheless identical across all violence items and racial/ethnic groups because the model assumes that the covariates are related to all types of violence in the same way. Supporting this assumption, the age-violence curve maintains approximately the same shape when it is modeled separately for each item in the violence scale and for each racial/ethnic group.

Model 2 in Table 2 adds controls for immigrant generation, revealing that the level of violence is comparatively lower for recent immigrants. First-generation immigrants' odds of violence are almost half those of third-generation immigrants (95% CI=0.48, 0.58), and second-generation immigrants' odds are approximately three quarters those of third-generation immigrants (95% CI=0.70, 0.85). Immigrant status is protective for all racial/ethnic groups except for Puerto Ricans/other Latinos, as indicated by the positive interaction coefficients. Controlling for immigrant generation reduces the logistic regression coefficient that describes the gap between Blacks and Whites by 14%, implying that one reason Whites have lower levels of violence than Blacks is that Whites are more likely to be recent immigrants. The odds ratio describing that gap drops from 1.85 to 1.70 (95% CI=1.56, 1.85). Adjusting for immigrant status also changes the direction of the gap between Whites and Mexican Americans, meaning that when the comparison is restricted to third-generation immigrants (the reference category), the risk of engaging in violence is slightly higher for Mexican Americans than for Whites.

Model 3 introduces controls for family structure, socioeconomic status, and length of

residence. Adding these controls reduces the logistic regression coefficient that describes the gap between Blacks and Whites by an additional 24%. The odds ratio describing that gap is now reduced from 1.70 to 1.49 (95% CI=1.36, 1.64). Adding these controls also reduces the contrast between Mexican Americans and Whites to nonsignificance. Contrary to a major line of sociological theory,<sup>22</sup> however, family socioeconomic status is not directly associated with violence. What matters instead are years of residence in the neighborhood and having married parents, both of which are protective. For participants with married parents, the odds of violent offending are 0.81 times those of participants with unmarried parents (95% CI=0.73, 0.89). Thus, among all of the dimensions of family structure, marital status alone is predictive of violence.

Model 4 assesses the explanatory power of constitutional differences between individuals, as operationalized by verbal/reading ability and impulsivity/hyperactivity. In our data, high verbal/reading ability is protective, but not for first- or second-generation immigrants, as indicated by the significant interaction terms. High impulsivity increases the risk of violence, but there are no significant interactions by race/ethnicity. Despite their significant associations with violence, the main finding is that verbal/reading ability and impulsivity explain a relatively small fraction of the gap between Blacks and Whites: the logistic regression coefficient describing the gap diminishes by only 8% in model 4 compared with model 3, while the corresponding odds ratio decreases from 1.49 to 1.44 (95% CI=1.32, 1.59). Also, verbal/reading ability and impulsivity have no bearing on the gap between Mexican Americans and Whites, which remains virtually unchanged. Therefore, constitutional factors are significant predictors of violence but weak explainers of racial/ethnic disparities in violence.

Model 5 introduces neighborhood racial/ethnic composition measured from the cohort sample, allowing us to disentangle the person-level (i.e., within-neighborhood) and compositional (i.e., between-neighborhood) components of the association between race/ethnicity and violence.<sup>40</sup> The logistic regression coefficient describing the gap in violence between

**TABLE 3—Neighborhood Predictors of Violence: Project on Human Development in Chicago Neighborhoods Waves 1–3, Age Cohorts 9–18<sup>a,b</sup>**

	Model 1, Coefficient (SE)	Model 2, Coefficient (SE)	Model 3, Coefficient (SE)
Intercept	-1.050 (0.043)**	-1.056 (0.044)**	-1.049 (0.043)**
% Black <sup>c</sup>	0.031 (0.095)		
% 1st-generation immigrant <sup>c</sup>	-0.524 (0.154)**	-0.563 (0.125)**	-0.532 (0.108)**
% professional/managerial occupation <sup>c</sup>	-0.652 (0.220)**	-0.659 (0.196)**	-0.511 (0.178)**
Concentrated disadvantage	0.027 (0.028)		
Residential stability	-0.009 (0.019)		
Moral/legal cynicism		0.045 (0.019)*	0.040 (0.019)*
Collective efficacy		0.002 (0.022)	
Friend/kin ties		-0.018 (0.022)	
Organizations/youth services		0.006 (0.021)	
Natural log violent crime rate, 1993			0.085 (0.030)**

Note. Coefficients are derived from equation 2 in “Statistical Methods” section.

<sup>a</sup>All models control for individual and family characteristics included in Table 2, model 5.

<sup>b</sup>n = 58 700 item responses (level 1), 2925 persons (level 2), 180 census tracts (level 3).

<sup>c</sup>Coefficients and standard errors have been multiplied by 100.

\*P < .05; \*\*P < .01.

Blacks and Whites is reduced by an additional 33%. The odds ratio describing the gap decreases from 1.45 to 1.28 (95% CI=1.08, 1.52), a 38% reduction. Note that the maximum potential reduction, or 100%, would be from 1.45 to 1.00.

### Neighborhood Mechanisms

The finding that neighborhoods explain a large percentage of individual-level disparities raises a new question: What are the mechanisms that connect neighborhood characteristics to violence? To answer this question, we expanded our contextual analysis to include neighborhood factors correlated with race and ethnic composition. In Table 3, we do not present the individual-level coefficients ( $\beta$  in equation 2), which are essentially identical to those shown in Table 2, and focus instead on the neighborhood-level coefficients ( $\gamma$  in equation 2).

We begin with a neighborhood-level model that includes percentage Black, the significant racial composition predictor in Table 2, and other neighborhood factors drawn from the Census and the PHDCN Community Survey. Model 1 in Table 3 shows that the direct effect of percentage Black is rendered non-significant after the introduction of immigrant concentration, percentage professional/

managerial, concentrated disadvantage, and residential stability. For individuals living in neighborhoods that are 40% immigrant, the relative odds of violence are about four fifths lower (odds ratio [OR]=0.81; 95% CI=0.72, 0.91) than for otherwise similar individuals living in neighborhoods with no immigrants—a contrast that corresponds roughly to the 10th vs the 90th percentile. Although concentrated disadvantage is not a significant predictor, the odds of violence are about three fourths lower (OR=0.77; 95% CI=0.65, 0.92) in neighborhoods with a 40% higher concentration of workers in professional occupations.

In model 2, we retain the 2 significant predictors from model 1 and add measures of neighborhood social process from the community survey. Immigrant concentration and percentage professional/managerial remain significant, and a third factor, moral/legal cynicism, is significantly linked with higher odds of violence (OR=1.05; 95% CI=1.01, 1.09). None of the other neighborhood processes are significantly associated with levels of violence.

### Robustness

It is possible that the neighborhood effects we observe in model 2 are spurious if high

levels of prior neighborhood violence induced moral/legal cynicism among residents or led to demographic changes that reduced the concentration of managerial/professional workers and possibly even immigrants.<sup>41</sup> To assess this possibility, we introduce a control in model 3 for the logged rate of violent crime (per 100 000) in the neighborhood as of 1993. Although the odds of engaging in violent behavior are significantly higher in neighborhoods with higher prior rates of violence (OR=1.09; 95% CI=1.03, 1.16), neighborhood cynicism maintains its significant independent association with cohort violence, as do immigrant concentration and percentage professional/managerial. All of the contextual effects are therefore robust to the conservative test of adding the association between the violent behavior of the subject and prior neighborhood violence. In model 3, the individual-level coefficient for Black respondents drops to 0.22 (OR=1.25; 95% CI=1.11, 1.40), a 64% reduction from the original coefficient of 0.614 in model 1 of Table 2.

To further probe the sensitivity of results to selection bias, we reestimated models with controls for individual-level measures of paternal and maternal history of criminality, substance abuse, and history of depression. Both maternal depression and father's criminality significantly predicted a subject's violence when added to model 3 (*t* ratios=3.66 and 3.86, respectively). Although potentially caused by neighborhood characteristics, neither maternal depression nor father's criminality materially altered the magnitude, direction, or statistical significance of the neighborhood-level findings in Table 3.

### Change Over Time

As a final step in our analysis, we examined person- and neighborhood-level predictors of subject-specific change in violence over time, as specified in equation 3. The question is whether Blacks, Whites, and Latinos differ in their developmental profiles of violence with respect to age. The answer from our data is that there are no significant unadjusted differences between Blacks and Whites in changes over time in violence. Moreover, once the full set of neighborhood covariates in Table 3 was introduced, there

were no remaining differences between Latinos and Whites. The results showed that average linear change ( $\pi_{1jk}$ ) was negative, meaning that most subjects were reducing their involvement in violent behavior (overall, a 3% reduction with each year). This finding is consistent with the secular decreases in violence that Chicago and other large cities experienced during the late 1990s.<sup>42</sup>

## DISCUSSION

The gap between Whites and Blacks in levels of violence has animated a prolonged and controversial debate in public health and the social sciences. Our study reveals that over 60% of this gap is explained by immigration status, marriage, length of residence, verbal/reading ability, impulsivity, and neighborhood context. If we focus on odds ratios rather than raw coefficients, 70% of the gap is explained. Of all factors, neighborhood context was the most important source of the gap reduction and constitutional differences the least important.

We acknowledge the harsh and often justified criticism that tests of intelligence have endured, but we would emphasize 2 facts from our findings. First, measured verbal/reading ability, along with impulsivity/hyperactivity, predicted violence, in keeping with a long line of prior research.<sup>25–28</sup> Second, however, neither factor accounted for much in the way of racial or ethnic *disparities* in violence. Whatever the ultimate validity of the constitutional difference argument, the main conclusion is that its efficacy as an explainer of race and violence is weak.

Our findings are consistent with the hypothesis that Blacks are segregated by neighborhood and thus differentially exposed to key risk and protective factors, an essential ingredient to understanding the Black–White disparity in violence.<sup>17</sup> The race-related neighborhood features predicting violence are percentage professional/managerial workers, moral/legal cynicism, and the concentration of immigration. We found no systematic evidence that neighborhood- or individual-level predictors of violence interacted with race/ethnicity. The relationships we observed thus appeared to be generally robust across racial/ethnic groups. We also found no significant

racial or ethnic disparities in trajectories of change in violence.

Similar to the arguments made by William Julius Wilson in *The Truly Disadvantaged*,<sup>20</sup> these results imply that generic interventions to improve neighborhood conditions may reduce the racial gap in violence. Policies such as housing vouchers to aid the poor in securing residence in middle-class neighborhoods<sup>43</sup> may achieve the most effective results in bringing down the long-standing racial disparities in violence. Policies to increase home ownership and hence stability of residence may also reduce disparities (see model 3, Table 2).

Family social conditions matter as well. Our data show that parents being married, but not family configuration per se, is a salient factor predicting both the lower probability of violence and a significant reduction in the Black–White gap in violence. The tendency in past debates on Black families has been either to pathologize female-headed households as a singular risk factor or to emphasize the presence of extended kin as a protective factor. Yet neither factor predicts violence in our data. Rather, being reared in married-parent households is the distinguishing factor for children, supporting recent work on the social influence of marriage<sup>44,45</sup> and calls for renewed attention to the labor-market contexts that support stable marriages among the poor.<sup>46</sup>

Although the original gap in violence between Whites and Latinos was smaller than that between Whites and Blacks, our analysis nonetheless explained the entire gap in violence between Whites and Latino ethnic groups. The lower rate of violence among Mexican Americans compared with Whites was explained by a combination of married parents, living in a neighborhood with a high concentration of immigrants, and individual immigrant status. The contextual effect of concentrated immigration was robust, holding up even after a host of factors, including the immigrant status of the person, were taken into account.

The limitations of our study raise issues for future research. Perhaps most important is the need to replicate the results in cities other than Chicago. The mechanisms explaining the apparent benefits to those living

in areas of concentrated immigration need to be further addressed, and we look to future research to examine Black–White differences in rates of violence that remain unexplained. As with any nonexperimental research, it is also possible we left out key risk factors correlated with race or ethnicity. Still, to overturn our results any such factors would have to be correlated with neighborhood characteristics and uncorrelated with the dozen-plus individual and family background measures, an unlikely scenario. Even controlling for the criminality of parents did not diminish the effects of neighborhood characteristics. Finally, it is possible that family characteristics associated with violence, such as marital status, were themselves affected by neighborhood residence. If so, our analysis would mostly likely have underestimated the association between neighborhood conditions and violence.

We conclude that the large racial/ethnic disparities in violence found in American cities are not immutable. Indeed, they are largely social in nature and therefore amenable to change. ■

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