BEYOND A VARIABLE-CENTERED APPROACH TO PLACE: IDENTIFYING AND ASSESSING NEIGHBORHOOD TYPOLOGIES

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ABSTRACT

Neighborhood context has emerged as an important correlate of adolescent risk behavior, health, and well-being, given the link between neighborhood characteristics (particularly social disorganization and structural disadvantage) and various problem behaviors and health-related outcomes. Given youths' limited geographic mobility, neighborhoods are part of an expanding circle of contexts to which individuals are exposed during adolescence. Traditional approaches for studying neighborhood effects often focus on disadvantage, using single indicators or indices of disadvantage. However, processes of racial segregation and socioeconomic stratification have lead to the patterning of particular neighborhood "types" or "profiles", and while past research has frequently discussed specific neighborhood types (e.g., the black middle-class), quantitative studies have not fully measured these typologies. The current study uses cluster analysis to identify specific neighborhood types that are patterned by three key structural components of neighborhoods: racial composition, income distribution (class), and urbanicity (or rurality).

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EXTENDED ABSTRACT

Neighborhood context has emerged as an important correlate of adolescent health, and well-being, given the link between neighborhood characteristics (particularly social disorganization and structural disadvantage) and various problem behaviors and health-related outcomes such as delinquency, violence, depression, substance use, obesity, sexual promiscuity, infectious disease transmission, teenage child-bearing, and high school dropout (for a review, see Leventhal and Brooks-Gunn 2000). Youths have limited geographic mobility and, accordingly, neighborhoods are part of an expanding circle of contexts (including families, friends, peer networks, and schools) to which individuals are exposed during adolescence (Arnett 2000; Bronfenbrenner 1989; Giordano 1995), making neighborhoods an important context in which adolescent development unfolds. Traditional approaches for studying neighborhood effects often focus on disadvantage, using single indicators or indices of disadvantage. However, processes of racial segregation and socioeconomic stratification have lead to the development or patterning of particular neighborhood "types" or "profiles" (Upchurch, Aneshensel, Sucoff, and Levy-Storms 1999), and while past research has frequently discussed specific neighborhood types, such as the black underclass (Wilson 1987) and black middle-class (Patillo 1998), quantitative studies have often failed to measure these typologies. The current study uses cluster analysis to identify specific neighborhood types that are patterned by three key structural components of neighborhoods: racial composition, income distribution (class), and urbanicity (or rurality).

Race and Class. Neighborhoods are economically stratified and racially segregated (Aneschensel and Sucoff 1996). Race and class tend to covary, and neighborhood research often discuss these effects in tandem, not attempting to disentangle neighborhood racial composition and SES (Sucoff and Upchurch 1998:573). However, it is important to avoid conflating race and SES by combining the two measures into a single scale (see Upchurch et al. 1999), as Massey and colleagues (2009) note that residential segregation is now becoming more influenced by the interaction between race and class. Thus, it is useful to categorize neighborhood types in a way that embraces the covariation between race and class, rather than attempting to estimate separate race/SES effects. It is also important to avoid assuming that blacks and whites respond similarly to segregation and poverty. Poor blacks and poor whites differ in the types of neighborhood they live in, with poor blacks living in substantially poorer neighborhoods than poor white (see Wilson 1987). It remains unclear whether one factor is more important than the other and to what extent these factors interact to shape various neighborhood contexts.

Urbanicity. A majority of research on neighborhood effects has focused on Chicago neighborhoods (e.g., Morenoff and Sampson 1997; Sampson, Morenoff, and Gannon-Rowley 2002), with specific attention to the geographic isolation and concentrated disadvantage among poor blacks (Sampson et al. 2002; Wilson 1987). On average, however, rural populations contain higher unemployment and lower population densities with higher proportions of poor residents than their urban counterparts (Hart, Larson, and Lishner 2005; Lichter and Johnson 2007). Additionally, many persistently poor rural communities have high concentrations of racial and ethnic minorities (e.g., the southern "Black Belt", Hispanics residing in the lower Rio Grande Valley, and Native Americans living on reservations in the Great Plains) (Lichter and Johnson

2007). Jensen, McLaughlin, and Slack (2003:130) argue that in rural areas "the poor in poor communities are doubly disadvantage," suffering not only from low income, but also experiencing a lack of institutional support and resources as well as physical, cultural, and economic isolation from mainstream America. Although a higher proportion of poverty occurs in rural rather than urban areas, most analyses of poverty have focused on urban areas and the impoverished minority groups concentrated there. Part of this is due to debates over the appropriateness of census tracts as proxies for neighborhoods in rural areas; however, county-based studies have been successful at illustrating contextual effects in rural places (e.g., Barnett and Mencken 2002; Osgood and Chambers 2000). In urban areas, race and class tend to be more highly correlated, further adding to the difficulty in distinguishing between race-based and class-based effects.

Measuring Neighborhood Characteristics. The tendency in neighborhood research of using a single summated or mean-rating scale comprised of structural characteristics (meant to represent an index of neighborhood disadvantage) is problematic because it treats the characteristics that comprise the scale (e.g., % poverty, unemployment rate, female-headed HH) as equally important and linearly distributed, which "fails to appreciate the differential role variables play in distinguishing neighborhoods" (Gross and McDermott 2008:162). It is additionally problematic to combine race (% black) and class (% poverty) measures into a single index (disadvantage), thus conflating race and class effects. Although these two characteristics are highly correlated, they are not equivalent. Hoffman (2002) notes that studies often observe a curvilinear relationship between percent black and community problems (see also Messner and South 1992). Collapsing % black into a single disadvantage scale does not allow one to take into account this curvilinear relationship. Additionally, including only % black neglects the effect of Hispanics or other racial/ethnic minorities in the neighborhood.

Some researchers have argued against using single dimensions to capture neighborhood effects. Gorman-Smith and colleagues' (2000:189) analysis of high-risk urban youth in Chicago revealed three distinct types of neighborhoods, providing evidence against (a) the reliance on a single dimension (e.g., percent of families living in poverty) to compare communities and (b) the related assumption that all poor urban communities are the same. Morenoff and Tienda (1997) also note problems with conventional approaches to categorizing neighborhoods that rely on single indicators such as the poverty rate. Categorizing based on cutoff points (>40% = ghetto poor; 20%-40% poverty = poor; <20% poverty = nonpoor) focuses primarily on neighborhoods in the extreme end of the poverty rate distribution (highest poverty) and provides little to no information to distinguish between less extreme neighborhoods (e.g., almost poor vs. nonpoor). Cutoffs such as >40% poverty = ghetto poor are arbitrary, and may only be applicable in very urban areas. Lower poverty rates in non-urban areas may represent similar degrees of disadvantage.

An alternative approach to traditional single-item or single-index measures of neighborhood characteristics is to use cluster analysis (Aldenderfer and Blashfield 1984), which identifies patterns among variables in the data, instead of relying on linear relationships between two variables. This is better suited to capture the complex interactions among covarying measures (Dupere and Perkins 2007), and neighborhood clusters are easier to interpret than the 3- and 4-way interactions necessary in linear models to capture multidimensional characteristics. Also,

interaction terms can imply combinations of variables that may not exist or are infrequently observed in the data (e.g., upper class black neighborhoods), thus further undermining their usefulness. Cluster analysis allows only the neighborhood types actually represented in the data to emerge.

THE CURRENT STUDY

To address the methodological concerns associated with these traditional "variable-centered" approaches to measuring neighborhood effects, the current study utilizes a cluster analysis approach to analyze the association between neighborhood characteristics and youth violence in a nationally-representative sample of adolescents. Cluster analysis is useful because it allows us to disentangle race and class effects, to include non-urban areas (i.e., rural and suburban neighborhoods), and to better contextualize the types of neighborhoods in which adolescent development and behavior occurs. We categorize neighborhoods using an array of structural characteristics, and then compare youths' experiences with violence across neighborhood types.

DATA AND METHODS

Data were drawn from the National Longitudinal Study of Adolescent Health (Add Health), a nationally representative sample of adolescents in schools, grades 7 through 12, in 1995. The primary sampling frame included 80 representative high schools, and their "feeder" middle schools, stratified by region of country, degree of urbanicity, school type (i.e., public and private), racial and ethnic composition, and school size. Each participating school provided a roster of all enrolled students, from which a core sample of about 20,000 adolescents was randomly selected for in-home interviews. Of those contacted at wave I, approximately 79% agreed to participate. For 86% of the participants, a parent also completed an interview at wave I. One year later (1996), 88% of the core sample subsequently completed the wave II interview. In 2001, all wave I participants who could be located were re-interviewed for a third wave, with a response rate of about 80%. These preliminary analyses use data from the wave I in-home interview (n=20,475).

Measures. We explore three measures of adolescent violence across neighborhood types (Sharkey and Sampson 2010): violent perpetration and violent exposure. *Violent perpetration* is measured from responses to five survey items asking respondents if they had committed the following acts during the past year: got into a fight; pulled a knife or gun on someone; used or threatened to use a weapon to get something from someone; got into a group fight; and shot or stabbed someone. *Exposure to violence* is measured from a single survey item asking respondents how often, during the past year, they saw someone shot or stabbed. *Violent victimization* is measured via responses to four survey items regarding the past year frequency that the respondent was jumped, had a knife pulled on him/her, was cut or stabbed, and was shot. For the current analysis, original response options for these measures (never, once, more than once) were dichotomized into never (=0) vs. ever (=1). The independent variables of interest include the neighborhood characteristics discussed below (all derived from the Add Health Wave I Contextual Database).

Analytic Strategy. To better capture the types of neighborhoods in which adolescent development occurs, we use a two-stage procedure to identify neighborhood typologies (see Gershoff, Pedersen, and Aber 2009; Gorman-Smith et al. 2000; Li and Chuang 2008). First, we identify

key dimensions of neighborhood composition. Following Duncan and Aber (1997), we executed a principal components analysis on 24 Census items from the Add Health Contextual Database which captured the educational, employment, and economic characteristics of the neighborhood (e.g., % persons with less than a high school education; % families with income less than $15,000; % persons employed in managerial occupations, etc.), the distribution of family structures across neighborhoods (e.g., % female-headed households with children; % divorced, etc.), ethnic diversity and immigrant status (% Hispanic, % foreign born), population density, and housing stability (% vacant housing structures; % persons is same house as 5 years prior, etc.). We do not include % white and % black in this stage of the analysis, in order to avoid conflating race and class. Duncan and Aber (1997) argue that a factor analytic approach to studying neighborhoods is useful because multi-item indices of underlying neighborhood dimensions are more reliable than single item measures (e.g., poverty rate), but more importantly, this approach is useful because it allows researchers to specify multiple neighborhood dimensions, rather than being forced to choose which single item best captures neighborhood context. Using principal components analysis with varimax rotation, and assessing the resulting scree test and factor loadings, we were able to derive two multi-item neighborhood components: high SES and low SES.[1] The individual items loading on each of the two components were combined to form two mean scales. Percent college-educated persons, % persons in professional occupations, and % families earning more than $50,000 were averaged to form the high SES scale. Percent female-headed households, % families earning less than $15,000, % families receiving public assistance, % persons with less than a high school education, and the unemployment rate were averaged to form the low SES scale.

In the second stage of classifying neighborhoods we utilized the k-means method of clustering in the SAS® PROC FASTCLUS procedure (designed to handle large sample sizes) which generates preliminary cluster that are then subject to the centroid hierarchical method of cluster analysis in the SAS® PROC CLUSTER procedure (Aneshensel and Sucoff 1996). This procedure allows us to explore the extent to which neighborhoods come together across multiple dimensions to form meaningful, unique, types. Nelson and colleagues (2006) and Sucoff and Upchurch (1998) have demonstrated the applicability of cluster analysis for deriving neighborhood typologies in national samples. We classify neighborhoods using two scales and six single items across the following dimensions: *socioeconomic status* (the high and low SES scales, median household income [in order to differentiate between neighborhoods that do not fall into one of the extreme ends of the income distribution (see Morenoff and Tienda 1997)]); *racial composition* (% non-Hispanic black residents); *ethnic diversity/immigrant status* (% Hispanic, % residents not Hispanic, black, or white, % foreign born); and *population density.*

We extracted 12 clusters using the cubic clustering criterion and the pseudo F-statistic. This number is slightly higher than the number of clusters extracted in previous research (e.g., Aneshensel and Sucoff 1996; Gorman-Smith et al. 2000; Sucoff and Upchurch 1998); however, our study differs from other studies in that we use a nationally representative sample that is not limited to metropolitan areas. Thus, not only are the neighborhoods in Add Health characterized

[1] Percent Hispanic, foreign-born, and non-Hispanic other race/ethnicity all loaded on a single component, similar to Duncan and Aber's (1997) ethnic diversity measure; however, we did not combine these three measures in the cluster analysis in order to distinguish native-born Hispanic neighborhoods from predominately immigrant neighborhoods.

by the predominant racial/ethnic group, but also in terms of their rurality and urbanicity (we also used interviewer assessment of whether the respondents' residence was in an urban, suburban, or rural area to assist with our labeling). This approach allows us to explore the effects of not just racially-proscribed risks, but also risks associated with individual socioeconomic status and geographic context. We labeled the neighborhood clusters based on our interpretation of neighborhood types and our expectations about particular patterns. The neighborhood types, along with descriptive characteristics about each neighborhood, are presented in Table 1.

FINDINGS

As Table 1 illustrates, the cluster analysis allowed us to extract lower class, working class, and middle/upper class white urban, suburban, and rural neighborhoods, lower class, working class, and middle class black urban and rural neighborhoods, lower and working class Hispanic neighborhoods that were predominately foreign born, and those with more native born residents. We also extracted two mixed-race neighborhoods—frequency distributions of the survey respondents categorized in these neighborhoods revealed that they had a high proportion of Asian residents. Table 2 displays the distribution of Add Health survey respondents across neighborhood types—we see that white respondents disproportionately reside in lower white rural and middle/upper class white suburban/urban neighborhoods. Black respondents are distributed across more neighborhood types, but the largest percent (just over one quarter) reside in lower class black urban neighborhoods. Hispanics live in working class mixed race neighborhoods, middle class white suburbs, and lower class Hispanic immigrant neighborhoods. Asian respondents are most concentrated in the working class mixed race/Asian neighborhoods, but one quarter also reside in middle class white suburbs. Respondents indicating American Indian or some other race/ethnicity show a similar residential pattern as Asian, although a larger proportion reside in lower class white rural neighborhoods.

To advance neighborhood effects research on youth violence, we assess the violent experiences of respondents within each neighborhood type (see Table 3), using Tukey's post hoc tests to compare proportions across all twelve neighborhood types. As Table 3 illustrates, 61% of respondents in lower class mixed race rural neighborhoods reported perpetrating violent behaviors.[2] Middle and lower class black urban neighborhoods have the next highest proportion of respondents engaging in violence, and this proportion differs from that in almost all other non-black neighborhoods. Exposure to violence and violent victimization is similarly high, although these latter two types of violent experiences are highest in working class black urban neighborhoods. Working class white rural, middle/upper class white suburban/urban, and working class mixed race/Asian neighborhoods have the lowest proportions of respondents engaging in, being exposed to, and experiencing violence. The high proportion of youth in middle class black neighborhoods experiencing violence may not be all that surprising, given the geographic proximity of these neighborhoods to lower class black neighborhoods (see, Patillo 1998; Sharkey 2008).

While descriptive in nature, the results in Table 3 provide insight into the varied neighborhood contexts in which adolescents of all races live and develop. We would argue that the cluster analysis approach is more informative about neighborhood experiences than are traditional approaches to capturing "neighborhood effects" (e.g., poverty rate, disadvantage indices, etc.).

[2] This finding should be interpreted with caution due to the small sample size of this cluster.

As Dupre and Perkins (2007) note, examining these race/class/immigrant/urbanicity domains using traditional measures would necessitate multiple interactions terms, resulting in model that is computationally complex and cumbersome to interpret. Table 4 illustrates such a traditional approach, using a mean-summated scale of neighborhood poverty (low SES) and neighborhood economic capital (high SES), racial, ethnic, and immigrant composition, and population density. Table 5 illustrates how the same information can be presented concisely and informatively using the cluster analysis approach. Here we see that youth in all neighborhood types, except working class Asian suburbs, have a higher odds of perpetrating violence than youth in middle class suburban/urban neighborhoods. Although Table 5 illustrates comparisons to the reference group of middle/upper class white suburban/urban, the reference group can be rotated to assess all other group comparisons.

DISCUSSION

Place is socially constructed and maintained by individuals, families, networks, organizations, institutions, etc., proximal or distal, operating individually or in concert across a range of geographic scales (Cummins, Curtis, Diez-Roux, and Macintyre 2007:1828). "Neighborhood" may have meanings and effects not bound by geographic proximities nor captured in single structural measures. Future research would benefit from moving away from urban-centric ideals about neighborhoods to a broader understanding of "place." It is important to distinguish "ways of thinking about" from "ways of measuring" neighborhoods (Burton, Price-Spratlen, and Spencer 1997:132). Variable-centered approaches that include only a few measures or analyses simply controlling for contextual characteristics may lead researchers to overlook more nuanced distinctions in neighborhoods as well as the intervening variables that may mediate the relationship between place and various outcomes (Cummins et al. 2007). Urban sociology and social disorganization research have provided an immense amount of information about how structure may affect a variety of individual- and community-level outcomes. However, this research has neglected rural, poor non-black, and majority-immigrant neighborhoods, and the applicability of "neighborhood effects" to these places remains in question. Rather than allowing ourselves to be limited by available data, we should realize that "place" means more than a fixed geographic point.

The current study applies a cluster analysis approach to studying the association between neighborhood characteristics and youths' experiences with violence. Although preliminary, our findings highlight variation in the types of neighborhood contexts in which adolescents develop, and differences across these contexts in levels of risk. Our analysis can be extended by (1) examining differences in (a) additional risk behaviors and also (b) in protective factors (e.g., informal social control, presence of positive role models, etc.) across neighborhood types, (2) furthering the ecological perspective by investigating interactions between individual- and family-level characteristics and neighborhood type and (3) utilizing Add Health's longitudinal data to explore longer term effects of neighborhood type on youth health and well-being. Exploring multi-dimensional and multi-level conceptual models of place that take into consideration the interaction between individuals and the various contexts within which they find themselves, and that vary across their life courses, can only add to our understanding of how and why neighborhoods matter.

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Table 1. Descriptive Characteristics of Neighborhood Clusters, Add Health Wave I, Medians and Ranges (in parentheses)

			Socioeconomic Status			*Racial Composition*			*Ethnic Diversity*		*Density*
(observed range, full sample)	# Resp	# Tracts	Low SES (0.00-0.87)	High SES (0.00-0.81)	Median Income (1000s) (4.99-125.05)	% NH White* (0.00-100.00)	% NH Black (0.00-100.00)	% Other (0.00-78.38)	% Hispanic (0.00-96.27)	% Foreign Born (0.00-86.90)	Population Density (0.00-69.17)
Cluster											
1: MC/UC white suburban/urban	5948	792	0.08	0.33	39.79	92.17	1.45	1.61	1.91	3.77	0.99
			0.00-0.23	0.14-0.81	22.01-125.05	27.54-100.00	0.00-57.25	0.00-34.97	0.00-38.72	0.00-42.07	0.01-37.66
2: WC white rural	5645	369	0.13	0.18	26.34	95.13	0.75	0.59	0.75	1.44	0.05
			0.05-0.45	0.05-0.42	9.90-39.45	46.14-100.00	0.00-51.18	0.00-14.87	0.00-34.95	0.00-20.50	0.00-1.33
3: LC black urban	1450	303	0.36	0.12	14.20	8.71	87.43	0.49	0.88	1.44	1.63
			0.17-0.78	0.00-0.31	4.99-31.82	0.00-64.37	21.21-100.00	0.00-20.55	0.00-52.14	0.00-57.91	0.01-69.17
4: LC/WC Hispanic urban	724	166	0.27	0.11	20.95	22.66	3.86	5.07	60.30	28.57	2.80
			0.11-56.23	0.03-36.10	8.49-49.76	0.00-66.12	0.00-38.34	0.00-25.70	22.40-96.27	7.78-62.87	0.04-67.89
5: LC white urban	2141	412	0.20	0.15	21.94	77.46	5.62	2.19	2.89	3.79	2.28
			0.08-87.45	0.00-58.42	6.84-36.74	5.75-99.74	0.00-54.45	0.00-58.76	0.00-54.44	0.00-55.44	0.14-30.72
6: LC black rural	825	48	0.29	0.13	17.37	35.18	64.38	0.37	0.19	0.28	0.02
			0.21-0.50	0.03-0.22	7.62-23.01	7.89-67.11	31.71-77.50	0.00-4.61	0.00-12.37	0.00-11.73	0.00-0.17
7: WC black urban	532	166	0.22	0.21	29.21	2.34	94.95	0.41	0.77	1.62	4.31
			0.11-0.45	0.04-0.43	11.66-43.07	0.00-36.58	59.40-100.00	0.00-11.53	0.00-29.51	0.00-65.24	0.28-61.45
8: WC mixed race (Asian) suburban	289	12	0.09	0.30	40.74	27.97	0.28	65.34	12.55	14.23	0.08
			0.07-28.69	0.09-35.66	17.28-47.34	0.10-39.57	0.00-14.35	46.99-78.14	3.72-15.22	6.93-65.27	0.02-10.02
9: WC/MC Hispanic/Asian mixed race urban	1754	73	0.13	0.30	41.18	30.93	4.38	28.53	28.74	35.56	3.51
			0.05-0.24	0.15-0.50	28.96-62.56	8.50-83.47	0.00-24.08	0.94-50.01	5.80-70.64	20.33-55.30	0.49-23.32
10: LC Hispanic immigrant urban	613	58	0.27	0.15	17.14	9.55	0.41	0.65	89.25	77.74	4.88
			0.16-0.42	0.05-0.33	9.12-32.92	3.06-39.58	0.00-26.00	0.00-13.13	46.53-96.24	45.67-86.90	1.83-13.69
11: MC black suburban/urban	487	46	0.09	0.40	55.90	22.61	69.48	3.69	5.60	6.96	1.09
			0.06-0.17	0.19-0.70	22.99-56.52	2.26-73.46	22.39-89.82	0.00-25.13	0.00-18.05	0.77-53.28	0.31-21.63
12: LC mixed race rural	139	2	0.36	0.10	11.47	41.24	3.07	37.24	18.45	6.81	0.03
			0.12-0.36	0.10-0.15	11.47-29.96	11.66-41.24	0.00-3.07	37.24-78.38	9.96-18.45	6.81-21.17	0.01-0.03

LC = lower class; WC = working class; MC = middle class; UC = upper class

*% NH White was not used in the cluster analysis; shown for descriptive purposes only

Among survey respondents in Cluster 8, 67.5% are Asian; among those in Cluster 9, 74.5% are Hispanic or Asian; among those in Cluster 12, 83.4% are Hispanic, American Indian, or some other race

Table 2. Distribution of Respondents Across Neighborhood Type, by Race, Add Health Wave I, Percentages

	White	Black	Hispanic	Asian	American Indian/Other
Cluster					
1: MC/UC white suburban/urban	40.24	10.76	19.69	25.02	29.74
2: WC white rural	42.90	15.24	6.93	4.24	14.21
3: LC black urban	0.70	26.77	3.40	1.51	5.53
4: LC/WC Hispanic urban	0.69	1.41	15.04	3.31	2.89
5: LC white urban	10.36	9.32	12.21	9.06	12.63
6: LC black rural	2.00	13.18	0.20	0.00	1.58
7: WC black urban	0.10	10.60	0.71	0.07	3.42
8: WC other/mixed race (Asian) suburban	0.45	0.11	0.91	14.02	2.11
9: WC/MC Hispanic/Asian mixed race urban	2.05	3.80	20.89	41.34	11.84
10: LC Hispanic immigrant urban	0.07	0.13	16.72	0.65	0.79
11: MC black suburban/urban	0.26	8.64	1.43	0.72	2.11
12: LC mixed race rural	0.18	0.04	1.86	0.07	13.16
	100.00%	100.00%	100.00%	100.00%	100.00%

LC = lower class; WC = working class; MC = middle class; UC = upper class

Table 3. Violent Perpetration, Exposure to Violence, and Violent Victimization by Neighborhood Clusters, Add Health Wave I, Percentages

	Violent Perpetration	Significantly different from Clusters:	Exposure to Violence	Significantly different from Clusters:	Violent Victimization	Significantly different from Clusters:
Cluster						
1: MC/UC white suburban/urban	34.73	3, 5, 6, 7, 9, 11, 12	8.53	3, 4, 5, 6, 7, 9, 10, 11, 12	16.90	3, 4, 5, 6, 7, 8, 9, 11, 12
2: WC white rural	36.88	3, 5, 6, 7, 9, 11, 12	7.95	3, 4, 5, 6, 7, 9, 10, 11, 12	17.93	3, 4, 5, 7, 8, 9, 11, 12
3: LC black urban	49.09	1, 2, 4, 8, 9, 10	24.14	1, 2, 5, 6, 8, 9, 10	27.81	1, 2, 8
4: LC/WC Hispanic urban	39.89	3, 11, 12	21.29	1, 2, 6, 8	27.48	1, 2, 8
5: LC white urban	46.15	1, 2, 8, 10, 12	17.11	1, 2, 3, 7, 8	26.40	1, 2, 8
6: LC black rural	46.58	1, 2, 8, 10	14.44	1, 2, 3, 4, 7, 8, 9	22.62	1, 8, 12
7: WC black urban	47.82	1, 2, 8, 10	25.48	1, 2, 5, 6, 8, 9, 10	28.52	1, 2, 8
8: WC other/mixed race (Asian) suburban	31.82	3, 5, 6, 7, 11, 12	4.20	3, 4, 5, 6, 7, 9, 10, 11, 12	8.74	all
9: WC/MC Hispanic/Asian mixed race urban	41.89	1, 2, 3, 10, 12	19.38	1, 2, 3, 6, 7, 8	26.84	1, 2, 8
10: LC Hispanic immigrant urban	32.67	3, 5, 6, 7, 9, 11, 12	17.11	1, 2, 3, 7, 8	22.43	8, 12
11: MC black suburban/urban	49.59	1, 2, 4, 8, 10	19.18	1, 2, 8	27.42	1, 2, 8
12: LC mixed race rural	60.58	1, 2, 4, 5, 8, 9, 10	23.36	1, 2, 8	37.96	1, 2, 6, 8, 10

LC = lower class; WC = working class; MC = middle class; UC = upper class

Table 4. Logistic Regression of the Association Between Neighborhood Characteristics and Adolescent Violent Perpetration, Add Health (W1)[a]

	Model 1	Model 2	Model 3
	β	β	β
Intercept	-0.484***	-0.413***	-0.374**
Neighborhood Socioeconomic Characteristics			
Neighborhood poverty	0.021***	0.008	0.004
Neighborhood capital	-0.006*	-0.008**	-0.103***
Neighborhood Racial/Ethnic Composition			
Percent non-Hispanic black		0.560**	0.570
Percent non-Hispanic other race		0.828†	-0.000
Percent Hispanic		0.308	-2.677*
Percent foreign born		-0.388	-0.131
Neighborhood Population Density			
Population density		-0.002	0.140†
Interactions			
2-way Interactions			
Neighborhood poverty X % black			-0.017
Neighborhood poverty X % other			0.048
Neighborhood poverty X % Hispanic			0.091
Neighborhood poverty X % foreign born			0.025
Neighborhood poverty X population density			0.003
Neighborhood capital X % black			0.022
Neighborhood capital X % other			0.035
Neighborhood capital X % Hispanic			0.096*
Neighborhood capital X % foreign born			-0.027
Neighborhood capital X population density			-0.001
% Foreign born X % black			-0.394
% Foreign born X % other			-1.811
% Foreign born X % Hispanic			1.448
% Foreign born X population density			-0.245**
Population density X % black			0.095
Population density X % other			0.103
Population density X % Hispanic			-0.045
3-way Interactions			
Neighborhood poverty X % black X pop density			-0.007†
Neighborhood poverty X % other X pop density			-0.035**
Neighborhood poverty X % Hispanic X pop density			-0.003
Neighborhood capital X % black X pop density			-0.005
Neighborhood capital X % other X pop density			0.013
Neighborhood capital X % Hispanic X pop density			-0.004

Notes:
† $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$
[a]Models estimated using SAS® SURVEYLOGISTIC procedure to adjust for complex survey design

Table 5. Logistic Regression of the Association Between Neighborhood Type and Adolescent Violent Perpetration, Add Health (W1)[a]

	Model 1
	β
Intercept	-0.633***
Neighborhood Type	
Middle/upper class white suburban/urban	—
Working class white rural	0.133†
Lower class black urban	0.652***
Lower/working class Hispanic urban	0.204†
Lower class white urban	0.498***
Lower class black rural	0.553***
Working class black urban	0.594**
Working class mixed race/Asian suburban	0.802
Working/middle class Hispanic/Asian urban	0.231**
Lower class Hispanic immigrant urban	0.390**
Middle class black suburban/urban	0.507*
Lower class mixed race rural	1.163***

Notes:
† $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$
[a]Models estimated using SAS® SURVEYLOGISTIC procedure to adjust for complex survey design