Neighborhood structural characteristics and mental disorder: Faris and Dunham revisited

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Abstract

We examined the relationship between neighborhood structural characteristics and mental disorder using data from the National Institute of Mental Health’s Epidemiological Catchment (ECA) surveys (n = 11,686). After controlling for individual-level characteristics, we found that neighborhood disadvantage was associated with higher rates of major depression and substance abuse disorder, and that neighborhood residential mobility was associated with higher rates of schizophrenia, major depression, and substance abuse disorder. Implications for future research on the social ecology of mental disorder are discussed. © 2002 Elsevier Science Ltd. All rights reserved.

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Introduction

More than 60 years ago, Chicago School researchers Faris and Dunham (1939) examined the pre-admission neighborhood locations of over 30,000 psychiatric patients treated in Chicago’s public and private psychiatric hospitals. Faris and Dunham (p. 35) found high rates of schizophrenia and substance abuse disorder “in the deteriorated regions in and surrounding the center of the city, no matter what race or nationality inhabited that region,” but found no discernable pattern across neighborhoods in the distribution of affective disorders (including depression, mania, and bipolar disorder). Faris and Dunham argued that the lack of social integration in socially disorganized communities—in addition to individual-level characteristics and pathologies—contributed to the “confused, frustrated, and chaotic” behaviors that characterized mental disorders. Residents of disorganized communities, they argued, found it difficult to develop and maintain positive affiliations with family members, neighbors, and local institutions, thus increasing their sense of social isolation—a variable Faris and Dunham argued was important to the onset and course of mental disorder. In addition, Faris and Dunham suggested that residents of disorganized communities were more likely to come into contact with illicit drug suppliers and drug users, thereby increasing their opportunities to develop substance abuse problems that led to disorder.

Faris and Dunham’s methodology was limited, however, because they only had access to aggregate level data. Therefore, they could not control for individual-level characteristics when estimating the effects of neighborhood conditions. Nonetheless, Faris and Dunham’s pioneering analysis stimulated considerable sociological interest in the relationship between social class and mental disorder (Hollingshead & Redlich, 1958; Srole, Langer, Michael, Opler, & Rennie., 1961; Dohrenwend & Dohrenwend, 1969) and grew into what today is the dominant analytic model in the sociology of mental disorder: the social stress model. The social stress model posits that stressful life events and chronic life difficulties cause psychological stress and that psychological stress contributes to mental
health problems, particularly among individuals who do not have access to adequate social supports (Pearlin, 1989; Turner, Wheaton, & Lloyd, 1995). Social stress research reveals consistently that mental health problems covary with measures of social status, including socioeconomic status, marital status, gender, and race/ethnicity (for reviews, see Dohrenwend, 1990, 2000; Turner & Lloyd, 1999).

Given the origins of the social stress model in the work of Faris and Dunham, it is surprising that social stress researchers have not paid more attention to the effects of neighborhood characteristics on the social distribution of mental disorder. Instead, social stress researchers have tended to treat the socioeconomic status of individuals as a proxy for the neighborhood contexts in which they live (Dohrenwend, 1990, 2000). However, although individual SES and neighborhood SES are correlated, research on residential attainment suggests that the social conditions of an individual’s neighborhood cannot be determined solely from his or her socioeconomic status (South & Crowder, 1997; Logan, Alba, McNulty, & Fisher, 1996; Silver, 2000a, b).

Moreover, a large number of studies find that, net of the effect of individual SES, persons who live in socioeconomically disadvantaged neighborhoods are significantly more likely to experience negative outcomes, such as bearing children out of wedlock, achieving lower levels of education and economic success, engaging in criminal or delinquent behavior, and becoming the victims of crime or violence (Silver, forthcoming; South & Crowder, 1999; South & Baumer, 2000; Sucoff & Upchurch, 1998; Corcoran, Gordon, Laren, & Solon, 1992; Duncan, 1994; Elliot et al., 1996; Sampson, Raudenbush, & Earls, 1997; Lauritsen, 2000; Miethe & McDowall, 1993). These studies underscore the importance of distinguishing between the effects of individual and neighborhood SES on behavioral outcomes and life experiences.

Understanding the effects of neighborhood conditions on the psychological well-being of individuals is perhaps more relevant today than it was earlier in this century when Faris and Dunham did their work. Prior to the 1960’s individuals with mental health problems had access to, and were likely to be treated in “total institutions” that removed them from communities. Since that time, however, deinstitutionalization policies have reduced significantly the number of persons who could be admitted long-term to state and county psychiatric hospitals in the US (US Surgeon General, 2000). As a result, individuals with mental health problems currently reside in communities where psychiatric care is provided—as needed (and when available) - by acute care, community-based mental health facilities (Silver, 2000a, 2001). Despite this dramatic change in the social ecology of mental health treatment, the vast majority of studies of mental disorder conducted since the 1960’s do not include measures of the neighborhood context (but, see Ross, 2000; Ross, Reynolds, & Geis, 2000; Goldsmith, Holzer, & Manderscheid, 1998).

In this paper, we examine individual- and community-level risk factors for schizophrenia, major depression, and substance abuse disorder using data from the Epidemiological Catchment Area (ECA) project, a large-scale, general population survey conducted by the National Institute of Mental Health in five cities between 1981 and 1983. We augmented respondent records from four of the five cities (New Haven, CT, Baltimore, MD, Durham, NC, and Los Angeles, CA, see below) with data on the census tracts where respondents lived at the time they were interviewed. The augmented ECA data set enabled us to analyze the degree to which residents’ mental health depends on the conditions of life in their neighborhoods, net of the effects of their individual characteristics. Our purpose in conducting this analysis was to update and extend Faris and Dunham’s (1939) work by examining whether neighborhood structural characteristics made an independent contribution to the prevalence of mental disorders among individual respondents, net of the effects of their individual characteristics.

Multilevel studies of adult mental disorder

We know of only three recent US studies that have combined individual- and community-level data to test the proposition that adult mental disorders vary across neighborhoods (Ross, 2000; Ross et al., 2000; Goldsmith et al., 1998). Using data from the 1995 Community, Crime, and Health survey, Ross (2000) found that residents of socioeconomically disadvantaged neighborhoods in Illinois were more likely to report symptoms indicative of depressed mood than residents of less disadvantaged neighborhoods, net of the effects of their socioeconomic and demographic characteristics. Ross measured neighborhood disadvantage by summing the prevalence of poverty and mother-only households in respondents’ census tracts. In a reanalysis of the same data, Ross et al. (2000) found that under conditions of low poverty, residents of neighborhoods with little residential turnover had lower levels of depression and anxiety than residents of more residentially mobile neighborhoods. However, under conditions of high poverty, residents of neighborhoods with little residential turnover had higher levels of depression and anxiety than residents of more residentially mobile neighborhoods. Thus, the effect of residential stability depended on the level of poverty in the neighborhood.
A study by Goldsmith et al. (1998), using ECA data, estimated the effects of individual and neighborhood characteristics on schizophrenia, affective disorder, and substance abuse disorder. These researchers found that, net of the effects of individual characteristics, median neighborhood income was significantly related to schizophrenia and substance abuse disorder. While consistent with the notion that the structural characteristics of the neighborhood influence the prevalence of mental disorder among residents, Goldsmith et al.’s analysis did not control for household income, but rather relied solely on a measure of educational attainment to reflect individual SES. Thus, we cannot be sure that the contextual effect they observed was not spuriously related to the income levels of the subjects in the study (Tienda, 1991; Jencks & Mayer, 1990). In addition, Goldsmith et al. did not report the magnitude of the neighborhood-mental disorder relationship prior to controlling for individual socio-economic and demographic characteristics. Thus, we do not know how much, if any, of the neighborhood effect was explained away due to individual-level characteristics.

Few studies outside of the US have estimated the effects of both individual and community level risk factors on adult mental disorders. In a recent study of the incidence of schizophrenia in the city of Maastricht, Van Os, Driessen, Gunther, and Delespaul (2000), found that the proportion of single and divorced people in a neighborhood was significantly related to the incidence of schizophrenia, controlling for a wide range of individual-level risk factors. The study was based on 220 cases nested within 35 neighborhoods.

Together, these studies suggest that neighborhood characteristics are important determinants of mental disorder. However, multilevel research on the relationship between neighborhood characteristics and mental disorder remains in an early stage of development. In an effort to further this area of research, the current study was designed to address the following research questions:

1. Do the structural characteristics of neighborhoods affect the prevalence of mental disorder? If so, which structural characteristics matter most for which types of mental disorder?
2. Do the effects of neighborhood structural characteristics on mental disorder remain after controlling for individual SES and other demographic characteristics?
3. Are the effects of individual SES and other demographic characteristics on mental disorder altered when neighborhood structural characteristics are taken into account?

Data, methods, and statistical procedures

The epidemiological catchment area (ECA) data

We use data from the first wave of the Epidemiological Catchment Area (ECA) project, a large community mental health survey sponsored by the National Institute of Mental Health in five locations: New Haven, CT, Baltimore, MD, St. Louis, MO, Durham, NC, and Los Angeles, CA (see Robins & Regier, 1991 for a description of the goals and scope of the ECA project). A primary goal of the ECA project was to ascertain the prevalence and incidence of specific psychiatric disorders across a broad segment of the general US population. Interviews were conducted in the field by trained laypersons who received 1–2 weeks of classroom training followed by field practice, and who passed a test demonstrating competence with the instrument. Typically, interviews took between 45 and 90 min to complete (Helzer & Robins, 1988). The completion rate at each site ranged from 77% to 80% with refusals accounting for a high proportion of nonresponses. One of the ECA sites—St. Louis, MO—was excluded from these analyses because household income data were not gathered there. Unlike Goldsmith et al. (1998), we chose to exclude St. Louis rather than do without a measure of household income because, as explained below, we consider household income to be an essential socioeconomic control variable. In addition, we excluded the rural portion of the Durham site (n = 1610) because census tract identifiers were not available there.

Selecting only those cases with valid information on all individual and neighborhood measures resulted in a final sample size of 11,686 respondents residing in 261 unique census tracts. One thousand four hundred and twenty two cases with missing data on any of the neighborhood or individual level measures were excluded from this study. Although the number of excluded cases was large, a comparison with included cases revealed no significant differences on any of the neighborhood measures. In addition, there were no differences between included and excluded cases on race, marital status, schizophrenia, or major depression. However, compared to those excluded, included cases were more likely to be males (47% versus 43%), younger (mean age, 42 versus 51), educated (mean highest grade, 12 versus 10), and to suffer from substance abuse disorder (7.9% versus 4.8%).

A comparison of the 261 census tracts included in this study to the 1781 census tracts included in the counties in which the ECA study sites were located revealed no significant differences in rates of poverty, public assistance, racial composition, or unemployment. However, the 261 included tracts were somewhat less residentially stable, with 56.6% of residents over the
age of five having changed residences within the past five years, compared to 50.2% in the remaining census tracts. The neighborhoods examined here are, to a considerable degree, representative of those in the surrounding geographic area.

In addition to the large sample size, two characteristics of the ECA research design make it an attractive data source for examining the relationship between neighborhood characteristics and adult mental disorder. First, the study is one of the largest ever to measure mental disorder using a structured diagnostic instrument across multiple sites. Second, respondents were sampled in geographic areas with sufficient density to allow for reliable estimates of contextual effects. The mean number of respondents within a census tract was 46 (median, 42).

**Measures of mental disorder**

The core interview used in the ECA project was the Diagnostic Interview Schedule (DIS; Helzer & Robins, 1988; Robins, Helzer, Croughan, & Ratcliff, 1981), a structured, self-report instrument that uses a lengthy series of preset questions with structured follow-up probing to assess the presence of psychiatric diagnostic criteria in adult respondents. The DIS was designed to be administered by trained lay interviewers and to generate DSM-III diagnoses (American Psychiatric Association, 1980). Using the DIS, diagnosable mental disorders were scored in a uniform fashion across sites (and neighborhoods), independent of whether the respondents had previously sought mental health treatment. The current study focuses on three mental disorder variables: schizophrenia, major depression, and substance abuse disorder (including disorders involving alcohol or drug abuse and dependence). We chose to focus on these disorders because they correspond to the types of mental disorders examined by Faris and Dunham (1939), and because they are featured in the more recent work by Goldsmith et al. (1998).

Following Swanson, Holzer, Ganju, and Tsutome (1990), we scored cases as positive for a disorder if the disorder was present during the one-year period preceding the research interview. We used a one-year period for this research because it is for this period that the correspondence between the mental disorder variables and the neighborhood location is most valid. Use of a longer period would be problematic, as subjects would have had more time to change residences prior to being interviewed. Use of a shorter time period would reduce substantially the already low base rates of mental disorder observed in these data. The one-year prevalence rate of each mental disorder is as follows: schizophrenia: 1.1%, affective disorder: 3.9%, and substance abuse disorder: 7.9%.

**Neighborhood structural characteristics**

This study utilizes census tracts to represent neighborhoods (Silver, 2000a,b; Silver, Mulvey, &
Monahan, 1999; Sampson et al., 1997; South & Crowder, 1999, 1997). Although census tracts are imperfect operationalizations of neighborhoods (Tienda, 1991), they come closer than any commonly available spatial entity to representing the usual conception of a neighborhood. Tract data were gathered from the 1980 Census Summary Tape Files to reflect neighborhood differences in socioeconomic disadvantage, racial/ethnic heterogeneity, and residential mobility. The 1980 Census data were collected independent of, and prior to, the ECA data (which was assembled in the early 1980s), ensuring proper temporal sequencing.

The selection of neighborhood characteristics for this analysis was guided by a long line of neighborhood-based research and theory (Shaw & McKay, 1942; Kornhauser, 1978; Sampson & Groves, 1989; Sampson et al., 1997). These works suggest that neighborhood socioeconomic disadvantage, racial/ethnic heterogeneity, and residential mobility undermine the ability of community residents to join together to realize their common values and to solve jointly experienced problems, a situation widely referred to as social disorganization. We selected the following nine census tract measures as reflective of the neighborhood's structural characteristics: percentage of persons living below the poverty line, percentage of families that are husband-wife, percentage of families with children that are female headed, percentage of households with public assistance income, the adult unemployment rate in the tract, percentage of families with annual incomes above $30,000, the percentage of adults employed in executive or managerial jobs, percentage of housing units that are rentals, and the percentage of persons over five years old who did not live at the same address five years earlier.

Not surprisingly, we observed a high degree of correlation among these measures. Of the thirty-six possible bivariate correlations, all but one were statistically significant, and thirteen were above 0.70. To avoid the multicollinearity problem that would result from analyzing these measures simultaneously in a linear equation, we followed the recommendation of Land, McCall, and Cohen (1990) and factor analyzed them. A principal components factor analysis (using Varimax rotation) revealed that the nine census tract measures broke into two empirical factors (eigenvalues = 6.04 and 1.45, explained variance = 67% and 16%, respectively). The first factor contained high loadings on the percentage of households with public assistance income (0.92), percentage of families that are husband-wife (−0.91), percentage of persons living below the poverty line (0.90), the adult unemployment rate (0.89), percentage of families with children that are female headed (0.83), the percentage of adults employed in executive or managerial jobs (−0.81), and percentage of families with annual incomes above $30,000 (−0.81). We use the label “neighborhood disadvantage” to describe this factor. The second factor contained high loadings on the percentage of persons over five years old who did not live at the same address five years earlier (0.95) and percentage of housing units that are rentals (0.76). We use the label “neighborhood residential mobility” to describe this factor. The loadings for each factor were used to compute a neighborhood disadvantage and a residential mobility factor score for each subject (after reverse scoring the variables with negative weights).

To classify tracts as racially heterogeneous, we constructed a dichotomous measure coded 1 for tracts that contain between 10% and 90% white residents; all other tracts are coded 0. Thus, tracts with greater than 90% white residents or greater than 90% non-white residents were considered to be homogeneous (Goldsmith et al., 1998). Mixed race neighborhoods were more likely to be residentially mobile ($r = 0.48, p < .001$) and somewhat more likely to be disadvantaged ($r = 0.14, p < .05$). The correlation between the neighborhood disadvantage and mobility indices was constrained to zero by the principal components factor analysis. All three neighborhood structural characteristics—disadvantage, residential mobility, and racial heterogeneity—were standardized to a mean of 0 and standard deviation of 1. Thus, the logistic regression coefficients presented below (i.e., odds ratios) for each of these measures indicates the amount of change in the odds of mental disorder that is associated with a one standard deviation increase in the structural variable.

**Individual characteristics**

A serious concern that emerges in any study that attempts to analyze contextual variables is the problem

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4 Following the recommendation of Massey (1998), we did not include percent African American in our measure of neighborhood disadvantage. Massey (1998, p.572) argues that: “even though race and class may be empirically correlated across neighborhoods in US cities, this is a result of high levels of discrimination and prejudice that continue to prevail in American society, not an inherent component of post-industrial ecological structure.” Nonetheless, our disadvantage measure was correlated strongly with percent African American at the tract level: $r = 0.71, p < 0.001$.

5 Although these cut-offs are somewhat arbitrary, we obtained similar results to those presented below when we measured racial/ethnic heterogeneity as the product of the percent white, percent black, and percent Hispanic in the tract. We present the dichotomous measure because it is easier to interpret.
of selection bias. If characteristics, such as low SES, age, race, or marital status lead individuals both to reside in disadvantaged neighborhoods and to experience psychological stress, then omitting such measures can lead us to falsely attribute to the neighborhood effects that are actually due to individual-level factors. Although compositional effects can never fully be controlled, taking into account key factors likely to result in such bias is crucial. Thus, our analyses controlled for ascribed demographic characteristics (i.e., gender, age, race); and achieved SES characteristics (i.e., household income, number of years of education, and marital status). Previous research finds that these measures are associated with psychological stress (Turner & Lloyd, 1999) and contribute to an individual’s ability to attain a stable residence in a desirable neighborhood (South & Crowder, 1997; Logan et al., 1996). In short, we are more confident that a significant neighborhood effect is indeed a contextual effect if that effect maintains after controlling for these individual measures.

We also are concerned that most prior research on social stress and mental disorder estimates the effects of individual characteristics without controlling for neighborhood measures. This strategy leaves open the possibility that the effects sizes attributed to individual level risk factors capture variation that actually originates in the neighborhood context. For example, in a recent study of race, neighborhood disadvantage, and violence among discharged psychiatric patients, Silver (2000b) found that the significant bivariate association between African American racial status and violent behavior was completely eliminated when neighborhood disadvantage was controlled. Had neighborhood disadvantage not been controlled, the magnitude of the effect of race on patient violence would have been overstated. To address this concern here, we estimate the effects of individual characteristics on mental disorder with and without neighborhood level controls. We are more confident that a significant individual level effect is indeed an effect that originates in the individual if that effect maintains after controlling for contextual measures.

Individual characteristics were measured as follows: sex was measured as a dichotomous variable in which 1 equals female; age was measured as the number of years since birth; race consisted of two dichotomous variables, one for African American and one for Hispanic, with white and other race/ethnicities (i.e., mostly Asian and Native American) as the comparison group; education was measured as a dichotomous measure coded 1 for individuals with 12 or more years of education; household income was measured by two indicator variables, one for individuals with annual incomes less than $10,000 and one for individuals with annual incomes between $10,000 and $35,000, with those receiving greater than $35,000 per year as the comparison group; and marital status was measured by a dichotomous variable indicating that the respondent was living with his or her spouse or living with someone else as if married at the time of the interview.

Data analysis and weighting

The data were weighted to compensate for differing probabilities of selection and refusal rates among respondents (Leaf, Myers, & McEvoy, 1991; Holzer et al., 1985). Initial sample weights were constructed for each respondent based on sample selection probabilities. An additional post-stratification adjustment was added to improve the fit of the sample to the 1980 US Census. In addition, a “downweight” was added to make the sample approximate the size of a simple random sample with the same variance (Leaf et al., 1991; see also, Goldsmith et al., 1998; Swanson et al., 1990). The formula for calculating the “downweight” is \[ \text{PS} = \frac{\Sigma W_{PS}}{\Sigma W_{PS}} \], where \( W_{PS} \) equals the post-stratification weight described above. Leaf et al. (1991, p. 28) note that using the downweight procedure “produces results that trend to overcompensate rather than undercompensate for artifacts produced by stratification” and “because the correction is a constant applied to each respondent’s weight values, it has no effect on estimates of prevalence or their relationships, but affects only tests of significance.” All of the analyses reported below are based on the “downweighted” data. We used logistic regression to model the effects of neighborhood and individual characteristics on mental disorder.

In addition, we re-estimated all of our multivariate analyses using binomial hierarchical linear regression (HLM; Bryk & Raudenbush, 1992). Binomial HLM allowed us to separate the residual variance of the dichotomous mental disorder variables (\( \sigma^2 \)) into two components: residual variance at the individual-level (\( \sigma^2_i \)); and residual variance that is constant across individuals within a neighborhood but random across neighborhoods (\( \sigma^2_s \)).
neighborhoods ($\sigma^2_v$).\textsuperscript{7} However, an examination of the tract-level variance components revealed no significant tract-level variation in any of the mental disorder variables after the individual and neighborhood-level characteristics were added to the model. Thus, the problem that HLM is meant to solve (i.e., correlated errors due to significant tract level variation) does not appear to exist in these data. This result justifies our use of logistic regression to analyze the data contextually (Silver, 2000a, b). Therefore, only the logistic regression results are reported below. All models were run including dichotomous variables for site (with LA as the comparison group) to control for site differences in the base rates of mental disorder (see footnote #3).

**Results**

**Sample description**

Respondents ranged in age from 18 to 96 years old with an average of 42 years. The mean education level was 12 years. The median household income was between $17,500 and $19,999. Fifty-three percent of respondents were female, 68% were white, 16% were African American, 13% were Hispanic, and 58% were cohabiting with a significant other or spouse. The level of poverty in respondents’ neighborhoods ranged from 1% to 68% with a mean of 16%. The level of residential mobility ranged from 14% to 94% of tract residents living in the same house as they did 5 years earlier with a mean of 43%; the percentage of tract residents who were black ranged from 0% to 100% with a mean of 20%, and percentage of tract residents who were Hispanic ranged from 0% to 99% with a mean of 14%. Fifty-two percent of tracts were categorized as mixed-race (i.e., containing between 10% and 90% white residents).

**Bivariate associations with mental disorder**

As a backdrop to the multivariate models that follow, Table 1 displays bivariate associations (odds ratios and 95% confidence intervals) between the psychiatric disorder variables (schizophrenia, major depression, and substance abuse disorder) and each of the neighborhood and individual level predictors. Each bivariate associations was estimated using a separate logistic regression equation with controls for site (not shown). As shown, schizophrenia, major depression, and substance abuse disorder were more prevalent in both disadvantaged and residentially mobile neighborhoods. Further, schizophrenia was more prevalent among females, younger people, African Americans, people with less than a high school education, those with lower household incomes, and those not cohabiting with a spouse or significant other. Major depression was more prevalent among females, younger people, those with lower household incomes, and those not cohabiting with a spouse or significant other. Substance abuse disorder was more prevalent among males, minorities, younger people, and those not cohabiting with a spouse or significant other. These individual level effects are consistent with those reported previously in the literature (Goldsmith et al., 1998; for a review, see Turner & Lloyd, 1999).

**Multivariate results: Schizophrenia**

Model 1 of Table 2 presents the main effects of the individual characteristics on schizophrenia. As shown, being female, younger, less educated, of lower income, and not living with a spouse or significant other predicted higher rates of schizophrenia. Model 2 shows that rates of schizophrenia were higher in disadvantaged and residentially mobile neighborhoods, consistent with the bivariate relationships shown in Table 1. Model 3 shows that the effect of neighborhood disadvantage was attenuated and rendered nonsignificant when individual characteristics were controlled. This attenuation was due solely to the SES characteristics (i.e., education, household income, and marital status); the effect of neighborhood disadvantage on schizophrenia remained unchanged when only demographic characteristics (i.e., gender, age, and race) were controlled (not shown). However, the significant effect of neighborhood residential mobility on schizophrenia remained after all of the individual characteristics were controlled. Thus, schizophrenia was found to be more prevalent in residentially mobile neighborhoods.

**Major depression**

Model 1 of Table 3 presents the main effects on major depression of the individual characteristics. As shown, being female, younger, of lower household income, and not living with a spouse or significant other were significantly associated with higher rates of major depression. Model 2 shows that major depression was
more prevalent in residentially mobile and disadvantaged neighborhoods, consistent with the bivariate relationship shown in Table 1. As shown in model 3, these effects remained when individual characteristics were controlled. Consistent with results reported by Ross (2000), residing in a disadvantaged neighborhood was related significantly to depression. This replication of results is important given that Ross’ measure of

| Table 1 |
|-----------------|-----------------|-----------------|
| **Schizophrenia** | **Major depression** | **Substance abuse disorder** |
| **OR (95% CI)** | **OR (95% CI)** | **OR (95% CI)** |
| Neighborhood disadvantage index | 1.35 (1.14–1.60)** | 1.14 (1.03–1.26)** | 1.20 (1.12–1.29)** |
| Neighborhood mobility index | 1.35 (1.11–1.68)** | 1.21 (1.10–1.33)** | 1.25 (1.17–1.34)** |
| Mixed race neighborhood | 1.20 (0.93–1.54) | 1.10 (0.99–1.23) | 1.07 (0.99–1.16) |
| Female | 1.78 (1.25–2.53)** | 2.30 (1.89–2.81)** | 0.25 (0.22–0.29)** |
| Age 18–24<sup>b</sup> | 6.13 (2.13–17.60)** | 3.28 (2.09–5.15)** | 14.52 (9.17–23.00)** |
| 25–44<sup>b</sup> | 6.72 (2.42–18.64)** | 3.68 (2.41–5.63)** | 8.72 (5.53–13.75)** |
| Mixed race neighborhood | 0.10 (0.03–0.34)* | 1.90 (1.20–3.00)** | 3.67 (2.28–5.89)** |
| Race African American<sup>c</sup> | 1.51 (1.01–2.27)* | 1.12 (0.86–1.46) | 1.22 (1.02–1.46)* |
| Hispanic<sup>c</sup> | 0.92 (0.39–2.18) | 0.98 (0.72–1.35) | 1.32 (1.06–1.66)* |
| High school graduate | 0.63 (0.44–0.92)* | 1.15 (0.95–1.38) | 0.87 (0.75–0.99)* |
| Household income < $10k<sup>d</sup> | 3.50 (1.81–6.77)** | 1.81 (1.34–2.44)** | 0.96 (0.81–1.20) |
| $10–35k<sup>d</sup> | 1.94 (1.01–3.72)* | 1.44 (1.09–1.90)* | 0.88 (0.73–1.04) |
| Live with spouse/significant other | 0.43 (0.30–0.61)** | 0.60 (0.50–0.72)** | 0.48 (0.42–0.55)** |

<sup>a</sup>Compared to Los Angeles site.
<sup>b</sup>Compared to 65 and over.
<sup>c</sup>Compared to whites and other race/ethnicities.
<sup>d</sup>Compared income > 35k/yr.

<sup>*p<0.05; **p<0.01; ***p<0.001</sup>
depression did not require that a threshold for a diagnosis of major depression be reached, but rather consisted of the mean response to seven self-report indicators of “depressed mood and malaise” (Ross, 2000, p. 180). In short, major depression was found to be more prevalent in socioeconomically disadvantaged and residentially mobile neighborhoods.

Substance abuse disorder

Model 1 of Table 4 presents the main effects on substance abuse disorder of the individual characteristics. As shown, being male, younger, less educated, of lower household income, and not living with a spouse or significant other predicted higher rates of substance abuse disorder. Models 2 and 3 of Table 4 show that the significant effects of neighborhood disadvantage and residential mobility on substance abuse remained after individual SES and demographic characteristics were controlled. Thus, substance abuse disorder was found to be more prevalent in socioeconomically disadvantaged and residentially mobile neighborhoods.

Residing in a mixed race neighborhood did not affect any of the mental disorder variables examined above, after controlling for individual-level characteristics. In addition, comparing models 1 and 3 of Tables 2 through 4, shows that the effects of the individual characteristics remained virtually unchanged after the neighborhood characteristics were controlled (except that the effect of African American status on substance abuse disorder and major depression went from being nonsignificant to being significantly protective). This pattern of results suggests that the risk for mental disorder attributable to individual characteristics, for the most part, did not depend on the characteristics of the neighborhood location. In addition, we found no cross-level interaction effects between the individual and neighborhood characteristics (data not shown). Finally, pseudo-$R^2$’s reported in Tables 2 through 4 indicate that the majority of variation explained in each of the three mental disorder variables was due to variation in the individual-level characteristics, a pattern that is consistent with prior multilevel research in this area (Ross, 2000; Ross et al., 2000).

To illustrate the magnitude of the significant neighborhood effects reported in Tables 2 through 4, we used the final model from each table to compute predicted prevalence rates for each disorder across neighborhoods with different degrees of residential mobility and disadvantage, holding constant all other measures at their mean values. We varied the neighborhood disadvantage and residential mobility factor scores from a low of 3 standard deviations below the mean for all subjects (indicating extremely low levels of neighborhood residential mobility and disadvantage) to a high of
3 standard deviations above the mean for all subjects (indicating extremely high levels of neighborhood residential mobility and disadvantage) (Silver, 2000a).

Using this strategy, we found that the predicted prevalence rate of schizophrenia in neighborhoods with extremely low levels of residential mobility was 0.32%, compared to 1.36% in extremely high mobility neighborhoods, a 4.3-fold difference. Similarly, we found that the predicted prevalence rate of major depression in neighborhoods with extremely low levels of residential mobility was 2.01%, compared to 4.68% in extremely high mobility neighborhoods, a 2.3-fold difference. In addition, we found that the predicted prevalence rate of substance abuse disorder in neighborhoods with extremely low levels of residential mobility was 2.59%, compared to 9.29% in extremely high mobility neighborhoods, a 3.6-fold difference. For neighborhood disadvantage, we found that the predicted prevalence rate of major depression in neighborhoods with extremely low levels of disadvantage was 2.07%, compared to 5.95% in highly disadvantaged neighborhoods, a 2.3-fold difference. Finally, we found that the predicted prevalence rate of substance abuse disorder in neighborhoods with extremely low levels of disadvantage was 3.09%, compared to 7.86% in highly disadvantaged neighborhoods, a 2.5-fold difference. Given the relatively low base rate of these disorders, these effect sizes are not trivial.

Discussion

Do the structural characteristics of neighborhoods affect the prevalence of mental disorders, net of the effects of individual characteristics? Using a large community survey, we found that the answer to this question is yes. Specifically, we found that neighborhood disadvantage was associated with higher rates of major depression and substance abuse disorder, and that neighborhood residential mobility was associated with higher rates of schizophrenia, major depression, and substance abuse disorder. However, the effect of neighborhood disadvantage on schizophrenia became nonsignificant when individual SES was controlled.

One conclusion that might be drawn from our ability to “explain away” the effect of neighborhood disadvantage on schizophrenia by controlling for individual SES is that neighborhood disadvantage is not an important part of the causal framework that produces schizophrenia, but rather it is schizophrenia that leads people to have low SES, which in turn, leads them to self-select into disadvantaged neighborhoods. Unfortunately, we do not possess the necessary longitudinal data with which to examine this assertion. Thus, we hesitate to draw such a conclusion based on the above analyses. Moreover, we would argue that just because a set of individual-level characteristics mediates the effect of a
contextual variable does not necessarily imply that the context measure has no causal influence on the outcome. In this case, the individual characteristics that mediated the effects of neighborhood disadvantage on schizophrenia consisted of education, household income, and marital status, the achievements of which may depend, in part, on the type of neighborhood in which one lives. According to Wilson (1996, p. 29), the long-term socioeconomic and marital prospects of residents of socially and economically disadvantaged neighborhoods become compromised because of high rates of joblessness, poor systems of education, and limited marriage markets. Wilson writes: “The economic marginality of the ghetto poor is cruelly reinforced... by conditions in the neighborhoods in which they live” (1996, p. 54). Thus, individual socioeconomic achievements must be conceptualized, to some degree, as a function of the opportunities and conditions of life inherent in the neighborhood environment. To the extent that individual SES affects schizophrenia, it remains conceivable that some of that effect is due to the effect of neighborhood conditions on individual SES. Therefore, the observation that individual SES mediates the effect of neighborhood disadvantage on schizophrenia does not imply necessarily that the neighborhood is unimportant as an etiological factor in this disorder.

Our finding that neighborhood residential mobility was associated with increased rates of schizophrenia, major depression, and substance abuse disorder, and that neighborhood disadvantage was associated with increased rates of major depression and substance abuse disorder—net of individual SES—raises the question: what is it about structurally disadvantaged neighborhoods that may lead to disorder? Based on a long line of sociological research on the effects of neighborhood characteristics on crime and other negative outcomes, we suggest that social disorganization theory may provide a useful explanatory framework within which to understand the neighborhood context of mental disorder (Faris & Dunham, 1939; Silver, 2000a).

Working within this tradition, Faris and Dunham (1939) argued that in highly mobile and disadvantaged neighborhoods, where social integration is weak, individuals may find it difficult to sustain supportive social contacts with others, thereby increasing the risk that those who are predisposed to mental disorder will manifest symptoms. Similarly, Sampson and others have shown that neighborhood residential mobility and disadvantage each reduce local friendship ties by constraining individual friendship choices, thereby decreasing social integration and access to social support (Sampson, 1988; Sampson & Groves, 1989; Sampson et al., 1997; see also, Kasarda & Janowitz, 1974; Cullen, 1994).

Moreover, to the extent that socially disorganized communities are less able to organize on their own behalf to prevent the occurrence of negative experiences, such as criminal victimization, chronic unemployment, family disruption, and other forms of incivility (Agnew, 1999), the risk that mental disorder will develop and persist among individuals who are predisposed to such problems is increased. A large body of research has shown that stressful life events and social support are related to the onset and course of mental disorder (Dohrenwend, 1990, 2000; Turner & Lloyd, 1999; Turner et al. (1995); Landerman, George, Campbell, & Blazer, 1989), although none has examined whether stressful life events and social support are responsible for the effects of neighborhood structural characteristics on mental disorder. It may be, for example, that neighborhood social disorganization limits the amount of social support that is available in a neighborhood (Silver, 2000a) and that this overall limit affects the general rate of disorders within the neighborhood boundaries.

In all of our models, the effects of individual level characteristics on mental disorder remained relatively stable after neighborhood characteristics were controlled. Also, we found no evidence that the effects of the individual characteristics on mental disorder varied significantly across neighborhood contexts (i.e., we found no significant cross-level interaction effects). Together, these results suggest that the effects of individual level characteristics operated similarly across neighborhood contexts.

Our methods and results differed in two important ways from those reported by Goldsmith et al. (1998). First, they did not include a measure of neighborhood residential mobility, a measure that turned out to be a robust predictor of schizophrenia, major depression, and substance abuse disorder. Second, whereas Goldsmith et al. found a significant effect of neighborhood SES (median household income in a tract) on schizophrenia after controlling for individual level characteristics, we did not (using our disadvantage index). This discrepancy most likely was the result of their not including a measure of household income at the individual level. Indeed, when we re-estimated the full equation predicting schizophrenia (model 3 of Table 2) without household income, we found a significant effect for neighborhood disadvantage, similar to Goldsmith and colleagues’ results. This finding underscores our assertion that because household income is a primary human capital characteristic related to both residential attainment and to mental disorder, its measurement is essential in multilevel studies of mental disorder.

As with most secondary research, this analysis of ECA data attempted to address questions that went beyond the study’s original scope, which was to obtain accurate estimates of the prevalence of mental disorder in the US general population. The ECA project was not designed to examine neighborhood effects. Therefore, our results are only suggestive and a great deal more
work needs to be done. Most important, better measures of the factors, other than individual SES, that might mediate the psychological distress brought on by the neighborhood must be examined. We propose exposure to stressful life events and the availability of social supports as possible relevant factors behind these observed relationships. Although we were unable to test this idea due to a lack of appropriate measures in the ECA data set, we would expect that individuals who live in socioeconomically disadvantaged and residentially mobile neighborhoods are more likely to be exposed to stressful life events and are less likely to have access to adequate social supports. These socially structured life experiences, in turn, are expected increase the risk of psychological distress. However, until measures of life stress and social support are gathered in a study of mental disorder that also includes contextual data, these hypotheses cannot be tested. Moreover, until we can understand what risk factors mediate the effect of neighborhood disadvantage and residential mobility on mental disorder, we cannot make policy recommendations regarding treatment and prevention with much confidence.

In addition to incorporating mediating variables, future research on the relationship between neighborhood characteristics and mental disorder would benefit greatly from the collection of additional types of data not currently available in any single study of mental disorder. Specifically, longitudinal data on the degree of individual exposure to various neighborhood conditions, including lengths of residence, number of moves, and reasons for moving—in conjunction with data on the onset, course, and severity of mental disorder as it develops over time—would enable us to better understand the dynamic relationship between neighborhood structural characteristics and mental disorder and, ultimately, to get a better handle on the direction of the causal relationships that might exist between them. Unfortunately, such data were not gathered in the ECA surveys, and the collection of such data would require a more intensive, focused effort than we were able to mount. In short, although the current study suggests that neighborhood structural characteristics matter, we still do not know why.

A number of limitations in the ECA data should be considered when interpreting the results presented above. First, the fact that the diagnoses produced by lay administrators of the DIS did not always correspond to the psychiatrists administrations of the instrument (Helzer & Robins, 1988) may call into question the validity of the measures of mental disorder used here (and in other analyses of the ECA data set). Second, the criteria for diagnosing major mental disorders currently contained in the DSM-IV are not the same as those that were contained in the DSM-III, which formed the basis of the ECA diagnostic interview. These limitations pertain most specifically to the predicted rates of mental disorder reported above. Although our models appropriately adjust for differing probabilities of selection and refusal rates among respondents, we could not adjust for validity issues with regard to the measures of mental disorder. Thus, it is more appropriate to interpret the predicted rates of disorder reported above in terms of their relative magnitudes across neighborhood contexts than it is to treat these predicted rates as valid or true estimates of disorder in the US general population.

Finally, in suggesting that neighborhood structural characteristics affect the psychological well being of individuals, we do not take the position that neuropsychological factors are unimportant in the etiology of mental disorder. Indeed, social-environmental and biological factors interact strongly in the development of many health conditions; psychiatric disorders and symptoms are no exception. Hence, we concur with Faris and Dunham (1939, p. 152) when they write: “Mentality, abilities, behavior, are all achievements of the person, developed in a history of long interaction with his surroundings, both physical and social.” Our purpose in doing this study was to highlight the neighborhood context as an important variable that may be associated in complex ways with the onset and course of mental disorder—both, because of the stress that adverse social environments can produce among individuals, but also because people with a predisposition toward mental disorder may more often find themselves in the disadvantaged neighborhood environments due to their inability to escape them through economic means. We believe that a better understanding of the complex associations that produce higher rates of mental disorder in structurally disadvantaged neighborhoods may lead to significant improvements in the delivery of effective community-based interventions for mental disorder.

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