American Journal of Orthopsychiatry
2005, Vol. 75, No. 1, 3–18

0002-9432/05/$12.00 DOI: 10.1037/0002-9432.75.1.3

Socioeconomic Status and Mental Illness: Tests of the Social Causation and Selection Hypotheses

Christopher G. Hudson, PhD
Salem State College

This study tests several hypotheses about the underlying causal structure of the inverse correlation between socioeconomic status (SES) and mental illness. It does this through the analysis of a longitudinal statewide database on acute psychiatric hospitalization in Massachusetts for the fiscal years 1994–2000 as well as supplemental census data. The modeling strategy used techniques of structural equation modeling and found that SES impacted directly on rates of mental illness as well as indirectly through the impact of economic hardship on low and middle income groups.

One of the most consistently replicated findings in the social sciences has been the negative relationship of socioeconomic status (SES) with mental illness: The lower the SES of an individual is, the higher is his or her risk of mental illness. Yet there have been remarkably inconsistent findings concerning the causal structure of this relationship. Do poor socioeconomic conditions predispose people to mental disability? Or do preexisting, biologically based mental illnesses result in the drift of individuals into poor socioeconomic circumstances? Are there particular types of conditions—whether unemployment, little family support, noisome work conditions, or lack of autonomy—that mediate this effect? Although the guiding assumption of many researchers is that this is an interactive and nonlinear relationship, involving multiple conditions and particular types of mental illness, even the best available longitudinal data sets do not permit adequate tests of the relevant theories.

Although there has been such limited progress in unraveling the SES–mental illness relationship, the trends of the last decade have underscored the importance of this issue. Ongoing spending cutbacks and retrenchment in state mental health programs have highlighted the need for targeting resources to those areas with the greatest need rather than relying on simplistic population-based formulas or historic spending patterns. Developments in biological psychiatry have led many to diminish the role of social conditions in the etiology of serious mental illnesses and the possibilities of early intervention or prevention. However, for others, the identification of specific genetic predispositions is seen as an opportunity to better understand the role of particular environmental conditions in triggering these predispositions or aggravating the course of mental illness.

This study, therefore, aims to enhance the field's knowledge of the causal structure of the SES–mental illness relationship. It does this through a structural equation analysis of two large-scale data sets covering Massachusetts. The Casemix database includes unduplicated records of 109,437 individuals hospitalized on acute psychiatric units during the fiscal years 1994–2000 and thus permits us to track the individuals' moves among communities over the course of their hospitalizations (Massachusetts Division of Health Care Finance and Policy [MDHCFP], 1998, 2000). U.S. Census Bureau (2003) long-form data on these communities for 2000 then permits us to understand specific community conditions associated with differential rates of psychiatric hospitalization as well as of reported mental disabilities in general.

Background

One of the first studies to identify the inverse relationship between SES and mental illness was that of Faris and Dunham (1939), who found disproportionate rates of mental illness in the poorest parts of Chicago. This was followed by the landmark studies of Hollingshead and Redlich (1958) in New Haven, Connecticut, and the Midtown Manhattan study (Srole et al., 1977). Whereas the former examined treated rates, the later looked at overall community rates, and both studies found dramatic disparities between the rates of the lowest and highest social classes. One review of the research from 1950 to

This project received partial support from the Office of Academic Affairs, Salem State College, and the U.S. William J. Fulbright Commission.

For reprints and correspondence: Christopher G. Hudson, PhD, School of Social Work, Salem State College, 352 Lafayette Street, Salem, MA 01945. E-mail: cghudson@comcast.net

1980 identified 21 studies pertinent to the SES–mental illness relationship (Dohrenwend, 1980). Whereas 10 of the 15 non-U.S. studies found the highest rates in the lowest class, 5 of the 6 U.S. studies obtained this same finding.

A later review, focusing on research of the 1980s, not only reported the continued replication of the core finding but also found that that it held up regardless of the type of SES indicator used—whether education, income, or occupation—or the type of mental illness examined (Hudson, 1988). It was during the 1980s that researchers began to test some of the competing social causation and social selection hypotheses, and, also during this period, considerably more evidence accumulated that was supportive of the social causation interpretation. Although some researchers found evidence for the role of the lack of primary (family) or secondary (institutional) supports (Kulka, Veroff, & Douvan, 1979), others examined psychosocial factors, such as the sense of fatalism some low-income individuals have (Kohn, 1972), and others focused on specifically economic factors, such as unemployment. One of the classics in the field was Harvey Brenner's (1973) study of 150 years of hospitalization and unemployment data in New York that provided persuasive evidence of a dramatic impact of unemployment, especially for men, on rates of psychiatric hospitalization.

During the 1990s, research on the SES–mental illness relationship accelerated and focused on the analysis of large-scale and often longitudinal data sets for the purpose of clarifying the causal structure of the relationship. However, findings from this latest wave of research are increasingly mixed. Several of the longitudinal studies have supported various causal pathways involving social causation. One of the strongest was that of Ritsher, Warner, Johnson, and Dohrenwend (2001), who interviewed 756 participants four times over the course of 17 years and found that low parental education was predictive of the risk of depression for their offspring, but not the reverse, after controlling for parental depression and offspring gender and age. Similarly, Link, Lennon, and Dohrenwend (1993) used a New York community sample that was interviewed twice over 3 years to test the social causation and selection hypotheses with depression—specifically, whether holding an occupation involving direction, control, and planning was prophylactic. Their data clearly showed that higher status occupations involving control and planning were associated with reduced risk of depression and that the alternative explanation, involving personality as a common cause of both occupational choice and depression, was too ambiguous to be adequately tested but was inconsistent with available evidence. In another prospective cohort study of 7,725 adults in the United Kingdom, Weich and Lewis (1998) found that poverty and unemployment served to increase the duration of episodes but not the likelihood of their initial occurrence. In contrast, Link, Dohrenwend, and Skodol (1986) found evidence that initial work in noisome occupations preceded and was predictive of the onset of schizophrenia. A large German study that used a cross-sectional design found evidence to suggest that not only low-SES but, specifically, single-parent families were strongly associated with the extent of psychological distress among children (Franz, Kuns, & Schmitz, 2000; Franz, Lensche, & Schmitz, 2002).

Also during the last decade, there has been continuing research concluding that social selection may be an important dynamic in explaining the negative SES–mental illness correlation. One version of this theory, often referred to as the geographic drift hypothesis, suggests that mentally ill individuals gravitate to low-income communities as a result of their disability, perhaps drawn by lower living costs. Probably the strongest support for this notion came from a study by Dembling, Rovnyak, Mackey, and Blank (2002), who examined geographic migration patterns of 11,725 state psychiatric patients in Virginia over the course of 18 years. They found a one-third migration rate among counties over the course of the hospitalizations, more often toward lower income communities. However, the effect was more modest than is portrayed in the researchers' narrative, as only somewhat over half (56%–59%) moved to communities with less favorable SES characteristics, and by how much it cannot be determined from the published report. Two other researchers (Rodgers & Mann, 1993) reanalyzed data from four earlier studies on intergenerational social mobility and found that the failure to adequately control for differences in the cohorts of mentally ill and healthy populations resulted in an underestimation of the degree of downward socioeconomic drift. Several studies (i.e., Levav, Zilber, Danielovich, Aisenberg, & Turetsky, 1987; Loeffler & Haefner, 1999; Munk & Mortensen, 1992; Murphy et al., 1991) have also reported evidence for social drift, even prior to hospitalization. Some of this research has been hamstrung with inadequate samples, lack of controls, or failure to document the actual magnitude of the purported drift.

However one weighs the merits of the research favoring the various hypotheses, most would agree that no single interpretation of the relationship has been consistently supported by the available data.

Efforts to develop and test an integrative theory of the mutual effects of both social causation and social selection have, for the most part, involved the attempt to identify the processes pertinent to particular disorders. Most studies that have found evidence for social selection have done so for the major mental illnesses, such as schizophrenia (Dohrenwend et al., 1992). Social causation has been most persuasively demonstrated with conditions of lesser severity, such as anxiety disorder. One long-term longitudinal study of New Zealand youth confirmed that although anxiety disorders are the outcome of social processes, both conduct and attention deficit disorders showed clear evidence of impacts on the educational careers of the youth (Miech, Caspi, Moffitt, Wright, & Silva, 1999). Both depression and personality disorders have most commonly been found to be outcomes of low SES; however, the reverse has also been found.

Although research has consistently replicated the strongly negative relationship between SES and mental illness, using a wide variety of samples, measures, and research designs, the findings about the underlying dynamics and their theoretical interpretation have been only marginally cumulative, if at all. This is due to both the wide variety of findings and the range of samples and methodologies used. To the extent that large, systemwide samples can be used, the goal of simultaneously testing competing models is becoming increasingly feasible. This study has attempted, with partial success, to do this through individual and combined tests of the following hypotheses. The primary hypotheses involve two variations of the social causation theory:

> *Hypothesis 1:* Economic stress. The inverse SES–mental illness correlation is a specific outcome of stressful economic conditions, such as poverty, unemployment, and housing unaffordability.

> *Hypothesis 2:* Family fragmentation. The inverse SES–mental illness correlation is a function of the fragmentation of family structure and lack of family supports.

In addition, three alternative social selection hypotheses are tested:

> *Hypothesis 3:* Geographic drift. The inverse SES–mental illness correlation results from the movement of individuals from higher to lower SES communities subsequent to their initial hospitalization.

> *Hypothesis 4:* Socioeconomic drift. The inverse SES–mental illness correlation results from declining employment subsequent to initial hospitalization.

> *Hypothesis 5:* Intergenerational drift. The inverse SES–mental illness correlation is a function of declines in community SES levels of hospitalized adolescents between their first hospitalization and their most recent hospitalization after turning 18.

Method

Overview

This is a longitudinal study of the population of individuals in the Commonwealth of Massachusetts who have undergone an acute psychiatric hospitalization during fiscal years 1994–2000. It is a naturalistic study involving the secondary analysis of an existing database, supplemented by data from the 2000 U.S. Census pertinent to socioeconomic conditions of the patients' home communities. Because the data set includes an encrypted social security number, it has been possible to consolidate almost all of the individual episode records for the 7 years into unduplicated patient records, which permits the tracking of patient experiences among hospitalizations. Part of this experience involves moves among communities of varying socioeconomic characteristics, which can be analyzed because included in the patient records is a home ZIP code for both the first and the last episode. The primary social causation hypotheses were analyzed for the 494 communities, defined by ZIP codes, with techniques of structural equation modeling through the LISREL software package (Version 8.53; Jöreskog & Sörbom, 2003). This analysis was supplemented by bivariate tests of the social selection or drift hypotheses based on the approximately 34,000 patients with two or more hospitalizations.

The Data and Their Preparation

The primary data consist of seven annual data sets from the Casemix Database for the fiscal years 1994 through 2000, each consisting of approximately 750,000 records of patients discharged from the various acute psychiatric and

medical facilities throughout the state.[1] Massachusetts state regulations (114.1 CMR 17.00) mandate that each hospital provide the state designated data items on each discharge that meet defined recording standards, including patient demographics, diagnoses, costs, insurance, utilization, and measures of severity. The system is considered to be one of the better developed among the states, and many of its data items have been shown to have moderate to good reliability (Hudson, 2001; MDHCFP, 1998).

Initial data preparation has involved the transfer and definition of the seven individual files and variable transformations as well as the merging, resorting, and selection of relevant psychiatric cases. Approximately 467,056 psychiatric and related medical episodes were selected out of the master 7-year file of 5.2 million records. For this study, the 237,976 psychiatric episodes were selected and then aggregated to a file of the 109,437 individuals who were hospitalized one or more times in an acute psychiatric facility over the 7 years of interest. Most analyses reported here focused on those 34,112 patients who had two or more hospitalizations.

The U.S. Census data used to supplement the above were extracted from the long-form data from the 2000 U.S. Census, referred to as the Standard Tape File 3C (STF-3C). These data were obtained for all 494 ZIP codes in the state with nonzero population, as well as various proportions, medians, and other indices computed from the raw counts provided.

The major variables used for this study are as follows (see Table 1).

Mental illness. Two indicators of the levels of mental illness throughout the various areas of Massachusetts were used for this study: (a) Rate of acute psychiatric hospitalization was computed from the Casemix database for the years 1994–2000. After aggregating the combined files to the patient level, I tabulated counts of patients for each of the state's ZIP codes, on the basis of the patient's home address at first admission. (b) A rate was then computed on the basis of the size of the local population, divided by 7 years, resulting in a fairly stable average annual rate. In addition, STF-3C also includes a question about the members of the household whom the respondent believes to be disabled because of a mental condition. Respondents are asked of each household member, "Because of a physical, mental, or emotional condition lasting 6 months or more, does this person have any difficulty in doing any of the following activities? . . . a. Learning, remembering, or concentrating? . . . Yes/No." Likewise, a rate was computed for each ZIP code on the basis of these reports. Both of these aggregate indicators were expected to include substantial measurement error; for this reason, their correlations were examined, as well as hospitalization rates for selected diagnoses, and these are reported in the Results section.

Community SES. SES was measured on the basis of community income, education, and occupational status. Data pertinent to each of these three areas were extracted from the STF-3C files for each of the state's ZIP codes, and these include (a) median household income, (b) median years of education, and (c) mean occupational status. This latter figure was computed for each ZIP code with empirically derived status ratings for major occupational groups (Davis, Smith, Hodge, Nakao, & Treas, 1991). These status ratings were then used to compute a weighted average using the proportion of persons age 15 and over who were employed in each of the major occupational groups as the weights—that is, (Status × % Occupation A) + (Status × % Occupation B). These occupational categories consisted of the following: (a) executive/manageral positions, (b) professional services, (c) other services, (d) sales, (e) farming, (f) construction, and (g) production. Although the raw scores for income, education, and occupation were used in the LISREL models (which are based on covariances rather than standardized correlations), separate versions were also standardized, and an unweighted mean of the z scores was used for descriptive purposes. For an examination of SES on the individual level, a proxy variable—employment status (1 = *yes*, 0 = *no*)—was computed for adults ages 18–65 years on the basis of either the presence of an employer ZIP code in the record or the receipt of commercial medical insurance that was not supported by any governmental program such as Medicaid or Medicare.

Economic stress. The level of specific economic hardship in each of the state's communities was assessed through use of the following three indicators: (a) proportion of individuals under the federal poverty level, (b) percentage of adults ages 15–65 who were reported as unemployed at the time of the 2000 census, and (c) rental housing unaffordability, calculated as median rent divided by median household income.

Family fragmentation. The fragmentation of family structure in each of the state's communities was measured through the following indicators: (a) proportion of households that are family households; (b) proportion of adults ages 15 and over who are separated, widowed, or divorced; and (c) proportion of families who have children under 18 that have only a single parent in the household.

Other. Other indicators of social conditions or control variables included (a) race, assessed as the percentage of non-White individuals and also through an index of racial diversity; (b) age; (c) gender; and (d) proportion of individuals living in urban areas and population density per square mile.

Analysis. The social causation and selection hypotheses were tested, whenever possible, through the use of structural equation modeling (SEM) or, for the alternative hypotheses, traditional bivariate tests. Whereas the social causation hypotheses were tested primarily on the community level, with some supplemental individual-level tests, the dynamic nature of the hospitalization data permitted tests of the social drift hypotheses on the individual level with traditional F

[1]Excluded from the system are stays in the commonwealth's Department of Mental Health facilities, specialized psychiatric hospitals, and Veteran's Administration facilities, which provide mostly nonacute care. This file excludes 22,000 episode records, or 9.3% of the total, for which there was no valid identification code to permit aggregation and tracking.

Table 1
Primary Measures Used and Their Statistics

Indicator	*n*	*M*	*SD*	Level[a]	Source
Mental illness					
Reported mental disability (% population 5+)	494	5.0	1.8	ZIP code	STF-3
Acute psychiatric hospitalization rate (mean 1994–2000 per 10,000)	494	22.0	13.1	Individual/ZIP	Casemix and STF-3
Hospitalization by selected diagnoses (principal or secondary), per 10,000 population					
Schizophrenia (295)	109,437	2.2	2.0	Individual	Casemix
Affective disorders (296)	109,437	10.6	6.0	Individual	Casemix
Neurotic disorders (300)	109,437	3.3	2.6	Individual	Casemix
Adjustment reactions (310)	109,437	3.2	2.8	Individual	Casemix
Depressive conditions (311)	109,437	1.0	0.9	Individual	Casemix
Mean severity level (1 = *mild*, 2 = *moderate*, 3 = *severe*, 4 = *extreme*)	64,788	1.6	0.7	Individual	Casemix
No. hospitalizations	109,437	2.0	2.7	Individual	Casemix
Length of hospitalization pattern (days)	109,437	222.7	471.3	Individual	Casemix
Socioeconomic status					
Median years of school	494	12.8	1.4	ZIP code	STF-3
Median household income	494	$53,750	$19,135	ZIP code	STF-3
Mean occupational status	494	46.7	3.3	ZIP code	STF-3
Economic hardship					
% Unemployed	494	4.7	2.7	ZIP code	STF-3
Individual poverty rate	494	9.4	7.6	ZIP code	STF-3
Median gross rent/household income (%)	494	25.2	2.8	ZIP code	STF-3
Family support					
% Households that are family households	494	65.8	11.5	ZIP code	STF-3
% Families with children and single parent	494	27.5	14.0	ZIP code	STF-3
% Adults age 15 or older separated, widowed, divorced	494	17.3	4.3	ZIP code	STF-3
Demographic					
Actual and median age	494	36.3	4.4	Individual and ZIP	Casemix and STF-3
Gender (% male)	109,437	45.5		Individual	Casemix
Race (% non-White)	494	15.5	17.4	Individual and ZIP	Casemix and STF-3
Other social conditions					
% Urbanized	494	91.4	19.0	ZIP code	STF-3
Population density (population/square mile)	494	4,639	6,551	ZIP code	STF-3
Employment at first/last hospitalization (based on employer ZIP code or private insurance; %)	109,437	43.0		Individual	Casemix
Home ZIP code	109,437			Individual	Casemix

Note. Data are from the 2000 U.S. Census, Standard Tape File 3 (STF-3) long-form data and the Massachusetts Department of Health Care Finance and Policy Casemix Database, 1994–2000.
[a] *Level* refers to level of aggregation on which data were initially accessed; some but not all of the individual data were aggregated to the ZIP code level and analyzed with population data as rates of various types.

and chi-square tests as appropriate. Both these tests were conducted only after the creation of community- and individual-level data sets with the various indices as described in the previous section. Because of wide variations in the size of areas as defined by ZIP codes, a weighting factor based on the relative population size of the various communities was used.[2] The variables were screened for normality, outliers, and other anomalies. Because the community-level data displayed significant departures from normality, generally weighted least squares (WLS) estimation procedures were used in the structural modeling. Attempts were made to fit a multilevel model within the SEM framework, but because of structure of the data (availability of the

[2] This weight was calculated as follows: (ZIP Code Population/State Population) × Number of ZIP Codes. Otherwise, a large number of minimally populated rural ZIP codes would camouflage the variation often associated with more heavily populated urban ZIP codes.

dependent SES measure on only the community level) as well as several limitations on structural modeling options when multiple levels of data are considered (i.e., unavailability of WLS), this turned out to be impractical. When no admissible or convergent SEM model could be fitted to the social drift model, given its poor fit, traditional bivariate tests were used as a backup procedure, albeit one that lacks the statistical controls and power of the SEM approach.

SEM allows the simultaneous test of a hypothesized structure of relationships among variables of interest as well an inclusive test of the measurement model of the latent or unobserved variables (i.e., SES, mental illness). When this is not done, measurement error in the composite variables is ignored. The failure in many studies to disattenuate the correlations obscures the relationships among the major indicators. In addition, when tests are conducted for individual measurement models and paths between subsets of variables, rather than testing the model as a whole, the standard errors are no longer valid, given the well-known tendency of multiple tests to capitalize on chance. In contrast, SEM procedures permit both the simultaneous estimation of all path coefficients, direct and indirect, and tests of the overall model, both as a whole and in comparison with previous models computed. Although SEM is a state-of-the art approach to theoretically based analysis, it also allows for data exploration and theory modification within its confirmatory framework. Other advantages include provisions for nonnormal, discrete, censored, and ordinal data as well as nonrecursive or two-way relationships.

The final tests of the alternative social selection or drift hypotheses considered changes in community SES and employment between the patients' first and last hospitalizations, for those patients with two or more hospitalizations. Change scores were computed. Differences in the size of the groups with decreases, no changes, or increases between first and last hospitalizations were tested with the chi-square statistic, to compare the observed distribution with the theoretical expectation that there would be no differences in the sizes of the groups with increases and decreases. Analysis of variance F scores enabled comparison of the absolute magnitude of the SES changes for those with upward and those with downward mobility, which provided a more comprehensive view of generalizability of the change scores. Although the positive or negative magnitudes of these changes are reported under *Tests of Social Selection* in the Results section, the F test compared the *absolute* magnitude of these changes, regardless of their sign or direction. Also, the test of the hypothesis involving geographic drift was replicated for selected diagnostic groups.

Results

The Rates

Results of this research include information on individual indicators as well as the bivariate exploration of key relationships in preparation for the tests of the study's hypotheses. Two indicators of the extent of mental illness have been used. During the 1994–2000 period, there was a mean annual incidence of 22 and a median of 20 new individuals hospitalized on an acute psychiatric unit for each 10,000 individuals in the total population. Throughout the state, this rate ranged from 0 to 188, with the middle 50% of the communities ranging from 13 to 29. The diagnostic group most frequently hospitalized consisted of those with affective disorders, who had a hospitalization rate of 16 per 10,000 population, and those with schizophrenia, with a rate of 2.2 per 10,000 population (see Table 1).

However, hospitalization rates have well-known limitations as indicators of the extent of mental illness, even when unduplicated and analyzed on the basis of home address, as diverse considerations govern admission decisions. An alternative set of data is the U.S. Census, which asks family members to identify individuals in their household with a disabling mental condition, one that has lasted at least 6 months but does not necessarily involve hospitalization. In Massachusetts, 5.0% of the population were identified by their significant others as having such a disorder. This rate varied from 0% to 18.0% throughout the 494 ZIP codes of the state, with the middle 50% ranging from 3.7% to 5.8%. Although 5.0% may seem to be a substantial number, it is nonetheless a low estimate on the basis of the 6-month and disability criteria and, no doubt, the family members' desire to minimize the extent of mental illness among loved ones. The National Comorbidity Study, which used validated instruments in general community surveys, found that almost three tenths (29.5%) of the population had a diagnosable *Diagnostic and Statistical Manual of Mental Disorders* (American Psychiatric Association, 1980) disorder within the previous 12 months (Kessler et al., 1994, p. 12). A zero-order bivariate correlation between hospitalization rates and reported mental illness of 0.56 ($p < .000$) indicates a moderately strong correlation, which suggests that the two variables measure the same underlying phenomena.

The Correlation

The Massachusetts data reveal a moderate to strong inverse or negative correlation between SES and mental illness. Whereas the Pearson zero-order correlation of SES with hospitalization levels was $-.52$ ($p < .000$), with reported rates from the census data it was a substantial $-.68$ ($p < .000$). However, a plot of communities based on these variables (see Figure 1) shows that this relation-

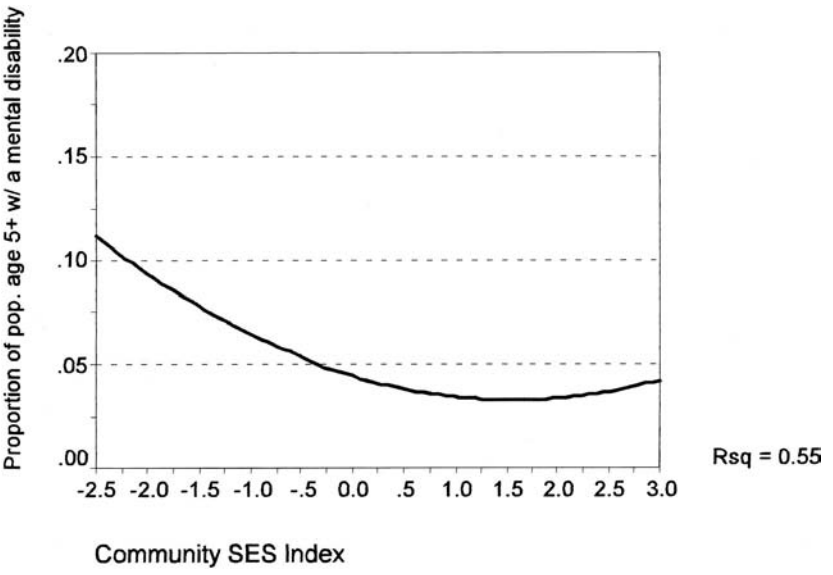

Figure 1. The negative correlation between socioeconomic status (SES) and mental illness. Data are from the 2000 U.S. Census long form (Standard Tape File 3). pop. = population; w/ = with; Rsq = R^2.

ship was nonlinear. When this nonlinearity is taken into account, the correlation is calculated to be −.74, accounting for over half of the variation in mental illness rates ($R^2 = .54$, $p < .000$). The changing slope of this relationship suggests that it may not be variation between middle and upper income communities that is associated with heightened levels of mental illness but, specifically, variation in lower to middle income areas. Whereas communities that are one standard deviation below average in respect to the levels of income, education, and occupational status have reported rates of mental illness of about 7%, these rates decline as conditions improve but level off at about 3% in communities with SES that is one standard deviation above average.

It is possible that the correlation between SES and mental illness exists only on the community level, not the individual level (i.e., low-SES individuals may not be the same people who become mentally ill). For this reason, this study also computed the relationship among a few proxy indicators of these variables for the 109,437 individuals in the study. Employment status at first hospitalization was found to be negatively correlated, though weakly, with condition severity (Kendall's $\tau = -0.12$, $p < .000$) and total episodes ($\eta^2 = .09$, $p < .008$).

This SES–mental illness relationship can also be represented in geographic terms (see Figure 2). Communities were split into four groups on the basis of their relative levels of hospitalization and SES. Those communities with patterns consistent with the negative SES–mental illness correlation were plotted in Figure 2, with lines sloping right representing those with low mental illness and high SES and with left-sloping lines for those with high hospitalization and low SES. Collectively, these represent two thirds (66.3%) of the state's ZIP codes. The remaining communities deviate from the pattern, with both high SES and high hospitalization, represented by cross-hatched lines covering 7.9% of the areas, or both low SES and low hospitalization, represented by the absence of lines covering about one quarter (25.8%) of the state.

A detailed examination of the various correlations between indicators of mental illness and SES, as well as other demographic and environmental conditions, reveals a remarkably consistent relationship (see Table 2). Whether income, education, or occupational status is considered in relation with overall rates or with schizophrenia or depression in particular, the correlations are moderately to strongly negative, ranging from −.25 to −.70 ($p < .01$). Similarly, the more economic hardship communities experienced, the higher the rates of hospitalization and reported mental illness were. These have correlations (Pearson's r) ranging from .12 to .69, with the most modest relationships involving housing affordability.

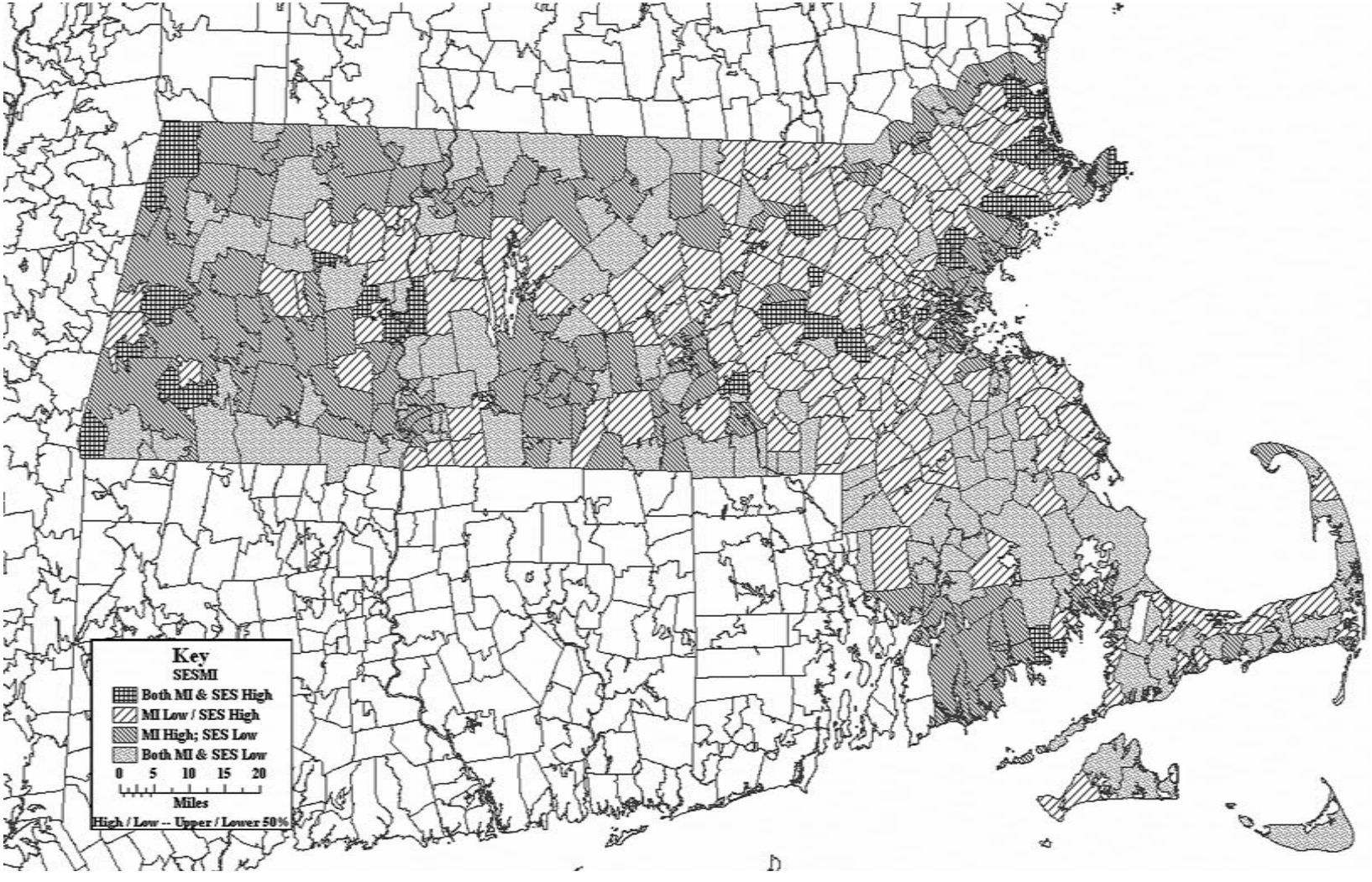

Figure 2. Socioeconomic and hospitalization levels in Massachusetts. SES = socioeconomic status; MI = mental illness.

Table 2
Zero-Order Correlations Between Indicators of Mental Illness and Socioeconomic Status in Massachusetts Communities (N = 502)

Indicator	Census reports 2000	Acute hospitalization data, 1994–2000			
		Overall rate	Schizophrenia rate	Depression rate	Mean no. hospitalizations per patient
Socioeconomic status					
Median household income	−.70**	−.57**	−.53**	−.44**	−.22**
Median years of school	−.64**	−.48**	−.32**	−.35**	.07
Mean occupational status	−.59**	−.42**	−.25**	−.33**	−.02
Economic hardship					
% Unemployed	.46**	.31**	.31**	.69**	.09*
Individual poverty rate	.63**	.42**	.75**	.51**	.23**
Median gross rent/household income (%)	.24**	.13**	.24**	−.12**	−.03
Family support					
% Households that are family households	−.29**	−.34**	−.45**	−.19**	−.28**
% Families with children and a single parent	.76**	.56**	.62**	.45**	−.20**
% Adults age 15 or older separated, widowed, or divorced	.78**	.54**	.37**	.45**	−.15**
Demographic					
Median age	−.37**	−.08**	−.33**	−.19**	−.21**
Gender (male = 1)	.21	.29	.29	.11	.15**
Race (non-White = 1)	.49**	.29**	.50**	.18**	.01
Racial diversity index[a]	.53**	.33**	.52**	.21**	.19**
Other social conditions					
% Urbanized	.18**	.04**	.17**	.13	.11*
Population density (population/square mile)	.17**	.13**	.38**	.01	.18**

Note. Correlations were computed on ZIP code level, weighted by relative population size.
[a] Computed with the Index of Dispersion (Loether & McTavish, 1980, pp. 153–154).
* $p < .05$. ** $p < .01$.

Also, the lower the indicators of family fragmentation were, the lower the rates of mental illness were. Whereas rates of mental illness were lower in areas with older populations, they were found to be slightly elevated in urbanized areas. This was particularly the case with schizophrenia, which was moderately correlated with population density ($r = .38$, $p < .01$). However, no matter how many bivariate correlations are examined, tests of hypotheses call for systematic control for spuriousness as well as the establishment of the time order of the variables, and it is to these tasks that I now turn.

Tests of Social Causation

The primary hypotheses of this study, that rates of mental illness are partly the outcome of economic stresses specific to lower income groups as well as lack of family cohesiveness, were tested with a structural equation approach. This involved successively testing and refining several models, beginning with measurement models for SES and mental illness, moving to the bivariate relationship, and finally testing models with economic stress and family fragmentation included. Three representative models are reported here. Each of these accounts for a substantial portion of the variation in mental illness rates, with R^2s ranging between .66 and .79. However, it is only the first and the final model computed, which included economic stress along with SES, that fit the data at an acceptable level (see Table 3).

Model 1 indicates that SES, when treated as the sole predictor, accounted for almost four fifths ($R^2 = .79$) of the variation in mental illness rates. For each decrease of a standard deviation in SES, there was a 0.89 increase in the level of mental illness. The strength of this bivariate relationship was greater than that found in the earlier zero-order analysis, because the LISREL model dissattenuates for measurement error in both of the latent variables, error that ordinarily obscures the strength of the underlying relationship. This also represents a model that is statistically significant. A modest chi-square of 5.2 had a probability of .074, which reveals that this model

Table 3
Standardized Regression Coefficients and Goodness-of-Fit Indices for Social Causation Models

Effects on MI	Model 1: MI–SES	Model 2: MI–SES–stress–fam. sup.	MODEL 3: MI–SES–stress
SES			
Direct	−.89**	−.23**	−.41**
Indirect	.00	−.63**	−.40**
Total	−.89**	−.86**	−.81**
Economic stress			
Direct		.80**	.56**
Indirect		.00	.00
Total		.80**	.56**
Fam. sup.			
Direct		.00	
Indirect		−.93**	
Total		−.93**	
Measures of goodness of fit			
R^2 for MI	0.79	0.74	0.66
χ^2	5.2	323.41	21.53
Degrees of freedom	2	39	14
Probability	0.074	0.000	0.089
ECVI	0.062	0.75	0.13
RMSEA	0.06	0.12	0.033
RMR	0.002	0.013	0.065
NNFI	0.96	0.48	0.92
CFI	0.99	0.63	0.96
Stability index		0.751	0.005

Note. MI = mental illness; SES = socioeconomic status; Fam. supp. = family support; ECVI = expected cross-validation index; RMSEA = root-mean-square error of approximation; RMR = standardized root-mean-square residual; NNFI = nonnormed fit index; CFI = comparative fit index.
** $p < .01$.

does not significantly deviate from the data.[3] In addition, the other measures of goodness of fit indicated an acceptable level of model fit, although this is a model that ignores the key hypotheses of this study. It should be noted that substantially the same statistics can be generated when the direction of the relationship is reversed, a problem that I return to in the next section.

Model 2 asks whether the rates of mental illness can be understood as a combined result of SES, economic stress, and family fragmentation. Several variations of this theory were tested, but only the "best" of these poor fitting models is included here. Although this model also accounts for substantial variation in the mental illness rates ($R^2 = .79$), it significantly departs from the pattern found in the data, $\chi^2(39, N = 503) = 323.41$, $p < .000$, and its various indices indicate a model that does not adequately fit the data (i.e., nonnormed fit index [NNFI] = 0.48; comparative fit index [CFI] = 0.63). Nonetheless, statistically significant indirect coefficients for family fragmentation suggest the use of caution in entirely dismissing the role of families in mediating the SES–mental illness relationship.

Model 3, as diagramed in Figure 3, tests whether SES directly, and indirectly through economic hardship, can better account for variations in the levels of mental illness than the previous models. This model also accounts for a substantial proportion ($R^2 = .66$) of the variation, in a manner that does not significantly depart from the data, $\chi^2(14, N = 503) = 21.53$, $p = .089$, NNFI = 0.92, CFI = 0.96. The model reveals that some but not all of the negative SES–mental illness correlation is accounted for by the impact of SES on specific conditions of economic hardship, which in turn contributes to the prevalence of mental illness. Whereas for each in-

[3] The reader should be aware that in the LISREL framework, chi-square is used as a test for badness of fit; thus, any significance level of .05 or less generally indicates that the model is significantly different from the data, as long as the sample size is more than 300 to 500. For large samples, this test is no longer considered valid.

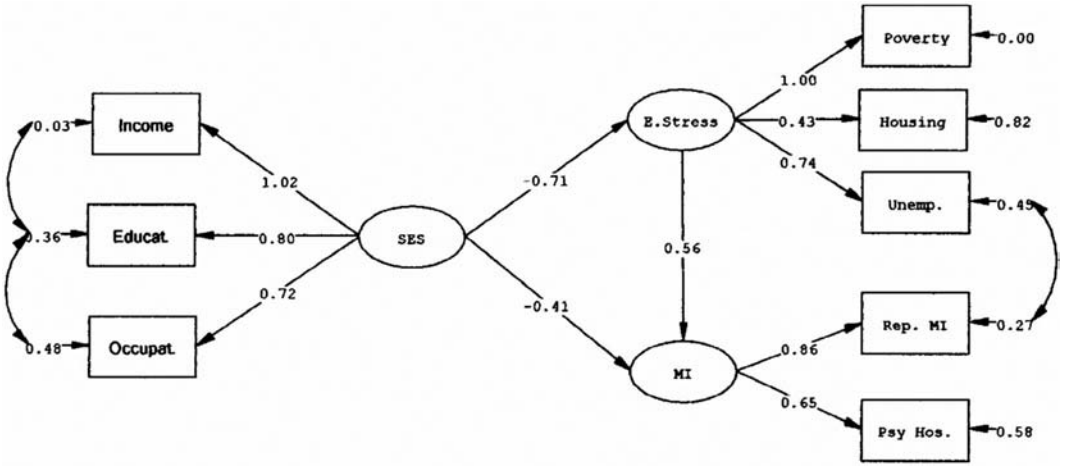

Figure 3. Model 3: the impact of socioeconomic status (SES) and economic stress (E. Stress) on mental illness (MI). All path coefficients are standardized. Educat. = education; Unemp. = unemployment; Occupat. = occupation; Rep. MI = reported mental illness; Psy. Hos. = psychiatric hospitalization.

crease of a standard deviation in economic stress there was a 0.56 increase in standard deviations in mental illness, SES continued to have a direct, possibly noneconomic, impact on mental illness, as the direct regression coefficient was a moderately strong −.41, down from −.89 when economic stress is excluded, as was the case in Model 1.

Numerous other models were tested, including one that posited an interactive effect between mental illness and SES and one that included urbanization, age, race, and the various other predictors. However, none of these represented an acceptable fit, on the basis of either unacceptable goodness-of-fit indices or the failure of the LISREL iterative algorithm to converge on a single solution. A final test of this model involved substituting the mental illness latent variable with hospitalization rates for selected diagnostic groups: schizophrenia, affective disorders, depression, neurosis, and adjustment disorder. Each of these models had similar, though slightly reduced, coefficients compared with those in Model 3 involving the overall mental illness variable. However, all five models significantly fit the data, with acceptable goodness-of-fit indices. The least positive fit was for the rates of schizophrenia ($R^2 = .66$), $\chi^2(14, N = 503) = 170.04$, $p = .089$, NNFI = 0.92, CFI = 0.96.

Thus, given the substantial variation explained and goodness of fit of Model 3; the inability for other models involving family fragmentation, urbanization, age, and race to match or improve on the model; and the ability to replicate the intended model with the particular diagnostic groups, substantial evidence has accumulated to support the revised hypothesis that SES, both directly and indirectly through adverse economic conditions, substantially contributes to the development of mental illness in the Massachusetts population. However persuasive this model might be for some, it still fails to convincingly address the problem of the time order of the variables—that is, the possibility that mental disability may be causing individuals to drift into less favorable socioeconomic circumstances. Thus, the study attempts to disconfirm this initial interpretation through tests of several alternative hypotheses.

Tests of Social Selection

When the data are analyzed on the individual rather than the community level, it becomes possible to test several alternative hypotheses involving social selection or drift. The data include home ZIP codes at both first and last hospitalization (in 90.7% of the cases). Specifically, these patients are the 34,000 of the 109,000 psychiatric patients who had two or more hospitalizations. Thus, it is possible to consider whether these each of these patients remained in his or her original community or moved to a community with more or less favorable socioeconomic conditions. If patients moved mostly to communities with poorer conditions, this would be clear evidence for downward socioeconomic drift, as the move occurs subsequent to patients' first recorded hospitalization.

The first version of the social selection hypothesis test involves geographic drift, or the idea that patients predominantly move to lower SES communities subsequent to their initial hospitalization. Table 4 reveals a negligible degree of such drift. Whereas 13.3% managed to move to better areas, 14.5% moved to less favorable communities. When such moves were made, the magnitude of changes in the conditions of these communities was also negligible. Whereas those who moved to better areas saw an average increase of 0.68 standard deviation in SES, the slightly greater number with unfavorable moves saw an average decline of 0.73 standard deviation, a difference of 0.05 in magnitude of change. These moves took place over the course of a mean of 3.8 hospitalizations spread over 621 days. Thus, the data reveal that there were virtually the same percentage and degree of changes between those with improving and those with worsening socioeconomic circumstances.

It may be that geographic drift is only seen when patients are disabled by the most severe psychiatric conditions, such as schizophrenia. For this reason, the same analysis as reported above was replicated with patients from selected diagnostic groups: schizophrenia, affective disorders, depression, neurosis, and adjustment disorder (see Table 5). Although in each of these diagnostic groups the proportion and magnitude of geographic drift remains either slight or negligible, as expected, those with schizophrenia did exhibit the highest *relative* level of downward geographic drift. A slightly greater percentage (17.2%) saw downward drift than the 15.2% who were upwardly mobile. Similarly, those with downward mobility saw greater changes than those with upward mobility, −0.76 standard deviations in SES, compared with 0.68 units. One exception to this pattern was the 14.7% of those with neurotic disorders who experienced downward mobility, versus the 12.6% who were upwardly mobile. Thus, these data indicate that within the 7 years of this study there is only evidence of negligible levels of downward mobility, with the exception noted that there are some data to suggest a very weak tendency toward downward geographic drift among those with schizophrenia and neurosis, involving about 2% of this population.

Even if there is no downward geographic drift, another of the alternative hypotheses suggests that the patients themselves may experience downward economic mobility. Downward mobility is most effectively assessed through an examination of changes in income and occupation but not educational status, as once education is achieved, it cannot decline. This study did not have access to specific data on income and occupation of individual patients; however, it did have data on a proxy variable, employment status, indicating whether the patient was employed or unemployed at both first and last hospitalization. Table 6 reveals that considerably more of the patients ages 18–65 (14.3%)—over twice as many—found employment, compared with the group of initially employed patients who became unemployed (6.3%) between their initial and most recent hospitalization. Almost four fifths (79.4%) of the patients saw no change in their employment status: They either remained employed or remained unemployed. Thus, no evidence of downward socioeconomic drift was found. In fact, the data suggest that the patients' hospitalization experience more often served to reengage them in employment activities, which could be expected to enhance their occupational and financial prospects. Whether this is a specific outcome of the services provided or the result of an improving econ-

Table 4
Changes in Community Socioeconomic Status (SES) Between First and Last Psychiatric Hospitalizations

Indicator	Increase	No change	Decrease	Overall
No. patients	4,386	23,829	4,802	33,017
%	13.3	72.2	14.5	100.0
First hospitalization—mean level (z scores)	−0.71	−0.36	−0.02	−0.35**
Mean change in SES score, first to last hospitalization (z scores)	0.68	0.00	−0.73	−0.02
Mean episodes	4.9	3.4	5.0	3.8
Mean period of hospitalizations (days)	912	503	940	621*

Note. The sample includes only those individuals hospitalized on acute psychiatric units in Massachusetts from 1994 to 2000 who had two or more hospitalizations and valid home ZIP codes. The analysis of variance compares those who had decreases with those with increases in community SES, excluding those with no change.
* $p < .05$. ** $p < .01$.

Table 5
Changes in Community Socioeconomic Status Between First and Last Psychiatric Hospitalizations, by Diagnosis

Diagnosis	Increase	No change	Decrease	Overall
Schizophrenia				
Frequency	764	3,407	864	5,035*
%	15.2	67.7	17.2	100.0
M	0.68	0.00	−0.76	−0.38**
Affective disorders				
Frequency	2,256	12,473	2,400	17,129
%	13.2	72.8	14.0	100.0
M	0.67	0.00	−0.72	−0.01**
Depression				
Frequency	179	894	180	1,253
%	14.3	71.3	14.4	100.0
M	0.62	0.00	−0.56	−0.01
Neurosis				
Frequency	655	3,771	763	5,189*
%	12.6	72.7	14.7	100.0
M	0.70	0.00	−0.69	0.00
Adjustment disorders				
Frequency	689	3,081	748	4,518
%	15.3	69.2	16.6	100.0
M	0.69	0.00	−0.70	0.00

Note. The sample includes only those individuals hospitalized on acute psychiatric units in Massachusetts from 1994 to 2000 who had two or more hospitalizations, a primary or secondary diagnosis as designated, and valid home ZIP codes. The same individuals may be included under more than one diagnostic group if they received several of the listed diagnoses at the time of their first episode. The analysis of variance compares those who had decreases with those with increases in community socioeconomic status, excluding those with no change. Significance of differences in frequencies was tested with the chi-square test.
* $p < .05$. ** $p < .01$.

omy during this period is beyond the scope of this study.

The final social selection hypothesis tested was that downward drift may happen not so much within the course of a generation but rather represents a failure of children and adolescents who are mentally ill to maintain the SES of their family once they become adults, sometimes referred to as intergenera-

Table 6
Changes in Employment Status Between First and Last Psychiatric Hospitalizations

Indicator	Became employed	No change	Became unemployed	Overall
No. patients	4,890	27,060	2,162	34,112**
%	14.3	79.3	6.3	100.0
First hospitalization—mean SES level (*z* scores)	−0.38	−0.35	−0.32	−0.35**
Mean change in SES score, first to last hospitalization (*z* scores)	−0.02	0.01	−0.04	−0.02**
Mean episodes	5.7	3.5	4.1	3.8**
Mean period of hospitalizations (days)	1,136	527	743	628**

Note. The sample includes only those individuals hospitalized on acute psychiatric units in Massachusetts from 1994 to 2000 who had two or more hospitalizations, who were between 18 and 65 years old, and who had valid ZIP codes. The analyses of variance compare those who had decreases with those who had increases in community SES, excluding those with no change. SES = socioeconomic status.
* $p < .05$. ** $p < .01$.

tional drift. This study tested this hypothesis by examining the experience of the 307 children or youth who had at least two hospitalizations, one prior to their 18th birthday and the other subsequent to it, specifically by comparing the numbers of participants with increases and decreases in community SES as well as the magnitude of the changes in SES. Table 7 reveals that there was essentially an equal level of upward (56, or 18.2%) and downward mobility (57, or 18.6%) among this group. Whereas those who saw improving community conditions saw them improve by 0.76 standard deviation, those with declines saw a marginally greater deterioration of 0.81 standard deviation. This experience reflects a mean of 3.9 hospitalizations, spanning a mean of 2.5 years, for these individuals over the 7 years of the study. Because there was no more downward than upward mobility for the group of patients examined, the intergenerational drift hypothesis is not supported for the Massachusetts population of acute psychiatric hospital users.

It is possible that downward geographic or socioeconomic drift might occur not after but prior to the patient's first hospitalization. If so, one would expect that the older that patients are, the greater discrepancy they will experience between their SES and mental health, as they have had a greater opportunity for downward drift. Although the data do not permit a definitive test of this possibility, they do permit analyses that demonstrate the implausibility of prehospitalization downward drift. A partial correlation analysis of the community-level data shows that a zero-order negative correlation of −.68 between mental disability and SES drops only marginally, to −.65, when median age is controlled for. Likewise, the SES–hospitalization correlation of −.52 drops to only −.49 with control for age. Significance tests conducted with the individual-level analyses—those that compared the absolute magnitude of SES changes between those who experienced increases or decreases in community SES or employment—were conducted a second time, with controls for patient age as a covariate. In none of these instances did this control change the significance of any of the magnitude differences. In two cases, those involving employment changes and SES community changes among patients with neuroses, the contribution of the age covariate was significant but of negligible magnitude ($p < .05$, $R^2 = .004$). Thus, it has not been possible with the available data to disconfirm the initial social causation model by demonstrating that downward geographic or economic drift happens *after* hospitalization or even that it likely happens prior to hospitalization.

Discussion

The current study reveals a remarkably strong and consistent negative correlation between socioeconomic conditions and mental illness, one that supports the role of social causation in mental illness and cannot be accounted for by geographic or economic downward mobility. The statewide database used in this study leaves little doubt that, at least in Massachusetts, the poorer one's socioeconomic conditions are, the higher one's risk is for mental disability and psychiatric hospitalization. This substantial correlation was found regardless of the particular indicator of SES or type of mental illness examined. A serendipitous finding that this was actually a nonlinear relationship, one affecting mostly low and middle income groups,

Table 7
Changes in Community Socioeconomic Status (SES): Intergenerational Patterns

Indicator	Increase	No change	Decrease	Total
No. patients	56	194	57	307
%	18.2	63.2	18.6	100.0
First hospitalization—mean SES level (z scores)	0.13	−0.26	−0.70	−0.27**
Mean change in SES score, first to last hospitalization (z scores)	0.76	0.00	−0.81	−0.01
Mean episodes	4.6	3.6	4.5	3.9
Mean period of hospitalizations (days)	932	850	1,148	920*

Note. The sample includes only those children or youth under 18 years old hospitalized on acute psychiatric units in Massachusetts from 1994 to 2000 who had two or more hospitalizations, at least one hospitalization prior to and one after turning 18, and valid ZIP codes. The analyses of variance compare those who had decreases with those who had increases in community SES, excluding those with no change.
* $p < .05$. ** $p < .01$.

reinforced the need to test the hypothesis that the effect of SES is through adverse economic conditions, such as poverty, unemployment, and housing unaffordability, that most dramatically impact those who are low on the SES scale. In addition, this curvilinear relationship suggests that even with the best of conditions there is a residual or baseline level of mental illness; according to our indicators, this baseline level is about three sevenths of the maximum. It has been suggested that such findings support the notion that this proportion represents the impact of biological and even genetic effects that operate independently of the immediate social and economic environment.

Of the various social causation hypotheses tested, the idea that the impact of SES on mental illness is mediated by economic stress received the strongest support, with this model substantially fitting the data. An alternative model, which suggested that SES acts through both economic stress and lack of family integration, failed to demonstrate an adequate fit, although the specific correlations in this model were also highly statistically significant. However, in its totality, the addition of the indicators of family fragmentation undermined the adequacy of this model. It would be unrealistic to expect global indicators of the fragmentation of family structure to capture the more dynamic processes of family support and nurturance. Many other models were tested, ones that involved interactive relationships; the inclusion of other predictors, such as race, age, urbanization, gender; and terms for nonlinearity, but in each case, none of these could compete with the simple SES/economic stress model for explaining the SES–mental illness correlation, usually because these additional predictors accounted for very little additional variation in the data.

Because the community-level data, which permitted the above preliminary test of the social causation model, could not invalidate the possibility of downward SES drift subsequent to hospitalization, several additional specific tests of social drift were conducted. These specifically examined whether more patients moved into less favorable community and employment conditions subsequent to their initial hospitalization, and all of these showed no or negligible downward drift, except, in one case of schizophrenia, slight downward drift involving about 2% more patients moving to less favorable than more favorable conditions over the course of their hospitalizations. In the case of changes in employment, a preponderance of upward mobility was found. In addition, tests involving the role of age in mediating downward drift failed to support the notion that downward drift happens prior to rather than subsequent to psychiatric hospitalization.

Thus, the experience of acute psychiatric hospital patients in Massachusetts during the middle to late 1990s provides strong evidence for the social causation interpretation of the SES–mental illness negative relationship, one that involves the notion that SES impacts the development of mental illness directly, as well as indirectly through its association with adverse, economically stressful conditions among lower income groups. However, this study represents only one piece of the puzzle and has its limitations. Probably the most important involves the indicators of mental illness used, which relied on the opinions of family members in the case of the census data and the admissions decisions in the case of the hospitalization data. Yet a strong correlation between these suggests that they may be measuring the same phenomenon, and for that reason I decided to use them as the best available indicators for a statewide study. Also, the comprehensiveness of the data, involving virtually the entire population of acute hospital users in Massachusetts, complicates the interpretation of the various significance tests used, because in such samples, just about any correlation, however small, may be significant or generalizable but substantively meaningless. Thus, the reader is cautioned not to rely on such tests but to ask whether the particular differences or correlations are substantively meaningful.

At the outset of this study, I hoped to discover that all five hypotheses account for some of the variation and even that the relationship is an interactive one, even though I suspected that the impact of the social environment played the most critical role. However, the analyses would not, in the end, support such an intuitively plausible and holistic theory. As measures that are practical for statewide studies are developed, it will no doubt be possible to validate more comprehensive and dynamic models than has been possible in this project. Nonetheless, this study highlights the need for the continued development of preventive and early intervention strategies of the major mental illnesses that pay particular attention to the devastating impacts of unemployment, economic displacement, and housing dislocation, including homelessness.

References

American Psychiatric Association. (1980). *Diagnostic and statistical manual of mental disorders* (3rd ed.). Washington, DC: Author.

Brenner, M. H. (1973). *Mental illness and the economy.* Cambridge, MA: Harvard University Press.

Davis, J. A., Smith, T. W., Hodge, R. W., Nakao, W., & Treas, J. (1991). *Occupational prestige ratings from the 1989 General Social Survey* [Data file]. Available from Inter-University Consortium for Political and Social Research Web site, http://www.icpsr.umich.edu

Dembling, B. P., Rovnyak, V., Mackey, S., & Blank, M. (2002). Effects of geographic migration on SMI prevalence estimates. *Mental Health Services Research, 4,* 7–12.

Dohrenwend, B. P. (1980). *Mental health in the United States: Epidemiological estimates.* New York: Praeger.

Dohrenwend, B. P., Levav, I., Shrout, P. E., Schwartz, S., Naveh, G., Link, B. G., et al. (1992, February 21). Socioeconomic status and psychiatric disorders: The causation-selection issue. *Science, 255,* 946–952.

Faris, R. E. L., & Dunham, W. W. (1939). *Mental disorders in urban areas.* Chicago: University of Chicago Press.

Franz, M., Kuns, M., & Schmitz, N. (2000). Der Zusammenhang von sozialer Schicht und psychogener Erkrankung im Langzeitverlauf [Correlation between social class and psychogenic disorders as shown in a longitudinal observatory]. *Zeitschrift fuer Psychosomatische Medizin und Psychotherapie, 46,* 140–165.

Franz, M., Lensche, H., & Schmitz, N. (2002). Psychological distress and socioeconomic status in single mothers and their children in a German city. *Social Psychiatry and Psychiatric Epidemiology, 38,* 59–68.

Hollingshead, A. B., & Redlich, F. C. (1958). *Social class and mental illness.* New York: Wiley.

Hudson, C. G. (1988). Socioeconomic status and mental illness: Implications of the research for policy and practice. *Journal of Sociology and Social Welfare, 15*(1), 27–54.

Hudson, C. G. (2001). Changing patterns of acute psychiatric hospitalization under a public managed care program. *Journal of Sociology and Social Welfare, 28*(2), 141–176.

Jöreskog, K. G., & Sörbom, D. (2003). LISREL (Version 8.53) [Computer software]. Chicago: Scientific Software International, Inc.

Kessler, R. C., McGonagle, K. A., Zhao, S., Nelson, C. B., Hughes, M., Eshleman, S., et al. (1994). Lifetime and 12-month prevalence of *DSM-III-R* psychiatric disorders in the United States: Results from the National Comorbidity Survey. *Archives of General Psychiatry, 51,* 9–19.

Kohn, M. L. (1972). Rejoinder to David Mechanic. *Social Forces, 50,* 311.

Kulka, R. A., Veroff, J., & Douvan, E. (1979). Social class and the use of help for personal problems: 1956 and 1976. *Journal of Health and Social Behavior, 20,* 2–17.

Levav, I., Zilber, N., Danielovich, E., & Aisenberg, E., & Turetsky, N. (1987). The etiology of schizophrenia: A replication test of the social selection vs. social causation hypotheses. *Acta Psychiatrica Scandinavica, 75,* 183–189.

Link, B. G., Dohrenwend, B. P., & Skodol, A. E. (1986). Socio-economic status and schizophrenia: Noisome occupational characteristics as a risk factor. *American Sociological Review, 51,* 242–258.

Link, B. G., Lennon, M. C., & Dohrenwend, B. P. (1993). Socioeconomic status and depression: The role of occupations involving direction, control, and planning. *American Journal of Sociology, 98,* 1351–1387.

Loeffler, W., & Haefner, H. (1999). Ecological patterns of first admitted schizophrenics in two German cities over 25 years. *Social Science and Medicine, 49,* 93–108.

Loether, H. J. & McTavish, D. G. (1980). *Descriptive and inferential statistics.* Boston: Allyn & Bacon.

Massachusetts Division of Health Care Finance and Policy. (1998). *Case mix payer validation report.* Boston: Author.

Massachusetts Division of Health Care Finance and Policy. (2000). *Hospital case mix and charge data base documentation manual.* Boston: Author.

Miech, R. A., Caspi, A., Moffitt, T. E., Wright, B. R. E., & Silva, P. A. (1999). Low socioeconomic status and mental disorders: A longitudinal study of selection and causation during young adulthood. *American Journal of Sociology, 104,* 1097–1129.

Munk, J. P., & Mortensen, P. B. (1992). Social outcome in schizophrenia: A 13-year follow-up. *Social Psychiatry & Psychiatric Epidemiology, 27,* 129–134.

Murphy, J. M., Olivier, D. C., Monson, R. R., Sobol, A. M., Federman, E. B., & Leighton, A. H. (1991). Depression and anxiety in relation to social status: A prospective epidemiologic study. *Archives of General Psychiatry, 48,* 223–229.

Ritsher, J., Warner, E. B., Johnson, J. G., & Dohrenwend, B. P. (2001). Inter-generational longitudinal study of social class and depression: A test of social causation and social selection models. *British Journal of Psychiatry, 178,* s84–s90.

Rodgers, B., & Mann, S. L. (1993). Re-thinking the analysis of intergenerational social mobility: A comment on John W. Fox's "Social class, mental illness, and social mobility." *Journal of Health and Social Behavior, 34,* 165–172.

Srole, L., Langner, T. S., Michael, S. T., Kirkpatrick, P., Opler, M., & Rennie, T. A. C. (1977). *Mental health in the metropolis: The Midtown Manhattan Study.* New York: Harper & Row.

U.S. Census Bureau. (2003). *Summary file 3: 2000 census of population and housing, technical documentation*. Washington, DC: U.S. Government Printing Office.

Weich, S., & Lewis, G. (1998). Poverty, unemployment, and common mental disorders: Population based cohort study. *British Medical Journal, 317,* 115–119.

Received April 10, 2003
Accepted January 30, 2004 ■