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SOCIOECONOMIC STATUS AND PSYCHIATRIC DISORDER: A PANEL STUDY

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ABSTRACT

Using the method of "Differential in Cross-lagged Panel Correlations", this paper attempts to evaluate the causal priority between socioeconomic status and mental illness on the basis of a secondary analysis of the panel data collected by the Stirling County Project from a sample of 132 non-institutionalized house-hold heads residing in twelve Canadian rural communities. It was found that socioeconomic status was more likely to have causal priority over mental illness, particularly among male adults. In other words, the "social causation" hypothesis may be more plausible than the "social drift" hypothesis.

SOCIOECONOMIC STATUS AND PSYCHIATRIC DISORDER: A PANEL STUDY*

This paper is derived from a ten-year panel study. It attempts to analyze the "causal" relationship between changes in mental illness and changes in social class status.

Over the last few decades, mental health workers have been greatly concerned with the relationship between mental illness and social environment. There exists, however, a controversial issue: do social-structural forces predispose mental illness? or do mental disorder cause changes in social-structural characteristics? To shed light on this interesting but controversial issue, the present paper attempts to focus on one aspect of the social-structural forces; namely, social class or socioeconomic status. This selection is primarily due to the fact that the "causal" direction between mental illness and socioeconomic status is most frequently discussed but not yet well understood.

Many social-epidemiological studies have supported the finding that there is an inverse relationship between socioeconomic status and mental illness (See Dunham, 1961; Mishler and Scotch, 1963; Faris and Dunham, 1939; Hollingshead and Redlich, 1958; and Srole, et al., 1962). This finding, however, can be interpreted in terms of two competing hypotheses: (1) Social Causation, i.e., the indigenous forces within social class influence the precipitation of mental illness, and (2) Social Drift, i.e., the mentally disordered tend to move into the lower strata as a result of their mental disability. The problem is: which interpretation or hypothesis is more plausible? A number of social and psychiatric researchers have debated on this issue (For review papers, see Mishler and Scotch, 1963; Dohrenwent, 1966; and Turner and Wagenfeld, 1967).

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* This paper derives from the Stirling County Study directed by Dr. Alexander H. Leighton. I gratefully acknowledge the encouragement and suggestions from the late Professor Edward A. Suchman. I am also indebted to the support and cooperation from Professor Alexander H. Leighton and his staff in the Department of Behavioral Sciences, Harvard University School of Public Health.

The pioneering work of Faris and Dunham (1939) supported the social causation framework by presenting some indicators of the stress of social isolation within the disorganized area in urban city. Tietze, Lemkau, and Cooper (1941) asserted that the differential distribution of schizophrenic patients by social class can not be accounted for by the downward movement of those who were already ill. Jaco (1959) discovered that more intergenerational downward mobility appeared in communities with high rates of mental illness, and argued that the indigenous conditions indicative of inducing isolation within given communities may be precipitants of schizophrenia. Hollingshead and Redlich (1958) noted that a substantial proportion of the schizophrenics were in the same class as their families of origin, while a very small proportion of the schizophrenics were in a lower class. Turner and Wagenfeld (1967) compared the intergenerational occupational mobility of schizophrenic males with that of a nonpatient sample, and found that the fathers of the patients were overrepresented at the lowest occupational level, but to a lesser degree than the patients. These studies supported the social causation hypothesis.

The above writers have merely shed light on one side of the coin. While Clausen and Kohn (1959) have found an approximately equal mobility between schizophrenics and controls, Lystad (1957) found that the first admission schizophrenics in New Orleans were more downwardly mobile than their controls. Dunham (1964) reported that schizophrenics in his Detroit sample showed no significant downward or upward mobility patterns; but in a later study of male schizophrenics, Dunham, Phillips and Srinivasan (1966) concluded that "it is the nature of disease that determines the class position of the schizophrenic, at least by the measure of occupation and education, and that it is not the class position that influences the nature of the disease". In their community study of Midtown Manhattan, Srole and his associates (1962) argued that the various psychiatric symptoms interfere with the life adjustment of the person and hence lead to downward mobility. A study in England by Goldberg and Morrison (1963), analyzing both intergenerational and intragenerational occupational mobility, also supported the social drift hypothesis.

The above studies have apparently contributed contradictory findings to the question: which causes which? These inconsistent findings may be due to many possible sources of potential error. Mishler and Scotch (1963), for example, have mentioned three: (1) the case finding precedures are not independent of social class, (2) the diagnostic procedures are not independent of social class, and (3) the measurement of social class is unreliable. Taking into consideration these possible sources of error, the present paper attempts to add knowledge to the understanding of the "causal priority" between social class and mental illness. Is social class more likely to be causally prior to mental illness? or, is it more plausible to be the other way around?

It should be noted that the previous studies largely worked with cross-sectional data. It is inherently difficult to analyze causality in such studies. As Rinehart (1966) has demonstrated in his critique of the work by Dunham, Phillips, and Srinivasan (1966), "in the absence of longitudinal information, selection of either interpretation (i.e., social causation or social drift) would have to be based on purely arbitrary criteria". A special feature of present paper is that it works with panel data, rather than data at one point in time. It is thus able to provide a more logical and accurate analysis of the causal relationship between social class and mental illness.

Furthermore, most of the previous studies primarily used the socioeconomic status of parents as the point of origin for measuring the status mobility of the respondents. They analyzed the intergenerational mobility rather than the mobility of an individual's own socioeconomic status. Since this panel study would re-examine the same respondents at different points in time, we could therefore measure the individual's own socioeconomic status mobility in relation to his own changes in mental health status over a period of time.

METHOD OF PROCEDURE

The present study used part of the data collected by an inter-disciplinary team, directed by Alexander H. Leighton, in the Stirling County Project (See Leighton, 1959; Hughes, et al., 1960; and Dorothea Leighton, et al., 1963) in 1952 and in 1962-63. Leighton and his associates had described in detail their methodological procedures, which were essentially the same for both 1952 and 1962-63 surveys. Nevertheless we would like to briefly recapitulate some of their research procedures and then incorporate our methodological approach to the particular problem under study.

Stirling County, located in one of the Canadian Atlantic Provinces, is a rural and small town region with a total population of 20,000. The county contains approximately 100 place-name areas, and consists of two main ethnic groups, English and French Acadian. In addition, there are several small Negro communities and a scattering of Micmac Indian families.

In 1952, a 211-item structured questionnaire was administered through interviews to a stratified probability sample of 1,015 male and female household heads in the county-as-a-whole. These household heads might or might not receive psychiatric care, but they were not institutionalized then. Ethnic composition was one of the major criteria for stratifying the county-population.

The questionnaire was intended to elicit sociocultural as well as psychiatric information. For psychiatric information each respondent was asked about health history as well as a series of neuropsychiatric screening questions. Many additional data were gathered, however, both for psychiatric and sociocultural purposes. For example, all the local physicians were interviewed by the project psychiatrists for comments on any respondents whom they knew, and a search of hospital records was conducted both in the local hospitals and in the mental and general hospitals at the nearest metropolitan center. These psychiatric data from different sources were combined into protocols on each of the sample respondents. The project psychiatrists then evaluated and described they symptoms of psychiatric interest in the protocols.

Each respondent may have multiple symptoms. The 1952 Diagnostic and Statistical Manual of the American Psychiatric Association was used as the standard method of symptomatic classification and description, rather than diagnosis. This evaluation procedure was thus independent of socioeconomic background. Each symptom pattern was also judged and rated in terms of the time and duration of presence, the amount of impairment on the respondent's normal life functioning, and the degree to which the psychiatric evaluator was confident in describing the respondent with this particular symptom category.

Leighton and his associates undertook a re-survey in 1962-63. A representative sample of 404 was drawn from the adult population of twelve communities in the County. The questionnaire schedules used in the re-survey were designed to elicit the same type of information that had been gathered in 1952 plus additional data on changes that had occurred during the ten years.

In both 1952 and 1962-63 surveys, the case-finding procedures were apparently independent of socioeconomic background. By comparing the two samples, we found that there were 132 individuals interviewed at both points in time. The present panel study attempts to analyze these 132 adults in terms of their changes in socioeconomic status and mental health over the decade. It should be noted, however, that these individuals under study may not constitute a representative or probability sample of the county population.

Psychiatric Disorder. To summarize all the symptomatology reported in the protocol, the Stirling County Project psychiatrists constructed a four-point (ABCD) "caseness" rating scale. The scale expresses the likelihood, felt by the evaluators, that the individual is, or at sometime has been, a psychiatric case (i.e., manifesting one or more of the specific psychiatric conditions described in the 1952 APA Manual). The method of psychiatric evaluation involves an agreement of judgements made by a panel of psychiatrists. The inter-rater reliability was found to be highly satisfactory (See Dorothea Leighton, et al., 1963: 423-38).

However, this caseness scale is cumulative over time as it is based upon "life-time" (current and/or past) symptomatology.[1] It is not appropriate for the purpose of the present panel study, which attempts to investigate the internal shifts toward mental deterioration as well as improvement. We therefore introduce a new composite index of "Psychiatric Disorder", which refers to the extent that a person is currently in need of psychiatric attention. It is based on the number and types of current symptom patterns, the amount of impairment caused by each symptom pattern, and the degree of confidence for assigning symptom categories. This overall index of psychiatric disorder is of three degrees: high, medium, and low.[2]

Our Psychiatric Disorder Index and the ABCD caseness scale differ in at least two ways: (1) the ABCD scale is a "life-time" measure while our index is based on "current" symptoms only; and (2) the ABCD scale is a probability statement of being a case while our index also implies the degree of disability due to mental disorder. Nevertheless, both are overall estimates of mental health status. They should share a certain amount of common properties, but are, of course, not identical. We tested the relationship between these two measures on the basis of the 1952 survey data, and found that the association was strong and positive. The Somers'd coefficient was .43.[3] In other words, if

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1 "Current" means within the last six months, while "past" means before the last six months.

2 For the construction and use of this index, we are indebted to Morton Beiser and Alexander H. Leighton, Department of Behavioral Sciences, Harvard School of Public Health. It is noted that among the various symptom patterns, Mental Deficiency and Brain Syndrome receive more weight than the others. Examples for a high degree of current psychiatric disorder are: (1) Brain Syndrome with significant impairment and high confidence; (2) Brain Syndrome with significant impairment but medium confidence, plus Psychophysiologic and Psychoneurologic symptoms. Examples for a medium degree are: (1) Brain Syndrome with significant impairment but medium confidence; (2) Psychophysiologic plus Psychoneurologic, both with high confidence but either one with negligible impairment. Examples for a low degree are: (1) Psychophysiologic plus Psychoneurotic, both with high confidence but negligible impairment; (2) no symptoms at all.

3 The statistical value of this non-parametric and asymmetric statistical measure of association for ordinal variables varies from -1 to +1. For a detailed description of this statistical model, see Somers (1962).

the rank-order for two individuals on the ABCD scale were known, then they would have 43 percent greater chances of being in same order than in different order on the psychiatric disorder index. To control on sex and age (60 and over, 40 to 59, and under 40), we found that the association was positive in all subgroups, and that it was particularly strong among females (d = .46) and among those at the age of 60 or over (d = .53). These findings apparently increase the validity of our new index.

Socioeconomic Status. Most of the social-epidemiological studies of psychiatric disorder used occupation and/or education as measures of socioeconomic status. However, the household heads or adults in the present study were unlikely to change their educational levels over time. Furthermore as suggested by the Stirling County Project researchers, the various classifications of occupation may not be meaningfully applicable for the measurement of social class status in a rural population. We hence decided to use eight indicators concerning the material style of life or the living conditions of the respondents. Five of these indicators were taken from responses to questionnaire items about household possessions including the lighting facilities, food refrigeration, toilet facilities, clothes washing, and heating facilities. The remaining indicators were from interviewer ratings on the quality of interior furnishings, house-type, and room-person index. Each of these indicators was dichotomized (See Hughes, et al., 1960: 459-66). They were then summed up to form a Likert-type scale, the score of which varies from 0 to 8 indicating the degree of socioeconomic status. However, in view of the trend of modernization and technological progress, we could expect that many more individuals would be on the upper end of the scale in 1962-63 than were in 1952.[4] In other words, a particular score in 1952 may not have the same subjective value to the same individual in 1962-63. Instead of taking the absolute values, we therefore transformed them into a set of relative or standard scores, and then collapsed the scores into three categories (high, medium, low) by taking the 33th and 77th percentiles as cutting points. An individual's socioeconomic status is hence defined in terms of his relative position to other sample respondents at a particular point in time.

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[4] This expectation was confirmed by our data. We found that almost no individual moved downward on this scale over the ten years.

Statistical Model. To detect which of the two variables (socio-economic status and psychiatric disorder) is more likely to have causal priority over the other, we employ the method of "Differential in Cross-lagged Panel Correlation", developed by Pelz and Andrews (1964).[5] The basic logic of this method is to measure the difference in the diagonal (i.e., cross-lagged) relationships between two variables on the basis of over-time data.

Both socioeconomic status and psychiatric disorder variables in the present study are measured on ordinal level. We decided to employ Kendall's Tau-c to measure their cross-sectional as well as longitudinal relationships. Our decision is based on several considerations: (1) Tau-c is a symmetric measure of association between variables measured on ordinal levels; (2) its statistical value ranges from -1 to +1 for equal or unequal number of rows and columns; (3) its application does not require the assumption of no ties on either variable; and (4) Kendall has developed a partial rank correlation method (See Kendall, 1955; and Siegel, 1956).[6] However since we can not claim that the present sample is random or representative in statistical term, we will not conduct any statistical test of significance (See Selvin, 1957; and Duggan and Dean, 1968).

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5 As discovered by Pelz and Andrew (1964), a similar method was independently developed by Cambell, "From Description to Experimentation: Interpreting Trends as Quasi-Experiments" in Harris (1963). In the case where the variables are dichotomous, Lazarsfeld's method of sixteen-fold table may be used to detecting causal priorities (See Zeisel, 1957).

6 Tau-c is basically a measure of deviation in the direction of monotonic correlation. Perfect monotonic correlation is represented by a situation in which the value of one variable increases as the other variable increases and conversely, regardless of the rate of increase. Hence, the greater the statistical value of Tau-c, the less is the deviation from perfect monotonic correlation. It should however be underscored that a limitation of Tau-c is that its statistical value has no clear cut operational interpretation.

FINDINGS

Before we detect the causal priority, let us first present the cross-sectional relationship between socioeconomic status and psychiatric disorder among the 132 sample respondents in 1952 and in 1962-63. The data distribution in Tables 1 and 2 obviously show that there was an inverse relationship between socioeconomic status and psychiatric disorder in 1952 as well as in 1962-63. In other words, the lower the socioeconomic status, the higher was the degree of psychiatric disorder; and vice versa. These findings are therefore consistent with general findings in most social-epidemiological studies with respect to the social class and mental illness relationship at one point in time. But which causes which?

Table 1. Socioeconomic Status and Psychiatric Disorder in 1952 (N = 132)

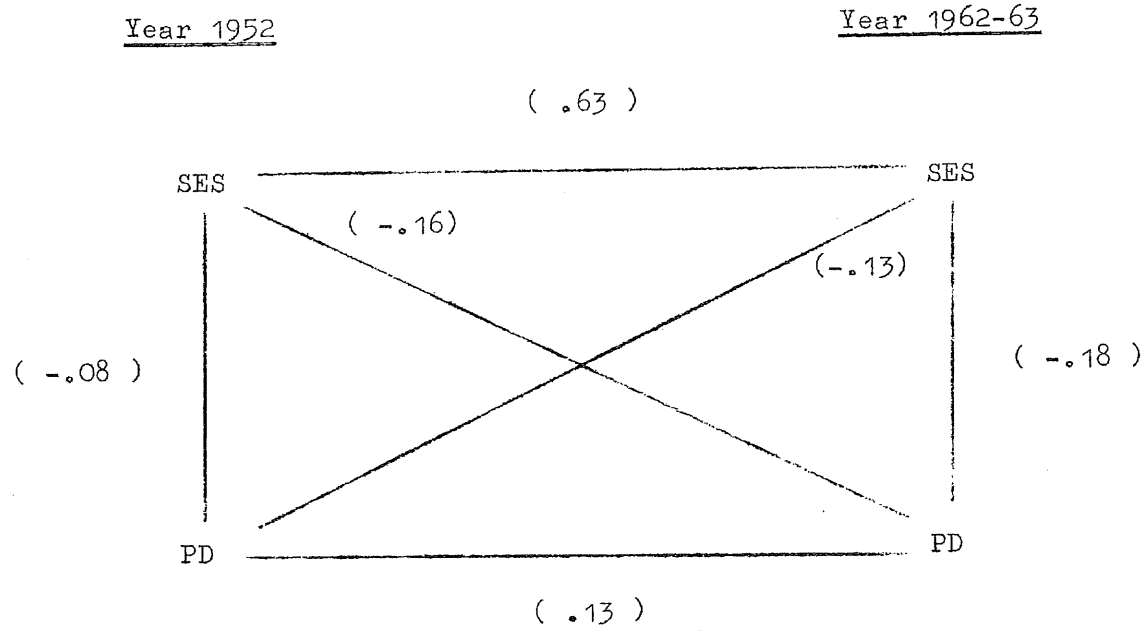
Psychiatric Disorder	Socioeconomic Status: Low N	Low %	Middle N	Middle %	High N	High %
High	7	13.7	3	7.3	2	5.0
Medium	11	21.6	8	19.5	8	20.0
Low	33	64.7	30	73.2	30	75.0
Total	51	100.0	41	100.0	40	100.0

Table 2. Socioeconomic Status and Psychiatric Disorder in 1962-63 (N = 132)

Psychiatric Disorder	Socioeconomic Status: Low N	Low %	Middle N	Middle %	High N	High %
High	14	25.5	2	5.4	4	10.0
Medium	21	38.1	12	32.4	14	35.0
Low	20	36.4	23	62.2	22	55.0
Total	55	100.0	37	100.0	40	100.0

Figure 1 summarizes the results from our application of the method of "differential in cross-lagged panel correlations" to the overtime data. It was found that (1) the inverse relationship between socioeconomic status and psychiatric disorder was stronger in 1962-63 (tau-c = -.18) than it was in 1952 (tau-c = -.08); (2) socioeconomic status had a higher degree of stability (tau-c = .63) than had psychiatric disorder (tau-c = .13) over the decade; (3) the diagonal relationship between socioeconomic status in 1952 and psychiatric disorder in

Figure 1. Causal Priority Between Socioeconmic Status (SES) and Psychiatric Disorder (PD). Figures in parenthesis are tau-c coefficients.



1962-63 (tau-c = -.16) was stronger than was that between psychiatric disorder in 1952 and socioeconomic status in 1962-63 (tau-c = -.13). However, since the diagonal relationships were inevitably contaminated by the lagged self-correlations for each variable, it would be mistaken if we draw a conclusion of causal priority by comparing the two diagonal correlation values. In order to free the diagonal relationships from

this constraint, we employed the technique of partial correlation. The Kendall partial rank correlation coefficient for the relationship between SES (socioeconomic status) in 1952 and PD (psychiatric disorder) in 1962-63 controlling on PD in 1952 was found to be .15; while that for the relationship between PD in 1952 and SES in 1962-63 controlling on SES in 1952 was .10. Apparently the former coefficient is greater than the latter one. We hence conclude that socioeconomic status is more likely to have "causal priority" over psychiatric disorder. In other words, the hypothesis SES ——→ PD (social causation) is more plausible than PD ——→ SES (social drift).

Since sex as a variable is of overwhelming concern to most psychiatric researchers and it may be an intervening variable in the causal links under study, we would like to elaborate the causal priority between socioeconomic status and psychiatric disorder separately among men and women. It was found that (1) the Kendall partial rank correlation coefficient between SES in 1952 and PD in 1962-63 controlling on PD in 1952 is .13 for men and is .16 for women; while (2) that between PD in 1952 and SES in 1962-63 controlling on SES in 1952 is .08 for men and is .13 for women. Hence, we found that the original findings that SES ——→ PD was more likely than PD ——→ SES were held among both men and women. Further, since the difference between the two diagonal partial correlations is .05 (= .13 - .08) among men while that among women is .03 (= .16 - .13), we may say that the causal priority of socioeconomic status over psychiatric disorder was stronger among men than among women.

SUMMARY AND DISCUSSION

The present paper attempts to evaluate the causal priority between socioeconomic status and mental illness, on the basis of a secondary analysis of the panel data collected by the Stirling County Project from a sample of 132 non-institutionalized household heads residing in twelve Canadian rural communities. The concept of psychiatric disorder was measured by a composite index of current psychiatric symptoms which were classified on the basis of the 1952 APA Manual, while the socioeconomic status scale was composed of eight items concerning the material style of life of the respondents. This study therefore focused on the causal relationship between an adult's own socioeconomic status mobility and his own mental health changes over a decade, instead of taking the socioeconomic status of parents as the point of origin for measuring the status mobility of the respondents.

The method of "Differential in Cross-lagged Panel Correlations" and Kendall's tau-c measure of association were used to detect the causal priority. It was found that socioeconomic status was more likely to have causal priority over mental illness, particularly among male adults. We therefore concluded that the "social causation" hypothesis may be more plausible than the "social drift" hypothesis.

It should be underscored that this paper attempts to shed some light, rather than make a firm conclusion, on the controversial issue of social causation verses social drift. We recognize that our analysis may be subject to several limitations. First, the concept of "causality" is exceedingly perplexing (See Simon, 1957; Leighton, 1960, and Blalock, 1961).[7] Although this paper has suggested that socioeconomic status is more likely to be causally prior to psychiatric disorder, it does not preclude the possibility that these two events may influence and reinforce each other in the process of change, or that the causality may be spurious. Furthermore, this paper has attempted to test the causal relationship of socioeconomic status, as measured by items concerning the material style of life, to an

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[7] Leighton (1960) presented a detailed discussion on the problem of causality in relation to social-psychiatric epidemiology.

overall index of psychiatric disorder. But both concepts are by no means unitary. Different dimensions of socioeconomic status (e.g., occupation, income, education, and residence) may have different patterns of causal relationship to different types of mental illness (e.g., psychophysiologic, pychoneurologic, sociopathic, schizophrenic, and brain syndrome). Similarly, this paper has tested the causal priority between socioeconomic status and psychiatric disorder among different sex-groups; but the finding may not be the same in other social-demographic groups, such as age and ethnic groups. The small sample size in this study, however, precludes us from introducing other "test" variables.

Second, Russell (1929) and Blalock (1961) have observed that causal laws are really only applicable to a completely isolated system. It is thus very difficult to make causal inferences on the basis of non-experimental data which are collected not in a completely controlled or isolated situation. It becomes necessary for this paper to postulate a simplifying assumption that the error terms, including measurement errors and confounding effects of outside factors, are randomly distributed and hence negligible. However the methodological problems of unreliability and invalidity are much more serious in panel design than in experimental research or cross-sectional survey (See Kendall, 1954; Zeisel, 1957; and Harris, 1963). Findings in the present panel study may be partially, if not entirely, a product of measurement errors. Moreover, the fact that the sample under study is relatively small (N = 132) and was selected with unknown probability precludes us from making a firm conclusion and generalization.

Third, the method of "differential in cross-lagged panel correlations" is in general a promising approach to evaluate causal priorities, but as Pelz and Andrew (1964) have stressed this method will not work if (1) the variables under study are markedly inconsistent over time and (2) the interval of remeasurement does not match the underlying interval of causation. Since we were not able to test these two basic assumptions, they may constitute possible sources of error in this study.

Fourth, psychiatric symptoms in this study were judged and defined by project psychiatrists in the Stirling County Study, but what is "real" for the psychiatrists may not be so for the members in local communities. As human thought is founded in daily activity and in the social relations brought about by this activity (See Berger and Luckman, 1966), the subcultural difference between project psychiatrists and respondents may be a possible source of error in this study. This problem becomes more serious in view of the finding that there are group differences in modes of expressing distress, including some that involve problems of response bias (Dohrenwend, 1966).

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