



香 港 中 文 大 學  
社 會 研 究 中 心

Social Mobility as a  
Source of Psychic Stress

Rance P. L. Lee

**SOCIAL RESEARCH CENTRE**  
**THE CHINESE UNIVERSITY**  
**OF HONG KONG**

**Suggested citation:**

Lee, Rance P. L. 1973. *Social Mobility as a Source of Psychic Stress*. Hong Kong: Occasional Paper No. 28, Social Research Centre, The Chinese University of Hong Kong.

SOCIAL MOBILITY AS A SOURCE OF  
PSYCHIC STRESS  
(Centre Paper)

By  
Rance P.L. LEE

Social Research Centre  
The Chinese University of Hong Kong

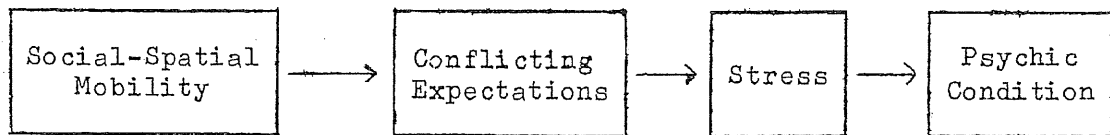
June 1973

## ABSTRACT

This study examined the combined, relative, and interaction effects of three social-spatial mobility variables upon the incidence of psychiatric symptoms among a group of Canadian rural adults over a period of ten years. The Automatic Interaction Detector was employed as the major statistical procedure for data-analysis. It was found that the three mobility variables together accounted for about one-eighth of the total variations. Spatial mobility during adulthood was relatively the most powerful variable, followed by socioeconomic status mobility; while spatial mobility during childhood was the least important factor. Those respondents who were spatially very mobile during adulthood and were socioeconomically downward-mobile or remaining-to-be-low had the highest rate of incidence, while those respondents who were spatially stable during both childhood and adulthood and were socioeconomically upward-mobile or remaining-to-be-high had the lowest rate.

## SOCIAL MOBILITY AS A SOURCE OF PSYCHIC STRESS\*

In most human societies, an individual is able to move from one social position to another. He may move horizontally between different cultural and spatial areas, or may move vertically between different socioeconomic strata within a social setting. However, these changes in social or spatial positions involve changes in cultural values and norms as well as changes in interpersonal relationships. The conflicting expectations, resulting from changes in social-spatial environment, may become a stress situation to the psychic stability of the individual. This causal process can be visualized in terms of the diagram as below:



Indeed, many studies have empirically demonstrated that migration and social mobility increase the likelihood of mental illness.<sup>4,5,12,13,16,21</sup> Most of these studies, however, are confronted with some essential issues. First, as suggested by Mishler and Scotch,<sup>13</sup> the case finding methods and the diagnostic procedures are not independent of the social correlates.

---

\* This paper is a secondary analysis of part of the data collected by the Stirling County Project at Harvard University School of Public Health. I wish to thank Dr. Alexander H. Leighton, director of the Stirling County Project, who made this research possible. The late Professor Edward A. Suchman has given valuable suggestions.

It is then possible that the demonstrated association between mobility and mental illness is an artifact rather than the objective reality. Second, previous findings were largely collected and analyzed in terms of the retrospective study design. Since (1) the incidence rate, rather than the prevalence rate, is a proper index of disease in etiological studies,<sup>9</sup> and (2) mobility implies a time-dimension, it is more logical to use the prospective, rather than the retrospective, design for testing the effects of mobility on psychic condition. Third, previous studies are primarily concerned with the effects of a particular type of mobility (e.g., migration or occupational mobility) on mental illness. The relative importance, the combined influence, and the interaction effects of several types of mobility have yet to be investigated.

The present paper is derived from a longitudinal study of a group of rural adults in Canada. Its objective is to evaluate the relative importance, the combined and the interaction effects of socioeconomic and spatial mobilities upon the incidence of psychiatric symptoms over a period of ten years. The case-finding and the measurement procedures of psychiatric disorders have been made to be as independent from social correlates as possible.

### Methods

This paper analyzed part of the data collected by an interdisciplinary team, directed by Alexander H. Leighton, in the Stirling County Project.<sup>7, 10, 11</sup> The county is located in one of the Canadian Atlantic Provinces. It is a rural and small town region with a total population of about 20,000. The County contains approximately 100 place-name areas, and mainly consists of two main ethnic groups, English and French Acadian.

Leighton's research team conducted a questionnaire survey of a representative sample of 1,015 adults in the county-as-a-whole in 1952, and also undertook a re-survey of a sample of 404 adults in twelve communities in 1962-63. The respondents might or might not have been receiving psychiatric care, but they were not institutionalized then. Since representativeness was a major criterion in the selection of the two samples, the case-finding procedures had been made to be as independent as possible of the social correlates.

The survey questionnaire was intended to elicit sociocultural as well as psychiatric information.<sup>7</sup> For psychiatric information each respondent was asked about health history as well as a series of neuro-psychiatric screening questions. Many additional data were also gathered from relevant sources for psychiatric purposes. These psychiatric data from different sources were combined into protocols on each of the sample respondents. The project psychiatrists then evaluated and described the symptoms of psychiatric interest in the protocols. 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, and each respondent might have multiple symptoms. This evaluation procedure was thus relatively independent of social correlates.

In the present study, all the symptomatology of each respondent was summarized by a composite index of psychiatric disorder, which refers to the extent that a person is currently (i.e., within the last six months) 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, and the degree of confidence on the part of the psychiatric evaluator for assigning such symptom categories. This overall index of psychiatric disorder is of three points: high, medium, and low. 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 Psychophysiological and Psycho-neurologic symptoms. Examples for a medium degree are: (1) Brain Syndrome with significant impairment but medium confidence; (2) Psychophysiological plus Psychoneurologic, both with high confidence but either one with negligible impairment. Examples for a low degree are: (1) Psychophysiological plus Psychoneurotic, both with high confidence but negligible impairment; (2) no symptoms at all.

To test the validity of this overall index, we analyzed its relationship to Leighton's ABCD caseness rating scale.<sup>10</sup> Since (1) the ABCD scale is a life-time prevalence 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 psychic symptoms, we expect that the two measures should have a high correlation, but are, of course, not identical. On the basis of the data in the 1952 sample, we found that the association was strong and positive. The Somers' d coefficient is .43. The association remains strong and positive among different sex-age groups.

Since the objective of this study is to investigate the incidence of psychiatric symptoms over the ten years, rather than the state of illness at one point in time, we constructed an overall measure of symptom incidence on the basis of the aforementioned composite index of psychiatric disorder in 1952 and in 1962-63. A respondent has had incidence of psychiatric symptoms if his degree of psychiatric disorder in 1962-63 was relatively higher than that in 1952. With this definition, we found that 52 of the 132 individuals under study were mentally less healthy in 1962-63 than in 1952.

To account for the variations in the incidence of psychiatric symptoms, we introduced the variable of spatial mobility and of socioeconomic mobility. Spatial mobility refers to the number of moves or changes in residence from one place-name area to another. Since the moves during childhood and during adulthood may produce differential consequences for psychiatric well-being,



we subdivided the variable into two sub-variables: (1) spatial mobility through the age 20, and (2) spatial mobility after 20.

Socioeconomic mobility refers to the individual's change in his living conditions or material style of life. The socioeconomic status of an individual at one point in time was measured by eight indicators, of which five were taken from responses to questionnaire items about household possessions including the lighting facilities, food refrigeration, toilet facilities, clothes washing, and heating facilities, while the remaining three were from interviewer ratings on the quality of interior furnishings, house-type, and room-person index. Each of these indicators was dichotomized, and all were then summed to form a Likert-type scale.<sup>7</sup> However, in view of the trend of modernization we could expect that many more individuals would be on the upper end of the scale in 1962-63 than in 1952. In other words, a particular score in 1952 might not have the same subjective value to the same individual in 1962-63. Instead of taking the absolute values, we transformed them into a set of standard scores, and then collapsed such scores into three degrees by taking the 33rd and 67th percentiles as cutting points. An individual's socioeconomic status is determined by his relative position to other sample respondents at a particular point in time. Changes in these relative positions from 1952 to 1962-63 were then classified into four types to form an index of socioeconomic mobility: (1) downward-mobile, i.e., changing from a relatively high socioeconomic position to a lower one, (2) low-stable, i.e., being in low socioeconomic position in both years, (3) high-stable,

i.e., being in high or medium socioeconomic position in both years, and (4) upward-mobile, i.e., changing from a relatively low socioeconomic status to a higher one.

To analyze the relative, the combined and the interaction effects of spatial and socioeconomic mobilities upon the incidence of psychiatric symptoms, we employed the AID (Automatic Interaction Detector) model, also called "Tree Analysis," developed by Morgan and Sonquist.<sup>14, 15</sup> Regarding one of the variables as a criterion variable, the model employs a nonsymmetrical branching process to subdivide the sample, through a series of binary splits, into a mutually exclusive series of subgroups. The binary splits are chosen so that at each step in the procedure, the two subgroup-means account for more of the total sum of squares than the subgroup-means resulting from any other binary split. As a result, the explanatory variables will be combined in such a way that we can obtain a maximum predictability of the values of the criterion variable. However, there are at least two requirements in using the AID model. First, the explanatory variables can be measured on nominal or ordinal level, but the criterion variable must be measured on interval level. To meet this requirement, we transformed the criterion variable, i.e., the incidence of psychiatric symptoms, into a 1-0 dummy variable. Those who had incidence of symptoms were scored 1; otherwise, scored 0. Second, the model requires a decision on the stopping criteria for the splitting process. Our stopping criteria are: (1) minimum size of a group for further splitting is 25 cases, (2) minimum size of a group resulting from preceding splitting is 3 cases, (3) the best

split on a candidate group must reduce the unexplained sum of squares by at least .005 proportion of the total sum of squares or that group will not be split.

### Findings

Figure 1 shows the tree structure for the three mobility variables. The numbers under particular variable-categories represent the proportion of respondents who had incidence of symptoms, while the numbers in parentheses represent the base of the proportion, i.e., the total number of respondents in the particular group.

Socioeconomic mobility was the first variable to be introduced. Those who were downward-mobile or low-stable were more likely to develop symptoms than those who were upward-mobile or high-stable. Spatial mobility after the age 20 was the second variable to be considered. In both subgroups of socioeconomic mobility, the higher the frequency of spatial movements the more likely were the respondents to have incidence of symptoms. Spatial mobility through the age 20 was the last variable to be employed. In the two subgroups which were split, the likelihood of symptom incidence was directly associated with the number of spatial movements during childhood. Hence, most of the binary splits in the tree go into the expected directions: those who were spatially mobile through the age 20 or thereafter and those who were socioeconomically downward-mobile or low-stable were found to be more likely than others to have incidence of psychiatric symptoms over the decade.

Nevertheless, one exception from the above expected findings was observed. The variable of spatial mobility after the age 20 was reintroduced into the tree analysis during the third step of binary split. It turned out that 50% of the respondents in the subgroup with 1 or no move had developed symptoms, but only 27% of those in the subgroup with 2 moves were so. This exceptional finding may suggest a channel to minimize the noxious effects of downward mobility or remaining to be low in the socioeconomic scale. In other words, moving away from the socioeconomically frustrating environment may reduce the amount of stress on the psychic condition of an individual. But, of course, as demonstrated by the aforementioned findings it should be under the condition that the movement is not too frequent (3 times or more).

The trunks in the tree structure picture the various ways in which the three mobility variables interact in the process of explaining the incidence of psychiatric symptoms. Their interaction effects were summarized in Table 1. The seven final groups, resulting from the tree analysis, represent the maximum explanation of the symptom incidence. The groups were listed in decreasing order in terms of the proportion of respondents with symptom incidence. Group 1 and Group 7 were markedly different from other groups. Group 1 consisted of those who were spatially very mobile after the age 20 and were socioeconomically downward-mobile or low-stable. This group of respondents had the highest rate of incidence (75%). On the contrary, Group 7 had the lowest

rate (13%). It consisted of those who were spatially stable through and after the age 20 and were socioeconomically upward-mobile or high-stable.

The proportion of respondents with symptom incidence in the remaining groups ranged from 27% to 59%. Group 3, however, should receive some attention. It indicates that among those who were upward-mobile or high-stable, spatial movements during adulthood would produce a high probability of symptom incidence. Of the 23 respondents, 48% had developed psychiatric symptoms.

What is the combined effects of the three mobility variables upon the incidence of symptoms? From Figure 1, it can be observed that the total sum of squares (TSS) in the criterion variable is 31.52, and that the coefficient of determination ( $R^2$ ) is .1224. In other words, the three mobility variables together accounted for 12.24 per cent of the variance in the criterion variable of symptom incidence.

Table 2 presents the relative explanatory power of each mobility variable. The "gross beta coefficient" represents the proportion of variance which can be explained by the particular mobility variable alone in a one-way analysis of variance. The "partial beta coefficient" represents the proportion of variance explained by the particular mobility variable in the tree structure. The sum of all the partial beta coefficients is thus equal to the coefficient of determination. The last column of the table indicates the predictor type identified in the tree

analysis. Type M (monotonic) means that the order of the coded values be maintained during the binary split, while type F (free) means that the values or categories can be re-arranged. Since the two variables of spatial mobility were measured on interval level, we imposed a type "M" to them. As the variable of socioeconomic mobility was measured on nominal level, it was assigned with a type "F". It was found that spatial mobility after the age 20 was the most powerful explanatory variable, followed by socioeconomic mobility. In other words, spatial movements during adulthood had produced relatively stronger effects than socioeconomic mobility upon the incidence of symptoms over the decade, while socioeconomic mobility was relatively more important than the spatial mobility through the age 20.

In the above statistical analyses, no test of significance was employed. The reason is that our sample respondents were not selected with known probability. The 132 adults under study were by accident interviewed in both the 1952 and the 1962-63 sample surveys conducted by the Stirling County Project investigators. We consider it inappropriate to test the statistical significance of results on the basis of a non-probability or accidental sample.<sup>18</sup> It follows that our findings might be contaminated by sampling bias. Nevertheless, we believe that the findings should have a high degree of validity since they are generally consistent with previous findings and with our theoretical expectations.

### Summary and Discussion

The central concern of this paper is about the impact of social-spatial mobility upon changes in mental health status. To shed light on this issue, we have studied the combined influence, the relative importance and the interaction effects of three mobility variables on the incidence of psychiatric symptoms among a group of 132 rural adults in a Canadian County over a period of ten years. The mobility variables are: (1) spatial mobility through the age 20, (2) spatial mobility after the age 20, and (3) socioeconomic mobility during the ten years. The respondents were interviewed by the investigators in the Stirling County Project in 1952 and were re-interviewed in 1962-63. The model of Automatic Interaction Detector was employed as the major tool of statistical analysis.

We found that the three variables of social-spatial mobility together accounted for about one-eighth (12.24%) of the total variations in the incidence of psychiatric symptoms over the decade. It suggests that a substantial portion of the variations remains to be explained by other variables, such as demographic characteristics and other social-psychological factors. Social-spatial mobility can only be taken as one of the many possible sources of stress on the psychic condition of an individual.

With regard to the relative importance of the mobility variables, we found that spatial mobility after the age 20 was the most powerful factor in determining the onset of psychiatric

symptoms. Socioeconomic mobility was not as important as spatial mobility after the age 20, but it was more powerful than the spatial mobility through the age 20. The least importance of spatial mobility through the age 20 may be due to the age characteristics of the sample respondents. During the ten years of our study, all respondents were in their adulthood. The psychic stress, resulting from spatial mobility during childhood, might have disappeared or have already produced psychiatric symptoms before the initiation of this study. In other words, we may have under-estimated the significance of spatial mobility through the age 20. Nevertheless, it seems valid to say that spatial mobility during childhood may not have significant long-term effects upon the incidence of psychiatric symptoms during adulthood.

It is underscored that our evaluation of relative importance is based on the statistical criterion, rather than the theoretical criterion. An explanatory variable may be statistically important but theoretically insignificant in the causal process.<sup>1</sup> The order of importance among the three mobility variables may be altered if they are evaluated in terms of the theoretical, rather than the statistical consideration.

The interactions among mobility variables were pictured by the tree structure. It was found that the group of respondents who were spatially very mobile after the age 20 and were socio-economically downward-mobile or low-stable had the highest rate of symptom incidence, while the group of respondents who were spatially stable through and after the age 20 and were socio-



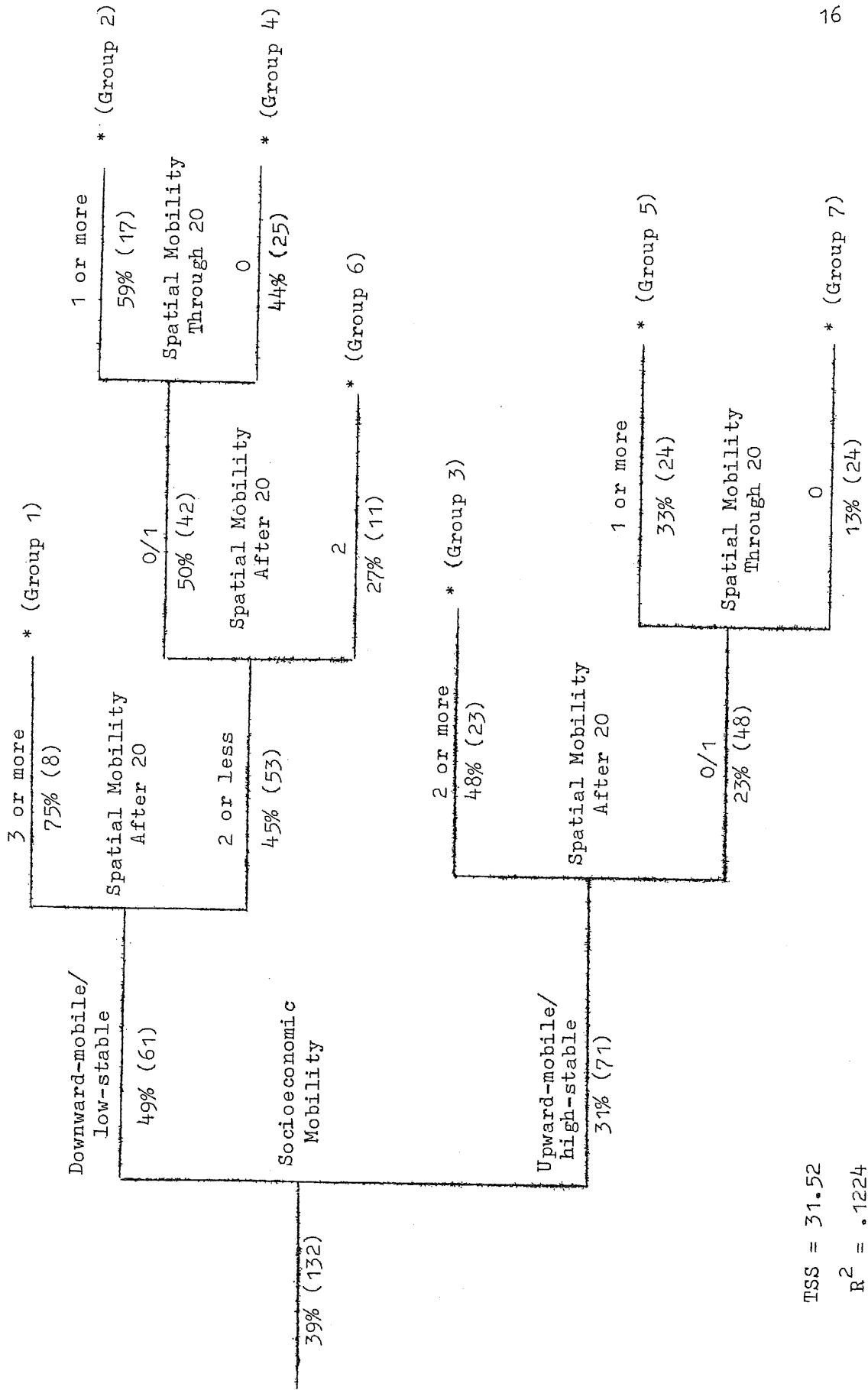
economically upward-mobile or high-stable had the lowest rate. It is noted, however, that among those who were upward-mobile or high-stable, spatial mobility during adulthood would markedly increase the likelihood of symptom incidence.

In general, our findings were consistent with the theoretical postulate that social-spatial mobility is a source of stress on an individual's psychic condition. The frequency of residential moves from one place-name community to another during childhood or during adulthood was found to be directly associated with the likelihood of symptom incidence. With regard to the vertical mobility along the socioeconomic status scale, we found that downward mobility or remaining to be low was more likely to produce psychiatric symptoms than upward mobility or remaining to be high. These specific findings about the effects of socioeconomic mobility support (1) the hypothesis that downward mobility, rather than upward mobility, has a noxious effect upon mental stability,<sup>12,13,16</sup> and also (2) the well-known proposition that mental illness is inversely related to socioeconomic status.<sup>3,4,6,8</sup>

As Suchman has asserted,<sup>19</sup> fundamental to all the social-epidemiological surveys is the acceptance of an "open-system, rational model of multiple causality" as opposed to the "closed-system, mechanistic, single-cause model of traditional medical research." However, the adoption of this multi-causal model of illness requires the use of multivariate statistical procedures in analyzing the survey data. A relatively simple but fundamental strategy is to subdivide the original bivariate table into

a series of sub-tables according to the categories of the third variables.<sup>17,22</sup> This "breakdown tables" analysis can generate a rich amount of information, but its disadvantage lies in the difficulty of handling and interpreting the interrelationships among a large number of variables. Another strategy is to use the multivariate correlational statistics, such as multiple regression analysis, partial correlation, factor analysis, and discriminant function analysis. But most of these advanced statistical models require at least three assumptions -- numerical measurement, linearity, and additivity -- which are not likely to be met by most survey data.<sup>2</sup> The Automatic Interaction Detector, used in the present study, appears to be a promising tool for the multivariate analysis of social-epidemiological survey data. The dependent variable has to be either numerical or a dichotomous dummy variable, but the independent variables can be measured on nominal or ordinal level. Moreover, the model does not assume additivity nor linearity. It can be used to investigate the relative importance, the combined influence, and the interaction effects of a large number of independent variables.

Figure 1  
AID Tree Structure for Social-Spatial Mobility



TSS = 31.52

R<sup>2</sup> = .1224

Table 1

## AID Final Groups for Social-Spatial Mobility

Group	N	%	Characteristics
1	8	75	Spatially very mobile (3 times or more) after 20, and socioeconomically downward-mobile or low-stable.
2	17	59	Spatially mobile (1 time or more) through 20 but relatively stable (0 or 1 time) thereafter, and socioeconomically downward-mobile or low-stable.
3	23	48	Spatially mobile (2 times or more) after 20, and socioeconomically upward-mobile or high-stable.
4	25	44	Spatially immobile (0 time) through 20 and also stable (0 or 1 time) thereafter, and socioeconomically downward-mobile or low-stable.
5	24	33	Spatially mobile (1 time or more) through 20 but stable (0 or 1 time) thereafter, and socioeconomically upward-mobile or high-stable.
6	11	27	Spatially mobile (2 times) after 20, and downward-mobile or low-stable.
7	24	13	Spatially immobile (0 time) through 20 and also stable (0 or 1 time) thereafter, and upward-mobile or high-stable.

N indicates the number of respondents in the group, while % indicates the proportion of respondents with incidence of symptoms.

Table 2

## Relative Importance Among Mobility Variables

Variable	Gross Beta Coefficient	Partial Beta Coefficient	Type
Spatial mobility through 20	.011	.024	M
Spatial mobility after 20	.031	.064	M
Socioeconomic mobility	.035	.035	F

References

1. Blalock, H.M., Jr., "Evaluating the Relative Importance of Variables," American Sociological Review, 1961, 26:866-874.
2. Cooley, W.W. and Lohnes, P.R., Multivariate Procedures for the Behavioral Sciences, New York: John Wiley & Sons, 1962.
3. Dohrenwend, B. P., "Social Status and Psychological Disorder: An Issue of Substance and an Issue of Method," American Sociological Review, 1966, 31:14-34.
4. Dunham, H. W. and Gruenberg, E. M., "Social Structures and Mental Disorders: Competing Hypotheses of Explanation," pp. 227-265, in Milbank Memorial Fund, Causes of Mental Disorders, Milbank Memorial Fund, New York, 1961.
5. Hollingshead, A.B., Ellis, R.A., and Kirby, E.C., "Social Mobility and Mental Illness," American Sociological Review, 1954, 19:577-584.
6. Hollingshead, A.B. and Redlich, F.C., Social Class and Mental Illness, New York: John Wiley & Sons, 1958.
7. Hughes, C.C., Tremblay, M.A., Rapoport, R.N., and Leighton, A.H., People of Cove and Woodlot, New York: Basic Books, 1960.
8. Jaco, E.G., The Social Epidemiology of Mental Disorders, New York: Russell Sage Foundation, 1960.
9. Kramer, M., "A Discussion of the Concepts of Incidence and Prevalence as Related to Epidemiologic Studies of Mental Disorders," Journal of Public Health, 1957, 47:826-840.
10. Leighton, A.H., My Name is Legion, New York: Basic Books, 1959.
11. Leighton, D.C., et al., The Character of Danger, New York: Basic Books, 1963.
12. Lystad, M., "Social Mobility Among Selected Groups of Schizophrenic Patients," American Sociological Review, 1957, 12:288-292.

13. Mishler, E.G., and Scotch, N.A., "Socio-Cultural Factors in the Epidemiology of Schizophrenia: A Review," Psychiatry, 1963, 26:315-350.
14. Morgan, J.M. and Sonquist, J.A., The Detection of Interaction Effects, Michigan: Institute for Social Research, University of Michigan, 1964.
15. Morgan, J.M. and Sonquist, J.A., "Problems in the Analysis of Survey Data," Journal of American Statistical Association, 1963, 61:415-431.
16. Murphy, H.B.M. and Jaco, E.G., "Social Change and Mental Health," pp. 280-329 in Milbank Memorial Fund, Causes of Mental Disorders, Milbank Memorial Fund, New York, 1961.
17. Rosenberg, M., The Logic of Survey Analysis, New York: Basic Books, 1968.
18. Selvin, H., "A Critique of Tests of Significance in Survey Research," American Sociological Review, 1957, 22:519-527.
19. Suchman, E.A., Sociology and the Field of Public Health, Russell Sage Foundation, New York, 1963.
20. Suits, D.B., "Use of Dummy Variables in Regression Equations," Journal of American Statistical Association, 1954, 52:548-551.
21. Turner, R.J. and M.O. Wagenfeld, "Occupational Mobility and Schizophrenia," American Sociological Review, 1967, 32:104-113.
22. Zeisel, H., Say It With Figures, New York: Harper and Row, 1957.