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ABSTRACT

The question addressed in this paper is to what extent does the use of measurement indicators based on differing, even contradictory, epistemic assumptions affect the acceptability of the empirical conclusions. The approach used monotonic transformations of empirically obtained measures of occupational and educational status to investigate the effect of patterns of intervalization which were isomorphic with epistemic relationship between the indices and the theoretical construct of social status. Data for this report were obtained from a 3 wave, 6 year panel of nonmetropolitan southern youths in Texas, Louisiana, Mississippi, Georgia, Alabama, and South Carolina. The first sample of high school sophomores was originally collected in 1966 and 1967, and subsequently 2 and 6 years later. From the resulting panel of 1,228, 627 males were analyzed. The analysis of the matrix of occupational transformations tended to suggest that, at least, for occupaticnal status measures of the Duncan SEI type that the relaxation of assumption of interval measurement required for parametric procedures may not result in excessive error. The configuration of the correlation coefficients for the educational status tended to follow a similar pattern. The reader is cautioned, however, about accepting the conclusions drawn from this analysis because there do not exist, at this time, any satisfactory procedures for analyzing differences in the type of coefficients produced or for directly evaluating epistemic error. (KM)

# ISOMORPHISM AND THE INTERVALIZATION OF OCCUPATIONAL AND EDUCATIONAL STATUS[1,2]

by

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## Introduction

Epistemic assumptions about theoretical constructs are implicit in the empirical indicators used to measure those constructs. Not only are these assumptions not often recognized but the selection of a particular indicator often varies considerably from, and is not consonant with, many alternate and perhaps equally plausible conceptualizations of the construct. The question addressed is to what extent does the use of measurement indicators based on differing, even contradictory, epistemic assumptions affect the acceptability of the empirical conclusions. Our approach was to use monotonic transformations of empirically obtained measures of occupational and educational status to investigate the effect of patterns of intervalization which were isomorphic with differing conceptualizations of the epistemic relationship between the indices and the theoretical construct of social status. For each set of transformations (occupational and educational), a matrix of proxy epistemic correlations was derived. To demonstrate the effects of the transformations on estimates of the relationship between occupational and educational status, a correlation matrix relating occupational transformations to educational transformations was also constructed.

The problem of isomorphism between measurement procedures and corre-

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[2]Technical Article No. _____ of the Texas Agricultural Experiment Station.

sponding theoretical constructs is of more than passing interest to the empirical researcher. For example, there appears to be consensus among most empirical sociologists that commonly used measures of occupational and educational status represent, at least, a ranking of the points on a continuum (ordinal level of measurement). However, there is a wealth of sociological studies that utilize these two indices under the assumption of interval level of measurement (most uses of correlation, regression, analysis of variance, and path analysis require this assumption). This assumption can be questioned by those who maintain that the nature of the intervalization is unknown.

At the theoretical level, our epistemic assumption is that both occupational and educational status are interval variables. That is, each can take on values along a continuum and that potentially the size of the interval between points on the continuum can be known. Unfortunately, at the measurement level the indices we use only approximate an ordinal arrangement of points on the continuum. Thus, there is a lack of isomorphism between the theoretical construct and the achieved level of measurement. This problem of isomorphism leads to a dilemma in research. If we utilize ordinal measurement, our assumption at the empirical level contradicts our assumption at the theoretical level. On the other hand, it is problematic for one to relax the measurement assumption and assume interval level of measurement because the exact intervalization is unknown at this time.

## The Approach

The implications of assuming interval level of measurement were investigated in this study in the following manner:

(1) Measures of parental occupational and educational status were obtained from the male subset of the southern youth study. Occupational status was coded according to Duncan's Socio-Economic Index and educational status according to an eight level index.

(2) The SEI scores were transformed to correspond to seven competing assumptions about the nature of the pattern of intervalization.

(3) Similarly, the scores of educational status were subjected to seven transformations reflecting plausible conceptualizations of educational status.

(4) This resulted in eight monotonic measures of both occupational and educational status, differing only in the pattern of intervalization.

(5) The degree of divergence among each set of transformations was determined by analyzing a matrix of inter-correlations. A correlation of one represents perfect correspondence. These correlations can be viewed as proxy epistemic correlations. For example, if any of the transformations are considered to be isomorphic with the theoretical construct while the researcher was using, say, Duncan's SEI, the correlation between the

two measures would be an estimate of the divergence between the empirical operation and the construct.

(6) The set of educational measures was then intercorrelated with the occupational measures for the purposes of evaluating the simultaneous divergence of two variables.

(7) A test of homogeneity of correlation coefficients was applied to the column and row vectors of the bivariate matrix. Although this test was not designed to analyze the problem of isomorphism between constructs and measurement instruments, it does provide a basis to compare this type of error to sampling error.

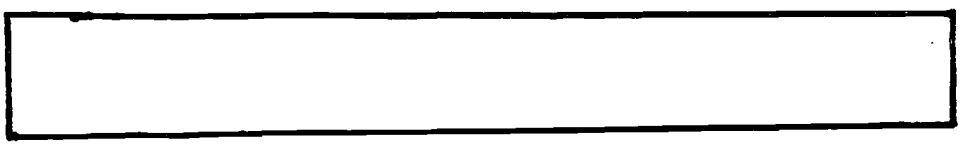
## The Data

The data for this report were obtained from a three wave, six year panel of nonmetropolitan southern youth. This study (USDA-CSRS - S-81) includes comparable data from the states of Texas, Louisiana, Mississippi, Georgia, Alabama, and South Carolina. The first wave of the data set, originally collected in 1966 and 1967, was a purposely selected sample of high school sophomores in the southern region. Subsequent data collection was carried out two years later when the majority of the youth in the panel were in their senior year of high school and again after another lapse of four years when the majority were four years beyond their expected date of high school graduation. The resulting panel consisted of a total of 1228 respondents. From the larger set we selected the subset of 627 male respondents for analysis.

The primary method of data collection for waves 1 and 2 was group administered interviews. Wave 3 information was primarily obtained by personal interviews; however, mailed questionnaires and telephone interviews were used to recontact a portion of the subjects. Panel attrition appeared to be associated with high school drop-outs as well as migration before the second data collection period.

## Measurement of Variables

Measures of parental occupational status were obtained from responses in 1966 to the following question and were coded according to Duncan's SEI.

> What is the main job held by the major money earner of your home? (Write in the answer in the following box. Give a specific job, not the company or place worked for. For example: press operator, foreman, teacher, etc.)
>
> ANSWER: 

Educational status was measured by the response in 1966 to the following structured question. "Don't knows" were deleted from the analysis.

What was the highest school grade completed by your father and mother? (Circle one number for father and one number for mother)

| FATHER | | MOTHER |
|---|---|---|
| 1 | Did not go to school | 1 |
| 2 | Grade 1-7 | 2 |
| 3 | Eighth grade | 3 |
| 4 | Some high school but didn't graduate | 4 |
| 5 | Graduate from high school | 5 |
| 6 | Went to Vocational School after graduating from high school | 6 |
| 7 | Some college but didn't graduate | 7 |
| 8 | College graduate | 8 |
| 9 | Don't know | 9 |

## Transformation of Occupational Scores

The following indices of occupational ranking were used:

(1) OCC1: This is Duncan's Socio-Economic Index (SEI) (Duncan, 1961). Since the occupational data of the southern youth study were coded according to the SEI, this scale was used as the basis for all the occupational indices constructed. The range of SEI scores is 1-93 with equal unit intervals between any two adjacent scores. This index reflects the concept of a constant and perfectly linear increase in status as the socio-economic ranking of occupations increases.

(2) OCC2: This index was constructed according to the transformation

$$OCC2 = 10\sqrt{SEI}.$$

The range of this scale is 1-96.4 and has the characteristic that the interval between adjacent scores decreases gradually as socio-economic rank increases. For example, the interval between the first two scores at the lower end of the scale is 14.1 - 10.0 = 4.1, while the interval between the last two scores at the upper end of the scale is 96.4 - 95.9 = .5. Thus, the interval between adjacent scores is approximately eight times as great at the lower end of the scale as the interval between scores at the upper end of the scale. This index reflects the proposition advanced by Carter (1971) that a given increase in income will have a greater relative impact on social position at the lower portion of the stratification system than the same increase will have at the upper portion of the system. This is isomorphic with the epistemic assumption of diminishing marginal utility of income.

(3) OCC3: This index was constructed by the transformation

$$OCC3 = (SEI)^{1.1}.$$

Its range is 1-146.3, with the size of the interval gradually increasing between adjacent scores as ranks increase. This index corresponds to the conceptualization that status increases at a greater rate at the upper end of the stratification system than at the lower end. For example, the interval between the first two scores is 2.1 - 1 = 1.1, while the interval between the last two scores is 146.3 - 144.6 = 1.3, a relative distance approximately one and a half times as great.

(4) OCC4: The transformation $OCC4 = (SEI)^{1.5}$ was used to construct another exponential scale with characteristics similar to that of OCC3, except that interval distances between adjacent scores are larger and increase at an even greater rate. The range of the index is 1 - 896.9, with the interval between the last two scores approximately five times that between the first two scores.

(5) OCC5: A third exponential index was constructed by squaring the SEI score: $OCC5 = (SEI)^2$. This index exaggerates the concept of increasing marginal utility of income far beyond anything that would probably be used in empirical research. It was included in order to determine what effect an extreme divergence in assumptions of epistemic relationships would have on empirical results. The range of this index is 1 - 8649, with approximately sixty-two times as much distance between the last two scores at the upper end of the scale as between the first two scores at the lower end of the scale.

(6) OCC6: This transformation corresponds to a Marxian conceptualization of two widely separated classes with little status differentiation within each class. Specifically the transformation $OCC6 = \bar{X}c + 0.25(\bar{X}c - SEI)$ where $\bar{X}c = 25$ for $SEI < 50$ and $\bar{X}c = 75$ for $SEI \geq 50$. This results in a within-class interval of 0.25 between adjacent scores and a between-class interval of 38.75 between scores of 49 and 50.

(7) OCC7: This index approximates a six-class stratification system similar to that advocated by Warner (1941). The scale scores are clustered into six groups with smaller distances between adjacent scores within each group than between adjacent scores belonging to two different class groups. The transformation was:

$X_7 = \bar{X}c + 0.90(\bar{X}c - SEI)$ where
$\bar{X}c = 6$ for $SEI \leq 11$
$\bar{X}c = 18$ for $12 \leq SEI \leq 24$
$\bar{X}c = 29$ for $25 \leq SEI \leq 34$
$\bar{X}c = 43$ for $35 \leq SEI \leq 50$
$\bar{X}c = 60$ for $51 \leq SEI \leq 69$
$\bar{X}c = 85$ for $SEI \geq 70$

Using this transformation, the within-class interval is 0.90 and the between-class intervals range from 1.9 to 3.4.

(8) OCC8: An approximation of the NORC occupational prestige index was constructed by assigning to each sample SEI score the median NORC score which was associated with that SEI score. These simulated NORC rankings have a correlation of 0.952 with the SEI rankings in our sample, while the actual NORC and SEI codes have a correlation of 0.938, a difference which is not very much different from that of random sampling error and quite acceptable statistically for purposes of comparison.

## Transformation of Education Scores

The epistemic assumption is that formal education is related to social status in a monotonic fashion. However, from one perspective some increments in education have no social consequences; status increases occur only as one attains certain socially meaningful educational plateaus. This conceptualization of the epistemic relationship between education and social status is explicit in all the intervalization alternatives we conceived and examined. These alternatives are described below and illustrated in Table 1.

(1) ED1: This is the original coding of the data from the southern youth study. The operationalization of this variable is discussed in the section "Measurement of Variables". The epistemic relationship is considered to be constant and perfectly linear; i.e., every change in the education index is associated with a constant unit change in social status. This conceptualization was also suggested by Lewis Carter (1971) in his discussion on socially significant educational plateaus.

(2) ED2: This intervalization approach directly reflects the attempts of Lewis Carter (1971) to relate income levels in census materials to education levels of the population. This conceptualization of the income utility of education defines each educational level in terms of the average income associated with each educational level.

(3) ED3: The epistemic assumption here is that the social consequences of each successive educational plateau are positive but decreasing; i.e., earlier educational increments affect life chances proportionately more than later educational achievements. This represents the concept of diminishing marginal utility of education.

(4) ED4: This transformation described an arrangement where high school completion represents a significant change in social status while any prior schooling is minimally differentiated in terms of social status. Similarly, college graduation portends major social consequences compared to the small gain in social status made in the transition from high school graduation (level 5) to college attendance (level 7).

(5) ED5: This is a more extreme representation of the notion of early education having almost negligible social consequences while high school com-

pletion signifies proportionately an even greater change in social status. However, college graduation, while significant compared to high school graduation (level 5), no longer represents such a significant plateau compared to college attendance (level 7).

(6) ED6: This transformation attributes immense social impact to both high school and college graduation with relatively unimportant effects on life chances of any intermediary educational attainment.

(7) ED7: This intervalization technique describes an epistemic relationship between education and social status that is increasing, but for each successive educational plateau reached the social status already attained is doubled.

(8) ED8: This is an approximation to a dichotomous conceptualization of the epistemic relationship between education and social status. High school graduation represents the significant social plateau; earlier educational achievement has almost no social impact; moreover, post-high school achievement has negligible additional social consequences.

## Analysis of the Occupational Proxy Epistemic Correlations

The matrix of proxy epistemic correlations appears as Table 2. An examination of the table will reveal that the correlations were generally large ranging from a low of .794 to a high of .998. The range, however, does not indicate the distribution of the values. For example, of the twenty-eight correlation coefficients, approximately 54% (15) of the correlations exceeded .95 and approximately 82% (23) exceeded .90. The three lowest correlation coefficients were associated with the transformation OCC6 which represents the two-class conceptualization with a large between-class interval. A more sensitive estimate of the "goodness of fit" is obtained by using the coefficient of determination ($r^2$) as an indicator of the strength of the linear relationship between the various transformations. These coefficients are presented in parentheses in Table 2.

As you will recall, there is a perfect correspondence between the empirical measure and the construct when the correlation equals one. In our analysis, all correlations were somewhat less than one and thus the question arises as to how large a departure would result in serious epistemic problems. Obviously there is presently no readily available procedure to answer this question. We can, however, utilize a second type of known error as a point of reference. Reliability coefficients which are often used as an indicator of random measurement error generally range for measures of reported occupational status between .80 and .90, a range which is generally considered to be within acceptable research tolerances. Our matrix of proxy epistemic correlations resulted in either as large or larger correlations than those one would expect to find in an analysis of reliability. Thus it appears that epistemic errors resulting from making different interval assumptions tend to result in errors of about the same magnitude, and probably of less magnitude, than one normally experiences

with random measurement error.

For the practicing researcher, probably the most interesting vector in the matrix is the first row where Duncan's SEI is correlated with each of the seven transformations. With this vector we can approach the question, if we use the SEI in research and our theoretical construct corresponds to any of the transformations, how large is the epistemic error? The coefficients in this vector were generally large; all were approximately greater than .90. Transformations reflecting either the concepts of increasing or decreasing marginal utility of income (OCC2, OCC3, OCC4, and OCC5) were found to be very highly correlated with Duncan's SEI suggesting slight epistemic errors. As might be expected, the largest epistemic errors resulted from the contrast with the two-class transformation. This suggested that the Duncan SEI was compatible with all the conceptualizations of social class we examined except the extreme two-class intervalization scheme.

## Analysis of the Educational Proxy Epistemic Correlations

Table 3 presents the matrix of the proxy epistemic correlations interrelating the educational transformations. As in Table 2, the coefficients of determination are presented in parentheses. In this matrix we can note not only a wider range of correlations (.620 to .995) but also a more even distribution of correlation coefficients. For example, of the 28 correlation coefficients, only 8 exceeded .95, while 12 were less than .90 and 4 were less than .80. We suggest that this can be attributed not only to the limited number of educational levels involved in the transformations but also to the nature of the transformations themselves.

In terms of compatibility, we can identify four groups of mutually comparable transformations. In one group are ED1 and ED2 which represent linear and income utility epistemic relationships respectively. Both are highly intercorrelated and similarly correlated with the other transformations suggesting that whatever may be the proper conceptualization, the use of either ED1 or ED2 would be equally acceptable. The second group is composed of ED3, the conceptualization of diminishing marginal utility of education. This transformation produced smaller correlations with the remaining measurement indices than the transformations in the first group and, therefore, is less acceptable if the theoretical construct corresponds to any of the other 5 conceptualizations. But ED3 is very compatible with the conceptualizations implicit in the transformations in the first group.

We can designate ED4, ED5, and ED6 as forming a third group of mutually compatible transformations. These three conceptualizations attempt to quantify the concept of major and minor educational plateaus in contrast to the near-equality of effect implicit in the operationalization of the educational plateaus in the first group of transformations. Not only were these three highly intercorrelated but they also were similarly correlated with all of the other transformations. Interestingly, the greater the contrast between the important (levels 5 and 8) and the other less important educational

levels, as in ED6, the higher were the proxy epistemic correlations. The less differentiated transformation of the three (ED5) not only produces the smallest correlations comparatively within the group but also was slightly less acceptable than the transformations in the first group. On the whole, this suggests that conceptualizations of differential impact of educational levels are compatible with other conceptualizations of the construct.

The fourth group is composed of the two remaining transformations, ED7 and ED8. They can be classified together because both, especially ED8, are notably less consonant with the other transformations, although the epistemic error is rarely greater than the probable reliability error generally present as noted earlier.

In general, conceptualizations reflecting massive social impact of one or many educational attainments relative to other educational attainments are not highly compatible with less extreme conceptualizations of the relative valuation of the intervals. On the other hand, among the first six transformations which conceptualize education as having alternately constant, slightly increasing, or decreasing marginal utility, the lowest intercorrelation is .892, suggesting a high degree of mutual compatibility among these epistemic assumptions.

## Analysis of the Alternative Estimates of the Bivariate Relationship

A matrix of correlations relating each of the occupational transformations with each of the educational transformations was produced and is presented as Table 4.

Interestingly, we can note that conceptualizations of increasing utility in occupational rankings (OCC3, OCC4, and OCC5) when used in conjunction with the educational transformations in the first and third groups (ED1, ED2, ED4, ED5, and ED6) described in the previous section seem to produce strong estimates of the bivariate relationship ranging from .447 to .528. On the other hand, ED3, and especially ED8, among the educational transformations, and OCC2 and OCC8 among the occupational transformations, tend to produce lower estimates of the bivariate relationship, ranging from .374 to .489. This suggests that "relatively" these transformations tend to underestimate the bivariate relationship. Interestingly, we would have expected this with the dichotomous conceptualization implicit in ED8, but OCC8, the simulated NORC transformation consistently estimated a weaker relationship than did not only its prodigy, Duncan's SEI (OCC1), but also all the other occupational transformations, which are, of course, in different ways functions of Duncan's SEI. This contrast may be due to the non-monotonic relationship of the NORC with the SEI (i.e., ranges in the SEI scale have only one corresponding NORC value and vice versa), which results in a curvilinear relationship with the SEI. Similarly, the ED3 and OCC2 transformations are distinctly curvilinear both being concave from below.

Since the "true" correlation is unknown at this time, it is impossible

to determine which transformations "underestimate" or "overestimate" the true relationship. However, it is statistically possible to compare each alternative pair of conceptualizations, but that effort would be too lengthy for this report. Consequently, we felt a more readily understandable and applicable technique was to analyze each column and row vector in the bivariate matrix to determine if, say, one occupational transformation were used with each of the educational transformations, would it produce significantly different estimates of the bivariate relationship?

To evaluate the divergence among the estimates of the bivariate relationships, a test of homogeneity of correlation coefficients was applied to each column and row vector of the bivariate matrix. As noted earlier, this test was not designed to evaluate epistemical error, but can serve to provide a comparable standard of acceptable sampling error. Essentially each correlation coefficient was assigned its corresponding z value and was compared to the mean z value for the vector to produce a $X^2$ (chi-square) statistic in the following manner (Fisher, 1921):

$$X^2 = \sum_i (n_i - 3)(z_i - \bar{z}_w)^2$$

where n = the number of observations producing the correlation (in this case n = 627)

$$z_i = .5 \, 1 \, n \, \frac{1 + r}{1 - r}, \text{ and}$$

$$\bar{z}_w = \frac{\sum i(n_i - 3) \, z_i}{\sum i(n_i - 3)}$$

While the $X^2$ values are not reproduced here, the critical value, $X^2_{.05,7}$, was 14.1. Only one vector, that corresponding to OCC5, which is the square of the SEI score, produced a $X^2$ statistic greater than the critical value. Thus the divergence among low and high estimates of the true correlation noted earlier is within the limits of error permitted for sampling error. Moreover, noting that OCC5 is a transformation based on the rather far-fetched assumption of very rapidly increasing occupational status, these results suggest that the use of any reasonable conceptualization of occupational status, including a skewed Marxian class structure, when utilized with any plausible educational intervalization scheme would err epistemically in the estimate of the bivariate relationship no more than one would similarly expect due to random sampling error.

## Discussion

The analysis of the matrix of occupational transformations tended to suggest that, at least, for occupational status measures of the Duncan SEI type that the relaxation of the assumption of interval measurement required for parametric procedures may not result in excessive epistemic error. If

we use the correlations in this matrix (Table 2) as an index of the degree of isomorphism between the measurement procedure and the theoretical construct, it is apparent that our errors would be comparable to or less than those one might anticipate from random measurement error. From a more pragmatic research point of view, one should recall that the Duncan SEI was highly correlated with each transformed variable ranging between .898 and .998. The salience of this result can be appreciated when one recalls that several of the transformations were intuitively extreme. For example, transformation OCC5 was defined as the square of the Duncan SEI - a transformation resulting in extremely violent alterations in the pattern of intervalization where intervals at the top of the scale were several times as large as those at the bottom. Yet, Duncan's SEI was found to be highly correlated with this epistemic assumption. The guarded implication drawn from an examination of the correlations in the SEI vector is that the use of Duncan's SEI under the assumption of interval level of measurement may not involve as weak a measurement assumption as the "conservative researcher" might maintain. It should also be considered here that the use of the most likely alternate assumption, rank order measurement, may also involve problems of epistemic error. In weighing this argument, the advantages in analytical approaches possible under the assumption of interval measurement as compared to those associated with rank order measurement tend to encourage the interval assumption. Labovitz (1969) argues for a more extensive use of parametric statistics on similar grounds:

> "(1) The insensitivity of ordinal and other nonparametric techniques, (2) the small error that results from assigning numbers to ordinal data and then treating the categories as if they conform to an interval scale, (3) tests of statistical robustness, and (4) the power-efficiency of tests."

The configuration of the correlation coefficients for the educational status matrix tended to follow a similar pattern to that obtained for occupational transformations. The degree of error, however, was generally greater than that observed in the first matrix. It is somewhat unclear at this time whether the increased error was a function of the transformations selected for educational status or a result of the reduced numbers of scale points in the original educational scale. This problem requires additional analysis beyond the scope of this report. Nevertheless, essentially the same argument for utilization of educational scales under the assumption of interval level of measurement can be made here, except the argument is less convincing as a result of the higher degree of error.

The analysis of the bivariate matrix of intercorrelations between occupational and educational transformations revealed a more complex pattern. If we exclude the violent transformation OCC5 ($SEI^2$) and ED8 (dichotomy broken at high school graduation), the correlations fall within a narrow range. Using the $X^2$ test of homogeneity, all correlations within this vector, with the exception of the OCC5 vector, could be judged similar to or from the same populations. Thus, the bivariate correlations tended to support the earlier conclusions regarding the feasibility of making tentative interval assumptions.

The reader should be cautioned about readily accepting the conclusions drawn from this analysis due to the following considerations.

First, we are not aware, presently, of any satisfactory procedures for analyzing differences in the type of coefficients we produced or for directly evaluating epistemic error. Until this has been accomplished, such an analysis can only be viewed as tentative.

Second, the use of transformations that correspond to such extreme epistemic assumptions as represented in OCC5 and ED8 produced the greatest variation in correlation coefficients. Should the desirable epistemic assumption about either occupational or educational status diverge greatly from the nature of the transformations we considered, or be entirely different, then contradictory conclusions could be reached.

Table 1 Educational transformations utilized in the study[a]

| Educational Levels | ED1 | ED2 | ED3 | ED4 | ED5 | ED6 | ED7 | ED8 |
|---|---|---|---|---|---|---|---|---|
| No Formal Education | 1 | 0 | 10 | 0 | 0 | 0 | 2 | 0 |
| Completed Less Than 8th Grade | 2 | 1 | 19 | 4 | 1.0 | 2 | 4 | 0.01 |
| Completed 8th Grade | 3 | 3 | 27 | 5 | 1.1 | 3 | 8 | 0.02 |
| Completed Some High School | 4 | 4 | 34 | 6 | 1.2 | 4 | 16 | 0.03 |
| Completed High School | 5 | 5 | 40 | 10 | 4 | 20 | 32 | 1.00 |
| Some Vocational School | 6 | 6 | 45 | 12 | 6 | 30 | 64 | 1.01 |
| Some College | 7 | 7 | 49 | 14 | 7 | 35 | 128 | 1.02 |
| Completed College | 8 | 10 | 52 | 20 | 9 | 50 | 256 | 1.03 |

[a] The theoretical implications of each of these transformations are discussed in the section on "Transformation of Education Scores".

Table 2 Proxy-epistemic product moment correlation coefficients and coefficients of determination[a] between alternative conceptualizations[b] of occupational status.

| | OCC8 | OCC7 | OCC6 | OCC5 | OCC4 | OCC3 | OCC2 |
|---|---|---|---|---|---|---|---|
| OCC1 | .952 (.906) | .998 (.996) | .898 (.806) | .965 (.931) | .989 (.978) | .998 (.996) | .983 (.966) |
| OCC2 | .982 (.964) | .985 (.970) | .854 (.729) | .912 (.831) | .953 (.908) | .980 (.960) | |
| OCC3 | .943 (.889) | .999 (.998) | .903 (.815) | .973 (.947) | .994 (.988) | | |
| OCC4 | .910 (.828) | .990 (.980) | .913 (.834) | .993 (.986) | | | |
| OCC5 | .867 (.752) | .966 (.933) | .906 (.821) | | | | |
| OCC6 | .794 (.630) | .901 (.812) | | | | | |
| OCC7 | .949 (.900) | | | | | | |

[a] The coefficients of determination are shown in parentheses.

[b] The occupational arrangements described by these transformations are discussed in the section "Transformation of Occupational Prestige Scores".

Table 3 Proxy-epistemic product moment correlation coefficients and coefficients of determination[a] between alternative conceptualizations[b] of formal education.

| | ED8 | ED7 | ED6 | ED5 | ED4 | ED3 | ED2 |
|---|---|---|---|---|---|---|---|
| ED1 | .823 | .876 | .953 | .942 | .968 | .984 | .980 |
| | (.675) | (.767) | (.908) | (.887) | (.937) | (.968) | (.960) |
| ED2 | .758 | .872 | .995 | .903 | .946 | .967 | |
| | (.575) | (.760) | (.990) | (.824) | (.895) | (.935) | |
| ED3 | .837 | .781 | .896 | .892 | .917 | | |
| | (.762) | (.610) | (.803) | (.796) | (.841) | | |
| ED4 | .824 | .947 | .991 | .984 | | | |
| | (.679) | (.897) | (.982) | (.968) | | | |
| ED5 | .895 | .904 | .[illegible]1 | | | | |
| | (.801) | (.817) | (.867) | | | | |
| ED6 | .766 | .932 | | | | | |
| | (.587) | (.869) | | | | | |
| ED7 | .620 | | | | | | |
| | (.384) | | | | | | |

[a] The coefficients of determination are shown in parentheses.

[b] The nature of the conceptualizations is discussed in the section "Transformation of Education Scores".

Table 4 Product moment correlation coefficients and coefficients of determination[a] for each alternative pair of conceptualizations[b] of occupational and educational status.

| | OCC1 | OCC2 | OCC3 | OCC4 | OCC5 | OCC6 | OCC7 | OCC8 |
|---|---|---|---|---|---|---|---|---|
| ED1 | .501 | .483 | .502 | .504 | .498 | .494 | .501 | .462 |
| | (.251) | (.233) | (.252) | (.254) | (.248) | (.244) | (.251) | (.213) |
| ED2 | .503 | .483 | .504 | .508 | .504 | .491 | .504 | .463 |
| | (.253) | (.233) | (.254) | (.258) | (.254) | (.241) | (.254) | (.214) |
| ED3 | .474 | .463 | .473 | .470 | .460 | .462 | .474 | .447 |
| | (.225) | (.214) | (.224) | (.221) | (.212) | (.213) | (.225) | (.200) |
| ED4 | .511 | .485 | .513 | .501 | .521 | .515 | .511 | .462 |
| | (.261) | (.235) | (.263) | (.251) | (.271) | (.265) | (.261) | (.213) |
| ED5 | .497 | .471 | .499 | .505 | .505 | .508 | .497 | .448 |
| | (.247) | (.222) | (.249) | (.255) | (.255) | (.258) | (.247) | (.201) |
| ED6 | .512 | .489 | .514 | .520 | .518 | .504 | .513 | .469 |
| | (.262) | (.239) | (.264) | (.270) | (.268) | (.254) | (.263) | (.220) |
| ED7 | .497 | .461 | .502 | .518 | .528 | .500 | .498 | .435 |
| | (.247) | (.213) | (.252) | (.268) | (.279) | (.250) | (.248) | (.189) |
| ED8 | .400 | .390 | .397 | .392 | .380 | .414 | .397 | .374 |
| | (.160) | (.152) | (.158) | (.154) | (.144) | (.171) | (.158) | (.140) |

[a] The coefficients of determination are shown in parentheses.

[b] The theoretical relevance of each transformation is discussed in the sections on transformations.

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