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Occupational status in the nineteenth and twentieth centuries

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Introduction

As contemporary and historical studies of occupational stratification multiply, social scientists display continuing ambivalence about the invariance of occupational status hierarchies across time and space. On one hand, macro-social theories demand comparative study, for which common measurement tools are a necessity. Probably Donald Treiman has been the leading proponent of comparability in the measurement of occupational prestige. On the other hand, serious students of specific societies or communities—past or present—are sensitized by inclination, training, and experience to culturally or historically unique features of those settings; thus they are understandably reluctant to use a standard occupational status scale. There has been no great rush of historians, or of sociologists, to use Treiman's Standard Scale, of which the validity and generality have been sharply questioned.[1]

My preference is comparability at the cost of validity, at least the kind of validity that is at stake as occupational status hierarchies vary across time and place. By way of an extended example, this paper first illustrates the price of choosing historic specificity. Price is a relational concept, and my argument is not that comparability is cost free, but that it is no more costly than other, casually tolerated sources of invalidity. Second, it shows how one might use linear structural models to assay the costs and benefits of standardized status measurement in other contexts. In this way it supplements contemporaneous applications of confirmatory factor models to socioeconomic scaling,[2] and it provides a methodological template for the more serious problem of modeling individual-level response variability in survey- or record-based studies of the stratification process.[3] No historical study has treated the latter problem satisfactorily, though one might expect many sources of historical data to be at least as susceptible to response variability as are contemporary social surveys.

The Five-City Study

The subject of my example is a fascinating and valuable effort in collaborative historical analysis, reported by Theodore Hershberg, Michael Katz, Stuart Blumin, Laurence Glasco, and Clyde Griffen in the *Historical Methods Newsletter*. These five social historians were each engaged in a large-scale study of a nineteenth-century North American city (Philadelphia, Pennsylvania; Hamilton, Ontario; Kingston, New York; Buffalo, New York; and Poughkeepsie, New York; in order of authorship). In order to carry out a comparative analysis of occupation and ethnicity, Hershberg et al. each rated a set of commonly occurring occupational titles (circa 1860) on a five-point scale. They used a composite scale, based upon modal ratings of each occupation, in their comparative analysis. For present purposes, the most important feature of Hershberg et al. is that it includes ratings by each historian of each occupational title.[4]

Before taking up these ratings and their properties in detail, it is worth noting that Hershberg et al. display much the same ambivalence about comparability and specificity in occupational scaling that characterizes other segments of the social scientific community. Their analysis begins with the supposition that there is "considerable variation among our five cities," and with the question, "To what extent were there similar sociostructural and demographic characteristics in five cities which differed in size, history, location, economy, and

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rate of growth" (p. 175). In brief, Hershberg et al. (p. 211) conclude: " . . . we believe that this description of relationship between ethnicity and occupation is important in illuminating a time of both massive immigration and industrialization. We have discovered more similarity in that relationship than we anticipated, given the differences between our cities in location, length of settlement, size, rate of growth, and ethnic composition." At the same time, they remain wary of further application of the measuring stick they had so carefully constructed. In a footnote to the composite ratings, they write (p. 215): "These rankings are appropriate to the year 1860. We have not yet considered how they should be altered to account for the impact of industrialization. . . . Hence, we would not recommend that anyone uncritically use these rankings in the study of social mobility between the mid- and latter-nineteenth century."

Hershberg et al. report that each of the collaborators first prepared a list of the most common occupational titles, cumulating as many titles as needed in each city until 75 percent of workers were covered. "The number of occupations required to reach this percentage varied from as few as 30 in Buffalo to as many as 80 in Philadelphia." These separate lists were collated, generating a combined list of 113 titles. According to Hershberg et al.: "The new combined list was then returned to each of us. Working independently a unique vertical code was assigned to each occupation. The vertical codes consisted of five levels and each historian determined which code he would assign to each of the 113 occupations." About the criteria used in assigning vertical codes to occupations, Hershberg et al. report: "The vertical codes are neither purely 'intuitive,' that is, based on skill or prestige, nor 'derived,' that is, based on empirical data such as wealth or wages. In fact, we deliberately avoided the discussion of such points because we wished to see how closely the occupational rankings made individually resembled those made by our colleagues." Apparently, Hershberg et al. were satisfied with the degree of consensus obtained in this way: "In 51 cases there was complete agreement on the vertical code assigned by each historian; in 26 cases one among us disagreed with the others; and in only 11 cases was there disagreement which was not confined to an adjacent category."

In this context, one might wonder what dimensions of the social standing of occupations are reflected in these ratings and, further, to what degree they reflect the unique social circumstances of each of the five cities relative to those of the raters. With regard to the first issue, on the substantial evidence that "vertical" ratings of occupations are largely invariant to the nominal dimension of the rating, the construction of the rating task, or the population of raters,[5] I think it sufficient to suppose that Hershberg et al. rated the "general social standing" of occupations. With regard to the second issue, I begin with the supposition that the five social historians were expert and independent observers of the social scene in their respective communities. Thus I take the common content of the ratings to be a nineteenth-century scale of occupational social standing—pertaining, at least, to the settled northeast corner of the American continent—and the unique content of each set of ratings to reflect the special circumstances of the respective communities.

One could take the ratings at less than face value, arguing that they may reflect the twentieth-century experiences of the raters, rather than those of nineteenth-century America. I am inclined toward a contrary view, that the raters were at least as familiar with the occupational and social structure of the mid-nineteenth century as were most citizens of the time. On the other hand, were it the case that the ratings did not actually reflect the special circumstances of the nineteenth century, there would be even less reason to use them in preference to a standard scale of occupational prestige. It would be possible to test the validity of the ratings by elaborating later models to include objective measures of the socioeconomic status of occupations in the nineteenth century, but that would exceed the resources available for the present analysis.

Contemporary Scales of Occupational Status

The five sets of occupational status ratings by Hershberg et al. are the primary data of the present analysis, but these are supplemented with mappings of nearly all the five-city titles into two contemporary scales of occupational status: Duncan's Socioeconomic Index for Occupations and the 1964–65 National Opinion Research Center scale of occupational prestige.[6] Hereafter, I refer to these, respectively, as the SEI and NORC scales.

The SEI and NORC scores refer to the period just after the middle of the twentieth century. The SEI is an average of the educational and income levels of male occupational incumbents in the United States Census of 1950, where the weights of education and income were chosen to predict prestige ratings in the 1947 North-Hatt study of occupational prestige for forty-five titles that occurred in both the census classification and the North-Hatt list.[7] The SEI values were originally assigned to lines of the 1950 census classification and later revised by O. D. Duncan for application to the 1960 census classification. The NORC prestige scores are based upon popular ratings of "the social standing" of all occupation lines in the U.S. Census of 1960 that were obtained in a series of NORC surveys in the early 1960s.[8]

To obtain scale values for the five-city titles, each title was first coded into one or more lines of the three-digit 1970 census occupational classification[9] and then mapped into the proper scale value. Featherman, Sobel, and Dickens had previously updated the SEI and NORC scales for use with the 1970 census occupational classification.[10]

One of the common complaints about suggestions

Table 1.—Correlations among Occupational Status Ratings in the Nineteenth and Twentieth Centuries

	X(1)	X(2)	X(3)	X(4)	X(5)	X(6)	X(7)	X(8)
X(1)	1.0000							
X(2)	0.8810	1.0000						
X(3)	0.7501	0.7715	1.0000					
X(4)	0.6537	0.7186	0.7719	1.0000				
X(5)	0.7781	0.7670	0.8284	0.8383	1.0000			
X(6)	0.7970	0.7620	0.8574	0.8307	0.8893	1.0000		
X(7)	0.7580	0.7386	0.7660	0.7938	0.9319	0.8569	1.0000	
X(8)	0.7570	0.7761	0.8589	0.8512	0.9576	0.9126	0.9268	1.0000
Mean	31.76	37.02	2.93	3.31	2.98	2.96	2.94	2.99
Std. Dev.	22.06	13.29	.9375	1.0030	.8877	1.1773	.9285	.8933

Note: Entries are pairwise-present correlations. The minimum pairwise N is 98, and the maximum pairwise N is 105. Variables are X(1) = SEI, X(2) = NORC, X(3) = Buffalo (Glasco), X(4) = Kingston (Blumin), X(5) = Philadelphia (Hershberg), X(6) = Poughkeepsie (Griffen), X(7) = Hamilton (Katz), X(8) = Composite.

that contemporary scales of occupational standing be applied to historical materials is the difficulty of coding anachronistic titles, or—worse yet—titles whose social referent has changed, into contemporary classification schemes. To be sure, this mapping was no small task, but I believe its difficulty was more a function of the scant descriptions in each of the five-city titles than of mismatches between nineteenth-century occupations and twentieth-century occupational coding materials. In many instances, complete descriptions of occupation, industry, and class of worker are needed to classify a job correctly by occupation alone.[11] However, sparse occupational descriptions are a familiar item to anyone who has carried out a social survey, and one learns to make the best of them.

The Alphabetic Index of Occupations and Industries cumulates a great deal of historical material, and my impression is that social historians are naive to underestimate its usefulness in their research. For example, Katz argues against the use of contemporary occupational classification systems: ". . . the content of categories in a system of classification that measures mobility need not remain constant from period to period. In fact, if the classification of mobility is sensitive, the content of categories will change as the rank of specific occupations changes over time. To take but one instance, which also points up the problem of using a contemporary classification, consider the occupation of a bank cashier. Today, it would rank as a routine clerical occupation; in the mid-nineteenth century the term frequently signified a bank manager."[12] According to the 1970 edition of the *Alphabetic Index of Occupations and Industries*, a "bank cashier" is classified as a "bank officer and financial manager."[13]

In any event, I first asked two expert 1970-basis occupational coders to code each of the five-city titles into a "best" line of the 1970 census classification. These coders had been working on an unrelated social survey, and they were unaware of the source of the titles or the purpose of the project. I reconciled the two sets of codes, "force coded" some difficult items, and assigned multiple codes (whose scale values were averaged) in cases of ambiguity.

In seven cases, I decided that a code could not be assigned, and the title was omitted from the remainder of the analysis. These titles were "Agent," "Carriage Maker," "Chair Factory," "Engineer," "Gentleman," "Operator," and "Student." Two of these titles (Gentleman and Student) are not included within contemporary definitions of the labor force. One (Carriage Maker) no longer occurs in the Alphabetic Index. Three are terms currently in use (Agent, Engineer, and Operator) but are insufficient in detail to specify even a moderate number of possible lines in the current occupational classification. The last (Chair Factory) is not an occupational title. The full list of five-city titles, 1970 census codes, and ratings is given in the appendix.

Analysis of the Occupational Ratings

Table 1 shows the means, standard deviations, and intercorrelations of the occupational status ratings. The correlations are based upon pairwise-present observations, which range in number from 98 to 105, depending upon the pair of historical ratings in question. That is, while twentieth-century ratings are available for the full 105 titles, some titles were not rated by all the historians. (Incidentally, while Hershberg et al. refer to a combined list of 113 occupational titles, their Table 3 includes 112 titles, consistent with my 7 omissions and the maximum count of 105.) Throughout this paper, test statistics are based on the minimum count of 98.

Obviously, each of the pairs of ratings is at least moderately intercorrelated. The smallest correlation, .65, occurs between Kingston (Blumin) and the SEI, while the largest, .96, is that between Philadelphia

(Hershberg) and the nineteenth-century composite rating. The correlation between the two scales of status in the twentieth century, .88, is larger by a substantial margin than that between either of those scales and any of the nineteenth-century ratings, whose modal value is roughly .75. Similarly, almost all of the correlations among nineteenth-century ratings are larger than those between nineteenth- and twentieth-century ratings; the three exceptions are about the same size as correlations between nineteenth- and twentieth-century ratings. Thus, by simple inspection, one might reasonably conclude that despite substantial commonality—accounting for roughly 75 percent of the variance in the ratings—there are real differences between the status hierarchies reflected in the nineteenth- and twentieth-century ratings.

In order to investigate the structure of these occupational status ratings in more detail, I have specified and estimated a series of confirmatory factor models within the LISREL framework.[14] The LISREL model and program provide a very general framework for the analysis of linear structural relations in systems of observed and latent variables. Conditional on the assumption of multivariate normality in the joint distribution of observables, the program produces maximum likelihood estimates of parameters and of their standard errors. It also produces a likelihood ratio test statistic, L^2, which tests the fit between observed (unrestricted) sample moments and those estimated under a given model. In large samples L^2 follows the chi-square distribution with degrees of freedom equal to the number of sample moments less the number of independent parameters in the model. In hierarchies of models, that is, where successive models are obtained only by restrictions of parameters or only by the addition of parameters, the likelihood-ratio test statistics are nested; thus, differences in the fit of two models can be tested by subtracting L^2 in the less restrictive model from L^2 in the more restrictive model, and the difference between the two test statistics is distributed as chi-square with degrees of freedom equal to the difference between the degrees of freedom in the two contrasted models.

As a preliminary step in the analysis, it is instructive to specify "null models" of the data, that is, models that do not incorporate features of major substantive interest. The test statistics generated under such null models are convenient reference points for the relative fit of more complex models. In fact, one can interpret reductions of the chi-square statistic in a null or baseline model as analogs of components of explained variance in regression or analysis of variance.[15]

A model of no correlation fits the data in Table 1 very poorly. The likelihood-ratio chi-square statistic is $L^2 = 899.33$ with 21 degrees of freedom. (Here and throughout the analysis, I ignore the data for the nineteenth-century composite, which are presented only as a matter of record.) In the body of this paper, the worst-fitting model yields a test-statistic of roughly 55, so one might say that, relative to a model of no correlation, the analysis focuses on the last 6 percent of the "variance" or association (55/899 = .061). In the body of the paper, the best-fitting models yield a test statistic of about 12; relative to the model of no correlation, they explain almost 99 percent of the association in the data.

A more realistic baseline is the model of equal correlation. If all correlations were equal, one could specify that each and all of the status ratings were reflections of a single underlying status factor, and, further, that every status rating were interchangeable with every other, regardless of the source or the nominal rating method. If I specify that all of the correlations in Table 1 are equal, $L^2 = 141.09$ with 27 df; the point estimate of the correlations is .79. Again, the fit of this model is poor. That does not show that a single factor does not fit the data, but it does show that the several status ratings are far from interchangeable. Relative to this baseline model, the worst-fitting models in the body of the paper account for roughly 60 percent of the association of interest in the data, while the best-fitting models account for more than 90 percent of the association of interest in the data.

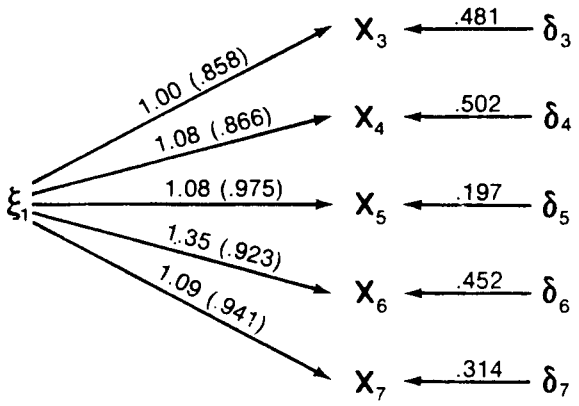
Nineteenth-Century Status: Single Factor Models

To simplify the process of model construction, I first developed models of the nineteenth-century ratings and then elaborated these to include the twentieth-century ratings. Figure 1A shows a path diagram of a single factor model of the five-city ratings, where the notation for the observable variables follows the stub of Table 1. In path analysis, unidirectional arrows flow in the nominal direction of cause and effect, while unanalyzed correlations are depicted by curved, two-headed arrows.[16] In the model of Figure 1A, the occupational ratings of each city (investigator) are taken to reflect (or depend upon) a single, unobservable, common cause (ξ_1). The common cause is defined only by its relationship with the observables, namely, that it accounts for the correlations among them. One might choose to think of the unobservable as "occupational status in mid-nineteenth-century Northeastern American cities." In addition to the common cause, each set of ratings is also affected by a unique cause, δ_i, which accounts for the remaining variance in it and is—in Figure 1A—uncorrelated with other variables in the model.

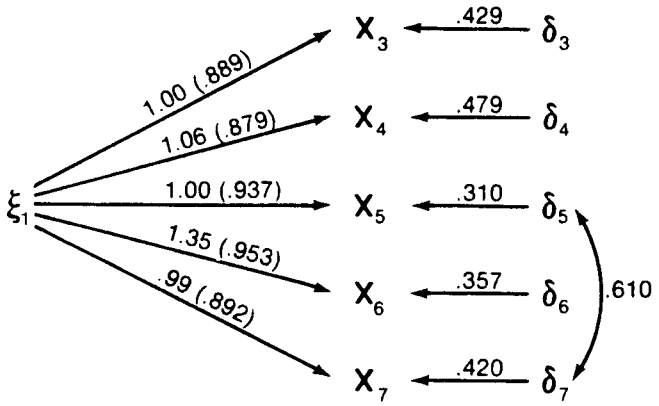
In order to elucidate scale properties of the historical ratings, the factor models in Figure 1 have been estimated from variance-covariance matrices, rather than correlations. The parenthetic entries on the paths from ξ_1 to the x_i are the usual (standardized) loadings; clearly, each set of ratings loads highly on the common factor. The main entries on those same paths are regres-

Figure 1. Single Factor Models of 19th Century Occupational Status Ratings

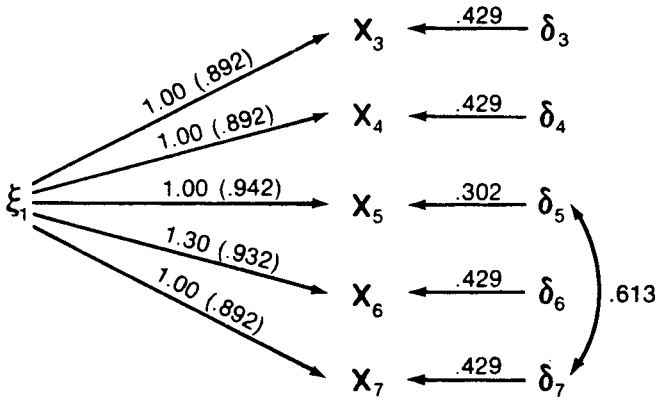
A. Random Error ($L^2 = 25.76$ with 5 df)



B. Correlated Error ($L^2 = 4.80$ with 4 df)



C. Correlated Error, Constrained Loadings and Errors ($L^2 = 9.78$ with 10 df)



Note: See text for explanation; X_i are defined in Table 1.
ξ_1 = occupational status in the 19th century

sions of the observables on the common unobservable status factor, where the regression of x_3 (whose coefficient has been fixed at 1.00) is taken as the standard. To put the matter in another way, the metric of the unobservable, ξ_1, has been fixed by letting its variance be the common variance in x_3; relative loadings of the other observables show the degree to which their common variance exceeds or falls short of that of the reference indicator.[17] Thus, there appears to be more common variance in the ratings for Poughkeepsie (Griffen) than in those for the other four cities.

While the x_i are in their original metrics, the disturbances (δ_i) are specified to have unit variances; consequently, the paths from disturbances to observables are the city-specific standard deviations of the distributions of observable ratings. There appears to be substantially less local variability in the ratings for Philadelphia (Hershberg) than in those for the other four cities. One might speculate that this follows from the larger size and more diverse occupational structure of Philadelphia, relative to the other cities. Hershberg et al. reported that it took the eighty most common occupation titles to cover 75 percent of the workforce in Philadelphia, while far fewer titles were required in other cities. Consequently, Hershberg may have been more familiar than other raters with some of the titles in the combined list.

Unfortunately, the single factor model of Figure 1A does not fit the status ratings. Even though there is a relatively small number of observations (occupation titles), the test statistic is highly significant ($L^2 = 25.76$ with 5 df). The LISREL program calculates first order derivatives of the likelihood function, and these are often useful in locating problems of fit.[18] In the present case, this diagnostic aid suggested the inclusion of a correlation between the disturbances in Philadelphia (Hershberg) and Hamilton (Katz). Estimated parameters of the modified model are displayed in Figure 1B. The improvement in fit is highly significant. With 1 df the test statistic falls by $25.76 - 4.80 = 20.96$, and the revised model fits satisfactorily.

The revised model says that in addition to their common causation by nineteenth-century occupational status, the Philadelphia (Hershberg) and Hamilton (Katz) ratings share another source of positive correlation. In the revised model, this is expressed by a correlation of .610 between the disturbances in that pair of ratings. I have no way of identifying the source of this correlation. Nothing in the superficial characteristics of Hamilton, a Canadian lakeport of 19,000 persons, and of Philadelphia, an American metropolis of 565,000, suggests why the ratings for these two cities should more closely resemble one another than do those of any other pair of the five cities. Conceivably, the two raters may have shared similar views of the occupational hierarchy, quite independently of the circumstances of the rating task.

In any event, beyond this one methodological artifact, the single-factor model provides a description of the relationships among the nineteenth-century status ratings that is plausible and that fits the data well. Indeed, following our earlier observations about the parameters of the model in Figure 1A, it is possible to simplify the model without substantially affecting its fit. Figure 1C displays the parameters of such a simplified model. Like that of Figure 1B, it permits correlation between the disturbances of x_5 and x_7. In addition it says that the relative loadings are the same in all the cities except Poughkeepsie (Griffen), and it says that the idiosyncratic variation in ratings is the same in all the cities except Philadelphia (Hershberg). There is no significant deterioration in fit between the models of Figure 1B and Figure 1C; $L^2 = 4.98$ with 6 df. However, relative to the model of Figure 1B, it is possible to specify neither that all of the relative loadings are equal ($L^2 = 28.84$ with 4 df) nor that all of the city-specific variances are equal ($L^2 = 17.00$ with 4 df). The combination of equal relative loadings (scales) and equal city-specific variances implies that the standardized loadings (.892) are equal in three of the cities: Buffalo (Glasco), Kingston (Blumin), and Hamilton (Katz). In the other two cities, the loadings are higher, in one case (Poughkeepsie) because there is more common variance in the ratings and in the other (Philadelphia) because there is less city-specific variance.

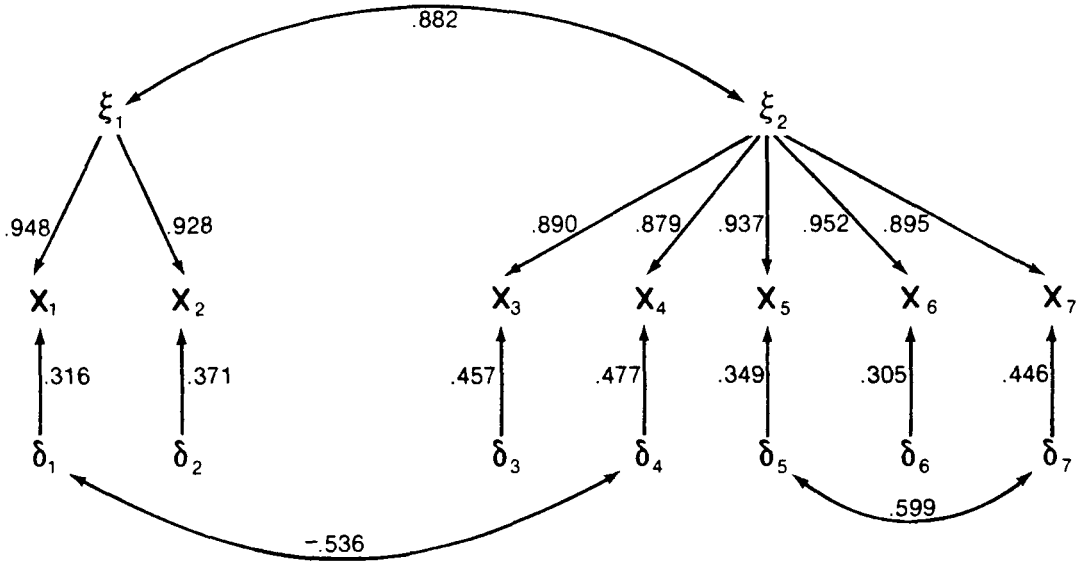
Status in the Nineteenth and Twentieth Centuries

The models in Figure 2 elaborate those in Figure 1 by the addition of a second latent factor, representing occupational status in the twentieth century, and two indicators of that factor, the SEI and NORC scales. From this point onward most of the analysis focuses on the relative magnitudes of correlations, and, for this reason, all of the variables in the remaining models are expressed in standard form, i.e., with unit variances. However, it would be possible to re-express the portions of the models in Figure 2 that pertain to the five-city ratings in much the same way as in Figure 1C, with a corresponding increase in parsimony.

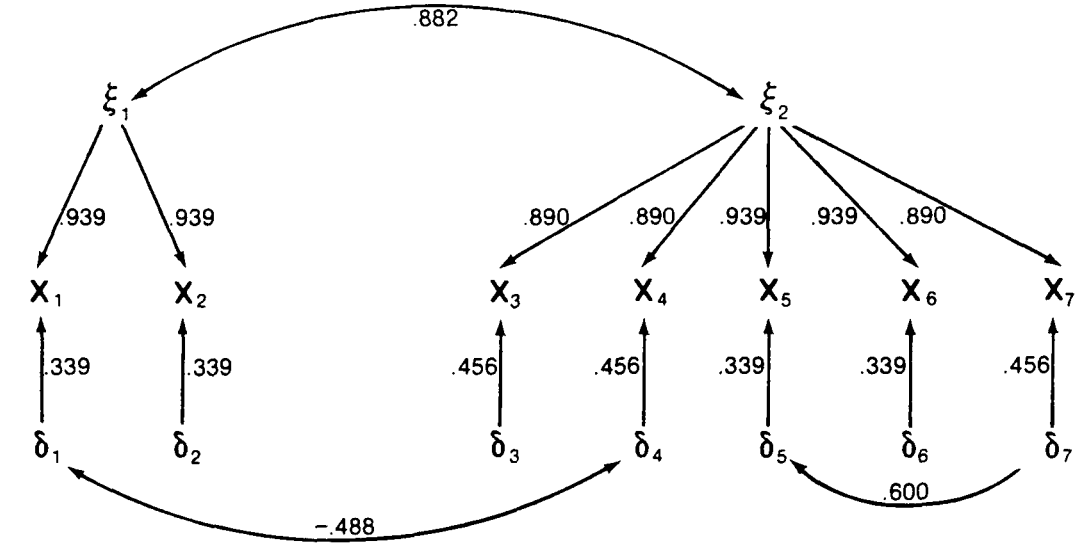
Figure 2A shows a basic two-factor model of occupational status in the nineteenth and twentieth centuries. It is "basic" in the sense that it incorporates a minimum set of (two) correlated disturbances that are required to fit the data, but it does not force any equality constraints across parameters of the model. The first disturbance correlation (.599) is that between Philadelphia (Hershberg) and Hamilton (Katz) that was introduced to fit the single-factor model. The second pertains to an almost equally large, but negative, correlation ($-.536$) between the disturbances of the SEI and Kingston (Blumin) ratings. If this correlation is deleted from the model, the fit deteriorates significantly ($L^2 = 12.96$

Figure 2. Two-Factor Models of 19th and 20th Century Occupational Status Ratings

A. Basic model with 2 Correlated Errors (L^2=11.85 with 11 df)



B. Correlated Errors and Constrained Loadings (L^2=13.71 with 21 df)



Note: See text for explanation; X_i are defined in Table 1.
ξ_1 = 20th century occupational status
ξ_2 = 19th century occupational status

with 1 df). I can only invite speculation about the source of this anomaly.

Several observations are in order with regard to the substantive portions of the model of Figure 2A. First, the loadings of the five-city ratings on their common factor are essentially the same as those of Figure 1B. Second, the two indicators of status in the twentieth century load highly on their common factor; the loadings are similar to those of the Philadelphia (Hershberg) and Poughkeepsie (Griffen) ratings. Third, the correlation between the common factors for status in the nineteenth and twentieth centuries is high, .882, but by no means perfect. In fact, if one fixes the value of that correlation at unity, the fit of the model deteriorates greatly (L^2 = 42.61 with 1 df).

At the same time, this finding that occupational status hierarchies changed from the mid-nineteenth century to the mid-twentieth century need not imply that one would do well to forswear the gratification of comparative analysis. We need to consider the interpretation of the estimated correlation between the latent variables as well as its size and variability relative to other parameters of the model.

To simplify the discussion, Figure 2B displays a constrained version of the model in which only three distinct parameter values describe the relationships of the latent variables with one another and with their indicators. One parameter value (.939) describes the loadings of the two twentieth-century indicators on the twentieth-century status factor, as well as the loadings of the Philadelphia (Hershberg) and Poughkeepsie (Griffen) ratings on the nineteenth-century status factor. One parameter value (.890) describes the loadings of the Buffalo (Glasco), Kingston (Blumin), and Hamilton (Katz) ratings on the nineteenth-century factor. The last parameter value (.882) is the correlation between the nineteenth- and twentieth-century status factors. This model is far more parsimonious than that of Figure 2A, but the fit is virtually the same.

By placing further restrictions on the model of Figure 2B, three hypotheses of substantive interest can be tested. First, it is not possible to equate the first two parameter values. That is, not all loadings are the same (L^2 = 25.25 with 2 df). Second, it is possible to equate the first and third parameter values; that is, the data are consistent with the hypotheses that the correlation between occupational status in the nineteenth and twentieth centuries is the same as the larger of the two distinct loading values (L^2 = 1.04 with 1 df). Third, it is possible to equate the second and third parameter values; that is, the data are consistent with the hypothesis that the correlation between occupational status in the nineteenth and twentieth centuries is the same as the smaller of the two distinct loading values (L^2 = 0.01 with 1 df).

The implications of these findings are almost as great as if the correlation between the two latent variables were not significantly less than unity. One way to put the matter is that true occupational status in the nineteenth century is about as good an indicator of true occupational status in the twentieth century as are the SEI or NORC scores. Obversely, true occupational status in the twentieth century is about as good an indicator of true occupational status in the nineteenth century as are any of the five-city ratings. To put the same findings in yet a third way, the correlation between nineteenth-century occupational status in any one city and true twentieth-century status is virtually indistinguishable from that between nineteenth-century status in that city and in any other city.

In light of these findings, can one justifiably be more reluctant to adopt a common scale for comparative analysis across the century than across the country? Again, this is not to argue that no loss is entailed by the choice of a common scale of occupational social standing, either in the case of cross-sectional or cross-time comparisons. It simply argues that, if one is willing to suffer the loss in cross-sectional comparisons, one ought to be equally willing to do so to gain cross-time comparability. If the blind spot of most sociologists lies in their ignorance of historic specificity, their assumption that the past is just another present, then possibly historians suffer a complementary defect in the assumption that the past—if different at all—is altogether different.

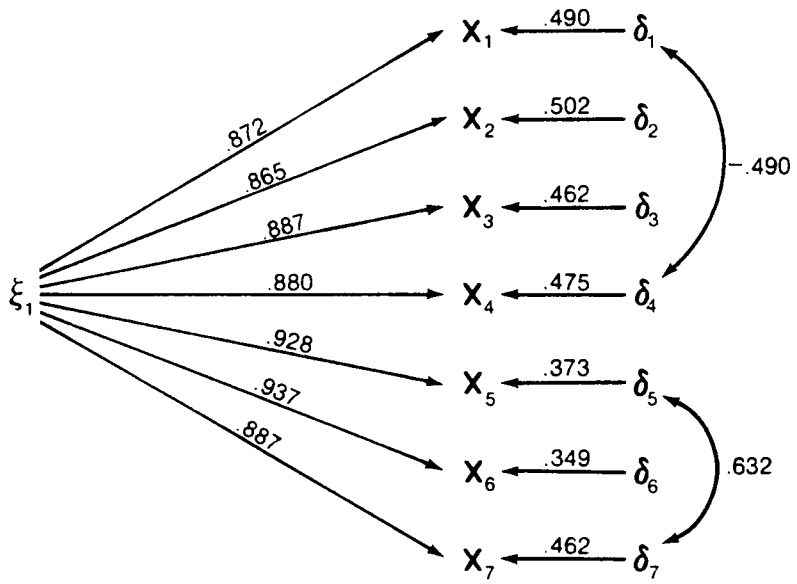
Of course, one may observe that, though equal in size, a correlation between status factors is not equal in meaning to a loading of rating on status. The complement of the former is change, while the complement of the latter is error. Thus, one may be willing to "average out" errors where it would be folly to ignore true change. However, such an argument would be inconsistent with the spirit of the present analysis, where I have tried to interpret each of the five-city status ratings as "true" with respect to the individual city to which it refers. If that assumption is not correct, then the five-city ratings are no more than expert guesses about the general nineteenth-century status hierarchy, and one might do well to seek other indicators of that hierarchy. Such other indicators might bear the same substantive relationship to the five-city ratings as the SEI does to the NORC scale, and their analysis might well lead to yet larger estimates of the correlation between occupational status hierarchies across the century.

A General Status Factor

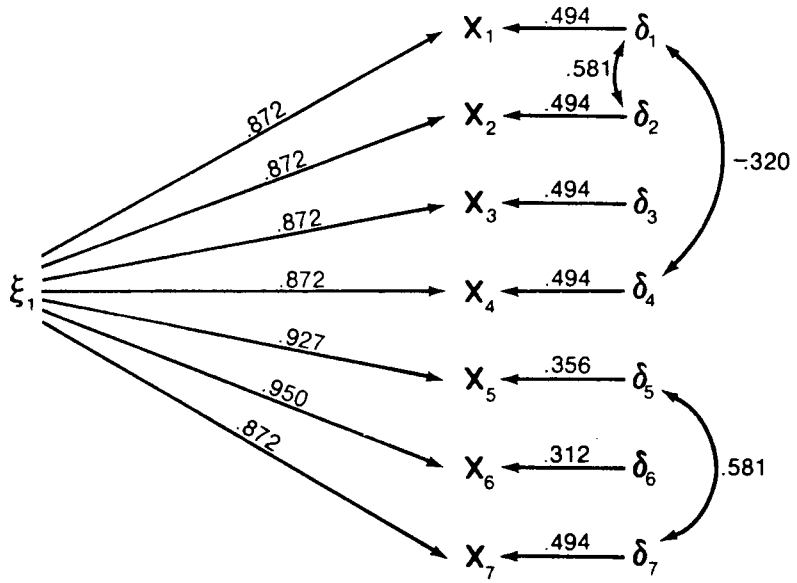
One last extension of the preceding analysis may help to encourage further questioning of the role of fact and artifact in our observations of stability and change in the occupational hierarchy. Figure 3 shows two models in which a single latent occupational status factor is proposed to explain the relationships among the nineteenth- and twentieth-century ratings. The model of Figure 3A includes only the two correlations between disturbances that were needed to fit the two-factor models of Figure

Figure 3. Single Factor Models of Occupational Status Ratings in the 19th and 20th Centuries

A. Uncorrelated Error within 20th Century Ratings ($L^2 = 54.46$ with 12 df)

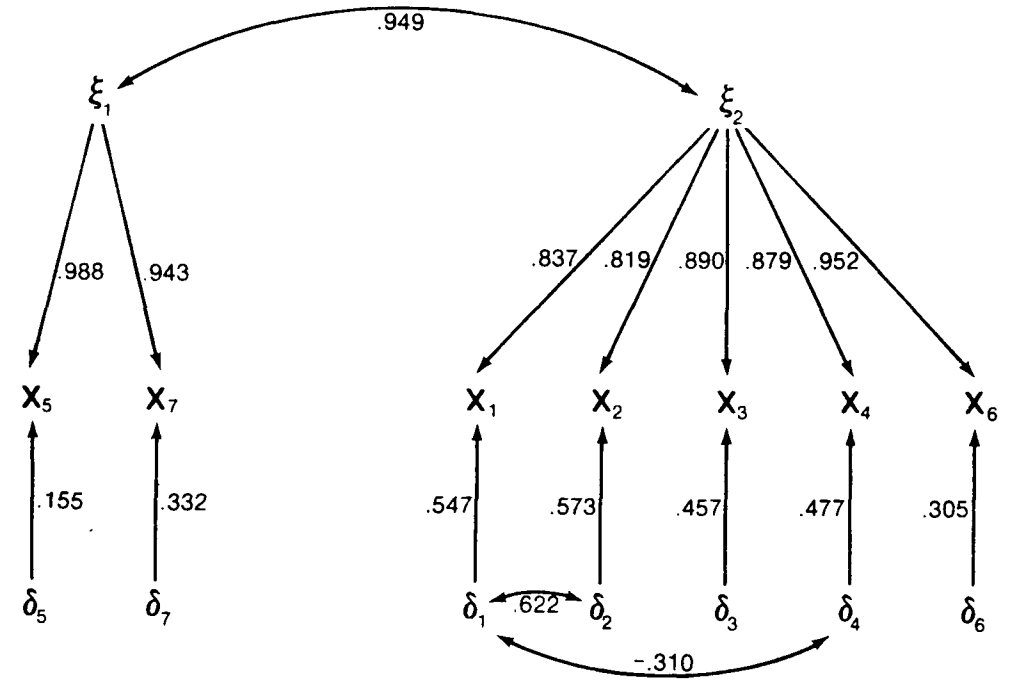


B. Correlated Error within 20th Century Ratings, Constrained Loadings ($L^2 = 21.27$ with 20 df)



Note: See text for explanation; X_i are defined in Table 1.
ξ_1 = occupational status

Figure 4. Two Factors for 19th Century Status (L^2=11.84 with 11 df)



Note: See text for explanation; X_i are defined in Table 1.
ξ_1= status (Philadelphia, Hamilton)
ξ_2= status (SEI, NORC, Buffalo, Kingston, Poughkeepsie)

2. This model fits very poorly (L^2 = 54.46 with 12 df), as one might well expect from the fact that it is just a reparameterization of the (previously rejected) two-factor model with perfect correlation. Despite the poor fit, it is interesting that the two twentieth-century indicators load as highly on the general occupational status factor as do three of the five-city ratings.

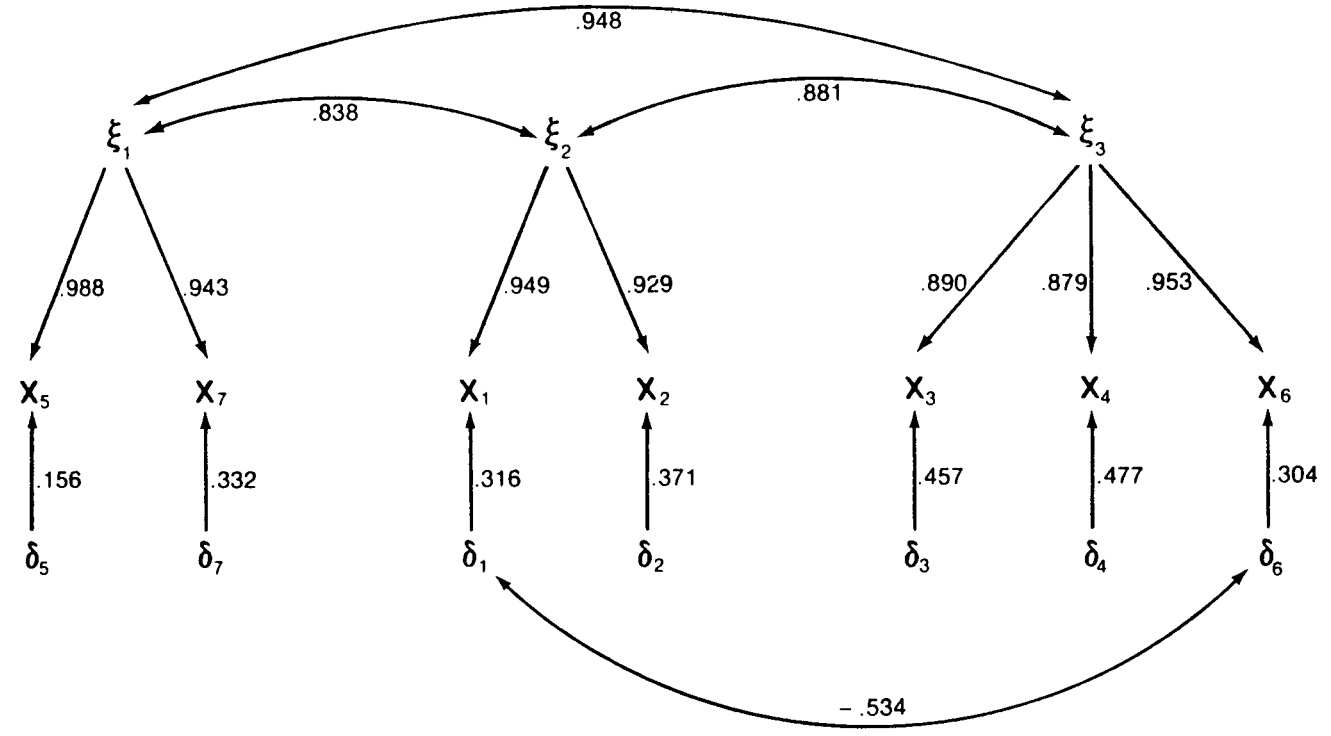
With one significant change in specification, the "single factor" model can be made to fit all the ratings about as well as the two-factor model. That change, shown in Figure 3B, is to permit correlation between the disturbances of the two twentieth-century indicators, the SEI and the NORC scale. (The model of Figure 3B also incorporates several additional equality constraints on loadings that are obvious from the diagram.) The introduction of this disturbance correlation can hardly be said to preserve the single-factor model in any substantive sense, for, ceteris paribus, the large correlation between the SEI and NORC scales accounts for the less-than-perfect correlation between nineteenth- and twentieth-century occupational status in the two-factor models.

At the same time, this treatment of the data is instructive because it shows that the correlation between the disturbances of the SEI and NORC scales is virtually the same as that between the Philadelphia (Hershberg) and Hamilton (Katz) scales. In fact, in the model of Figure 3B, those two disturbance correlations have been equated, but the values of the two correlations are so similar that the fit of the model is virtually unaffected by the equality constraint (L^2 = 0.05 with 1 df). That is, the evidence that the status hierarchy has shifted between the nineteenth and twentieth centuries is about as strong as the evidence that two nominally independent nineteenth-century prestige ratings were more highly correlated than one would expect from their dependence on a nineteenth-century status factor. If, for purposes of comparative analysis, one is prepared to regard the latter datum as a relatively unimportant methodological artifact, why not the former?

Two Factors for Nineteenth-century Status?

To make this last observation specific, consider the model in Figure 4. Its configuration is much like that of Figure 2A, and the fit of the two models is the same. However, the names of the factors have been changed. The Philadelphia (Hershberg) and Hamilton (Katz) ratings load on one factor, while the twentieth-century ratings, along with the three remaining nineteenth-

Figure 5. A Three-Factor Model of Occupational Status (L^2=11.85 with 11 df)



Note: See text for explanation; X_i are defined in Table 1.

ξ_1 = 19th century status (Philadelphia, Hamilton)
ξ_2 = 20th century status (SEI, NORC)
ξ_3 = 19th century status (Buffalo, Kingston, Poughkeepsie)

century ratings, load on the second factor. The fit is satisfactory in the model of Figure 4 because it permits correlation between the disturbances of the two twentieth-century ratings, just as it is satisfactory in Figure 2A because that model permits correlation between the disturbances of the Philadelphia (Hershberg) and Hamilton (Katz) ratings. To be sure, the correlation between the two nineteenth-century status factors (in Figure 4) is larger than that between the nineteenth- and twentieth-century status factors (in Figure 2A), but the difference is not very large.

Again, the model of Figure 4 is not proposed as a preferred representation of the structure of occupational status but as an illustration that the evidence for distinct nineteenth- and twentieth-century prestige factors is little different from the evidence that the Philadelphia (Hershberg) and Hamilton (Katz) ratings are spuriously correlated.

Even if one acknowledges that the five-city ratings tap two distinct status hierarchies—and the correlation between the factors in Figure 4 is significantly less than one (L^2 = 26.98 with 1 df)—these two nineteenth-century hierarchies are more similar to one another than to the twentieth-century hierarchy. This is shown in the model of Figure 5, where there are two factors for status in the nineteenth century and one for status in the twentieth century. The fit of this model is virtually the same as that of the models of Figure 2A or Figure 4. In the model of Figure 5, the correlation between the two nineteenth-century status factors (.948) is significantly larger than that between the twentieth-century factor and the Philadelphia (Hershberg)-Hamilton (Katz) factor (.838); L^2 = 16.27 with 1 df. The contrast (.948 versus .838) is less strong in the case of the Buffalo (Glasco)-Kingston (Blumin)-Poughkeepsie (Griffen) factor, where L^2 = 5.81 with 1 df.

Is this strong enough evidence on which to base the working assumption that occupational status hierarchies differ between the nineteenth and twentieth centuries? Are the differences between centuries large enough relative to those between groups of nineteenth-century cities (investigators) to discourage comparative analysis of occupational stratification between the nineteenth and twentieth centuries? This paper will have

served its purpose if it encourages historians and sociologists to give further attention to these questions.

Conclusion

Even if one does not accept the present methodological argument, the estimates of correlation between nineteenth- and twentieth-century prestige hierarchies may be of substantive interest. In arguing against the uncritical acceptance of contemporary occupational prestige ratings, Katz expressed his astonishment at Blau and Duncan's report of a .93 correlation between scales of occupational prestige in 1925 and in 1963: "The persistence found here provides evidence which runs against the arguments in this paper. However, it is possible that the differences in the nature and organization of work shifted much more between 1850 and 1925 than between 1925 and 1963."[19]

Suppose that the evolution of occupational prestige hierarchies follows a simple causal chain,[20] and accept the estimates of .93 for the correlation between prestige in 1925 and in 1963 and of .882 (from Figure 2A) for the correlation between prestige in the mid-nineteenth century and in the 1960s. In that case, the estimated correlation between prestige in the mid-nineteenth century and in 1925 is just .882/.93 = .95. This figure may be too high, because the 1925–1963 correlation is based on two prestige scales, while the inter-factor correlation is based on the common content of prestige and socioeconomic scales for the twentieth century. This can be corrected by using instead the correlation between the nineteenth-century prestige factor and the NORC scale: .818. In this case, the correlation between prestige in the mid-nineteenth century and in 1925 is estimated to be .818/.93 = .88. One may justifiably ask whether the difference between the latter correlations of .88 (from 1860 to 1925) and .93 (from 1925 to 1963) is strong enough to support Katz's speculation that "differences in the nature and organization of work shifted much more" in the earlier period.

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Appendix. Five-City Occupation Titles, Census Codes, and Status Scores or Ratings

No.	Occupation Title	1970 Census Code(s)	Status Score or Rating							
			Duncan*	Siegel*	Glasco	Blumin	Hershberg	Griffin	Katz	Composite
1	Agent	omit	----	----	2	2	2	2	2	2
2	Baker	402	21.9	34.0	3	3	3	3	3	3
3	Barber	935	17.0	37.9	2	3	3	3	4	3
4	Bartender	910	19.0	19.9	4	4	4	4	4	4
4	Bartender	910	19.0	19.9	4	4	4	4	4	4
6	Boat Captain	221	49.9	56.7	3	3	3	2	3	3
7	Boatman	701	24.0	36.8	4	4	4	5	4	4
8	Boiler	690	19.0	28.4	3	4	3	-	3	3
9	Bookbinder	405	39.0	31.3	3	3	3	3	3	3
10	Bookkeeper	305	50.8	47.3	2	3	2	2	2	2
11	Brewer	575	25.7	42.1	3	2	3	3	3	3
12	Bricklayer	410	27.0	35.7	3	3	3	3	3	3
13	Brickmaker	690	19.0	28.4	3	3	3	3	3	3
14	Brickmason	410	27.0	35.7	3	3	3	3	3	3
15	Broker	245,265,270,271	65.6	48.2	2	2	2	2	2	2
16	Builder	245	62.0	50.8	3	2	2	2	2	2
17	Butcher	631,633	22.6	27.8	3	3	3	3	3	3
18	Cab Maker (cabinet maker)	413	22.3	38.1	3	3	3	3	3	3
19	Carman	640,486	18.5	31.0	4	5	4	4	4	4
20	Carpenter	415	18.9	39.7	3	3	3	3	3	3
21	Carriage Maker	omit	----	----	3	3	3	3	3	3
22	Carter	763	08.8	12.2	4	5	4	4	4	4
23	Chair Factory	omit	----	----	-	4	4	4	4	4
24	Clergy	086	52.0	69.0	1	2	1	1	1	1
25	Chemist	045	79.4	67.1	1	2	2	1	2	2
26	Cigar Maker	694	19.2	29.1	3	3	3	3	3	3
27	Clerk	395	44.0	36.2	2	3	2	2	2	2
28	Coachman	714	10.0	21.5	4	5	4	4	4	4
29	Commission Merchant	245	62.0	50.8	1	1	1	1	1	1
30	Conductor	704,226	45.3	34.5	3	4	4	2	3	3
31	Confectioner	245	62.0	50.8	3	3	3	3	3	3
32	Cooper	575	25.7	42.1	3	3	3	3	2	3
33	Cordwainer	664	9.2	31.6	3	3	3	3	3	3
34	Dealer	245	62.0	50.8	2	3	3	2	4	3
35	Dentist	062	96.0	73.6	1	2	2	1	2	2
36	Drayman	763	8.0	12.2	4	5	4	4	4	5
37	Druggist	064	81.3	60.3	1	2	2	1	2	2

Continued

No.	Occupation Title	1970 Census Code(s)	Status Score or Rating							
			Duncan*	Siegel*	Glasco	Blumin	Hershberg	Griffin	Katz	Composite
38	Dry Goods/Fancy	245	62.0	50.8	-	2	2	1	2	2
39	Dyer	620	12.0	25.0	3	4	3	3	3	3
40	Engineer	omit	----	----	1	2	3	3	3	3
41	Farmer	801	14.0	40.7	2	2	3	2	3	2
42	Farm Laborer	822	06.3	18.9	5	5	5	5	5	5
43	Ferryman	661	16.0	33.7	4	4	4	-	4	4
44	Fisherman	752	10.6	30.3	4	4	4	5	4	4
45	Furnaceman	622,666	17.4	32.3	3	4	4	4	4	4
46	Gardener	755	10.9	22.1	4	3	4	4	3	4
47	Gas Fitter	522	34.0	40.6	3	4	3	3	3	3
48	Gentleman	omit	----	----	-	1	1	1	1	1
49	Glass Blower	575	25.7	42.1	3	3	3	3	3	3
50	Grocer	245	62.0	50.8	2	3	2	2	2	2
51	Saddle Maker	575	25.7	42.1	3	3	3	3	3	3
52	Hatter	630,690	17.0	23.3	3	3	3	3	3	3
53	Hostler	740	16.9	28.7	2	5	4	5	4	4
54	Hotel Keeper	245	62.0	50.8	2	3	2	1	1	2
55	Innkeeper	245	62.0	50.8	2	3	2	1	1	2
56	Jeweler	453	36.4	37.5	3	2	2	3	2	2
57	Joiner	415	18.9	39.7	3	3	3	3	3	3
58	Lab Man	922	25.0	26.3	5	4	5	-	5	5
59	Laborer	785	08.3	17.5	5	5	5	5	5	5
60	Lawyer	031	92.3	75.1	1	1	1	1	1	1
61	Liquor Dealer	245	62.0	50.8	2	3	2	2	1	2
62	Machinist	461	32.9	47.7	3	3	3	3	3	3
63	Manufacturer	245	62.0	50.8	2	2	1	1	2	2
64	Mariner	661	16.0	33.7	4	5	4	5	4	4
65	Mason	410	27.0	35.7	3	3	3	3	3	3
66	Merchant	245	62.0	50.8	2	1	1	1	1	1
67	Moulder	415,503,630,690	16.2	31.4	3	3	3	-	3	3
68	Nail Maker	690	19.0	28.4	3	4	3	4	3	3
69	Operator	omit	----	----	2	4	3	-	3	3
70	Painter	510,644	17.2	29.5	3	3	3	-	3	3
71	Paper Hanger	512	13.7	27.7	3	3	3	-	3	3
72	Pattern Maker	514	43.0	38.7	3	3	3	3	3	3
73	Peddler	264	08.8	18.6	2	4	3	2	4	3
74	Piano Maker	602	17.2	27.5	3	3	3	3	3	3

Continued

No.	Occupation Title	1970 Census Code(s)	Status Score or Rating							
			Duncan*	Siegel*	Glasco	Blumin	Hershberg	Griffin	Katz	Composite
75	Physician	065	92.1	81.2	1	1	1	1	1	1
76	Plasterer	520	25.0	33.2	3	3	3	3	3	3
77	Plumber	522	34.0	40.6	3	3	3	3	3	3
78	Porter	934	07.8	17.5	4	5	4	5	4	4
79	Printer	422	52.0	38.0	3	3	2	3	2	3
80	Puddler	751,622,641	21.4	38.9	3	4	3	3	3	3
81	Quarryman	640	16.5	26.4	4	5	4	5	4	4
82	Railroad Worker	780	8.2	19.1	5	5	4	5	4	4
83	Saddler	575	25.7	42.1	3	3	3	3	3	3
84	Sailor	661	16.0	33.7	4	5	4	5	4	4
85	Sales Agent	280,265	57.7	41.1	2	3	2	2	2	2
86	Salesman	280	49.4	35.4	2	3	2	2	2	2
87	Seaman	661	16.0	33.7	4	5	4	5	4	4
88	Servant	984(Z)	07.0	18.0	4	5	4	5	4	4
89	Ship Carpenter	415	18.9	39.7	3	3	3	3	3	3
90	Shipwright	415	18.9	39.7	3	3	3	3	3	3
91	Shoemaker	542	12.0	32.6	3	3	3	3	3	3
92	Stonecutter	546	24.0	31.7	3	3	3	3	3	3
93	Stonemason	410	27.0	35.7	3	3	3	3	3	3
94	Storekeeper	245	62.0	50.8	2	3	2	2	2	2
95	Student	omit	----	----	-	-	2	-	2	2
96	Tailor	551	22.0	34.0	3	3	3	3	3	3
97	Tanner	690	19.0	28.4	3	3	3	3	3	3
98	Tavern Keeper	230	37.6	38.7	4	3	2	2	2	2
99	Teacher	142	71.2	58.9	1	3	2	1	2	2
100	Teamster	763	08.0	12.2	4	4	4	4	4	4
101	Tinsmith	535	33.0	36.8	3	3	3	3	2	3
102	Tabacconist	245	62.0	50.8	2	3	2	2	2	2
103	Turner	694	19.2	29.1	3	3	3	3	3	3
104	Typesetter	422	52.0	38.0	3	4	3	3	3	3
105	Upholsterer	563	21.1	29.9	3	3	3	3	3	3
106	Victualer	230	37.6	38.7	2	3	2	2	2	2
107	Waiter	915	16.0	20.3	4	5	4	4	4	4
108	Waterman	780	08.2	19.1	5	5	4	5	4	5
109	Watchman	964,962	29.4	35.0	2	5	4	4	4	4
110	Weaver	673	05.9	25.0	3	4	4	3	3	3
111	Wheelwright	492	26.5	32.8	3	3	3	3	3	3
112	Yardman	755,761,785	11.7	33.0	4	5	4	5	4	4

*Average if more than one code.

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