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ABSTRACT

This paper contrasts two approaches to the analysis of the occupational achievement process. Human Capital Theory, developed in economics, and the status attainment literature in sociology both explain the achievement process in terms of individual characteristics. These characteristics form a person's level of resources, and growth in achievement is seen as a result of changes in resources. Social mobility research on the other hand sees changes in achievement as a result of the utilization of structural opportunities that allow for gains in prestige and income without a prior change in resources.

An attempt to specify the interplay between structural and individual characteristics is made in a model for job-shifts. The parameters of this model measure the influence of structural constraints on the achievement process. Structural characteristics, such as the level of employment and the distribution of opportunities, may determine a person's control over the job-transition. Amount of control in turn affects the magnitude of the gain obtained in the job-shift and thus the increment in return on resource obtained in the job-shift. This model for job-shifts can be extended to a model for occupational careers. The career pattern predicted by this model is similar to the one predicted by Human Capital Theory. Thus structural opportunities and investment behavior will tend to produce similar age profiles of prestige and income.

An empirical analysis of outcomes of job-shifts shows that a major part of the gain realized in job-shifts appears to reflect

increments in resources and not change in levels of resources. This means that occupational returns on personal resources, will vary with variations in the opportunity structure of the labor market.

Growth in Occupational Achievement: Social Mobility or Investment in Human Capital

Introduction

The term occupational achievement is used here to refer to the prestige and income an individual has obtained at a point in time. Although it is of interest to explore differences in the processes that generate prestige and income respectively, the common elements in these processes should be specified first. This paper focusses on what are believed to be such common elements in the processes that result in the attainment of a certain level of prestige and income.

The objective of the analysis of the occupational achievement process presented here is to contribute to the development of appropriate indicators of the process. We shall be concerned with the development of analytic indicators, [Sheldon and Land (1972)] i.e., indicators that constitute parameters in a model of the process. We shall argue for a model that shows the outcome of the achievement process as a result of several forces that may vary independently from each other. This model therefore implies that alternative policies for affecting the process are possible. Evaluation of these alternative policies needs indicators that can separate the operation of the various forces that affect the achievement process. One must use analytic indicators, rather than descriptive ones.

Research on occupational achievement has been carried out both in economics (mostly on income) and in sociology (mostly on status or prestige). The conceptualizations of the process have been quite different in the two fields. The two approaches are not mutually exclusive, however,

and a comprehensive theory of achievement needs elements from both approaches. Such a theory, we will argue, can fruitfully be based on an analysis of job-shifts since the achievement process can be considered as a result of a succession of job-shifts.

The following sections will briefly review some of the most relevant features of the conceptualization of occupational achievement in economics and sociology. The review is followed by an analysis of the outcome of job-shifts carried out by a cohort of 30-39 year old males from their entry into the labor force until time of interview. The data are obtained from the Hopkin Life-History Study.[1] A discussion follows that will attempt to clarify what the estimated parameters indicate and what are the policy implications of the various interpretations.

2. Occupational achievement as social mobility

The sociological research on achievement process originates in research on social mobility. Social mobility and occupational achievement are closely related phenomena. The main problem posed in traditional mobility research is however not the question of what makes a person achieve a certain level of prestige and income, but what makes a person's achievement differ from the achievement of his father. Given a certain origin, the factors that determine the distance from that origin are of course those that determine occupational achievement.

Traditional mobility research seems most interested in establishing only the magnitude of the difference between origin and current status, that is the amount of mobility. The amount of mobility in turn indicates the "openness"

of a society, an important social indicator in a society concerned with equal opportunity. The concern with mobility is for what it tells about social systems rather than what it tells about individual achievement.

Mobility is the movement of individuals among positions in a social structure. Most often these positions are jobs organized in occupations. Individuals differ with respect to their probability of moving between a a given set of positions, that is, mobility depends on individual ability, values and motivation. Also, in order for an individual to move there must be a vacant position for him to occupy. Hence mobility is also a function of the distribution of opportunities given by the occupational structure. This definition and the conceptualization of social mobility as an interplay between structural and individual characteristics is accepted in most mobility research. Consequently, much effort has been directed toward separating individual and structural contributions to mobility.

The most ambitious attempt to separate the various sources of mobility is probably the one made by Kahl (1957), who tried to separate out the amount of technological change, demographic factors, migration and individual characteristics that affect mobility. The result is unsatisfactory since the information contained in father-son mobility tables cannot be linked to structural changes in society. Duncan (1966) argues that generation of fathers is not a cohort which represents occupational structure at any point in time. It might be added that mobility between father and son is the result of a career mobility process that cannot be

located precisely in time with cross-sectional data, and therefore cannot be linked to observed structural changes. Despite continued ingenuity in the development of measures and models of mobility for intergenerational data it seems doubtful that such data will ever enable a separation of various sources of mobility. Intragenerational mobility data are needed instead, since such data will at least permit a more precise time-anchoring of the mobility process and therefore may allow a more detailed analysis of the process.

A major recent development in the analysis of mobility with the emphasis on structural sources of movement uses data that represent intergenerational mobility. The data are, however, only indirectly data on individual mobility as they are measures of the movement of vacancies in organizations (White, 1970). Individuals are seen to move in response to the creation of vacancies, that is opportunities, and this generates chains of moves that will end only with the elimination of jobs or the entrance of new individuals to the system. Vacancy chains in this way generate careers of individuals by offering opportunities for gains in achievement without changes in individual characteristics.

White's models are an important contribution to our understanding of how structural opportunities may create mobility and represent a major advance over the many unsatisfactory models and measures that have been proposed for conventional mobility tables. The initiative is however, completely in the hands of vacancies in White's models. There is no attempt to specify the interplay between individual and structural characteristics for generating mobility.

The analysis of the importance of specific individual attributes for mobility was difficult to carry out within the context of traditional mobility tables. This point is well documented in the critique of Anderson's (1961) analysis of the importance of education for mobility given by Blau and Duncan (1967). A reformulation of the basic question was needed. Thus, rather than asking what is the importance of, education, for example, for the distance between origin and current status, the status attainment literature asks what is the importance of individual characteristics for occupational achievement. The origin is seen as one of those characteristics, and the status attainment literature thus gives a more appropriate formulation of the problem for the analysis of occupational achievement. This most important re-orientation of mobility research of which the monograph by Blau and Duncan (1967) is the most prominent example, also represents a change in emphasis away from the study of mobility as a system characteristic to the focus on mobility as an individual process.

The origin of the status attainment literature in research on inter-generational mobility is visible in the concern for the influence of origin variables directly and indirectly through the achievement of education and first job, that is, it is an analysis of the transformation of resources from one generation to the next (Duncan, 1966). The origin in mobility research is however, not reflected in a concern for structural sources of variation in occupational achievement. On the contrary, there is no attempt to specify structural opportunities as a source of variation in occupational

achievement in the status attainment literature. But if changes in occupational structure influence the degree of departure of sons' status from fathers', as the traditional conceptualization of mobility dictates, then structural characteristics certainly will affect occupational achievement in general and therefore the relation between background variables and achievement.

From a largely descriptive concern for the measurement of the mobility between father and son, research in sum has turned to the analysis of the sources of individual processes of mobility. However, recent research has diverged into two unrelated activities with respect to implementing the conceptualization of mobility as an interplay between structural and individual characteristics. On the one hand, status attainment literature focuses exclusively on individual attributes. On the other hand, White's models show an exclusive concern for structural sources of mobility and careers.

Status attainment research concerns itself with individual attributes that directly or indirectly influence a person's occupational achievement. Although the term is not universally used in the literature it seems reasonable to subsume those individual characteristics under the term personal resources. Family background and education do not determine a fixed level of resources throughout an individual's life-time, although the sociological literature is only concerned with these characteristics. A person may undertake additional training and in other ways add to his resources at any point in the life-cycle, and in this way influence his

achievement. We must turn to the economic literature, more specifically, to the so-called Human Capital Theory for a concern for the change and development of resources over time.

3. Occupational Achievement as Investments in Human Capital

Sociological research on occupational achievement is not grounded in any well specified theory about the achievement process. Apart from the distinction between structural and individual sources of mobility there is little concern for the mechanisms that produce occupational achievement. A comprehensive conceptual scheme that will justify the choice of variables and interpret their interrelations, does not exist. This contrasts to the economic approach, where Human Capital Theory offers a rather elaborate conceptual apparatus developed mainly analogous to standard economic concepts.

The basic idea in the Human Capital Theory is that the resources of an individual can be regarded as a stock of capital that determines the individual's productivity in the market and hence his earnings. This stock can be augmented by investments in training and education. These investments in human capital increase productivity and hence earnings, and the earnings increase constitutes a return on the investments.

Investments are undertaken at a cost that may be a direct one in the form of tuition and material, and indirect costs that are earnings forgone. The indirect costs are present even if training takes place on the job, since general training (that may be transferred to another job) must be financed by the individual. Otherwise, such training would reduce the competitiveness of the firm that gives on-the-job training (Becker, 1964).

The increase in earnings subsequent to the investment, that is the return on the investment, is compared to the cost of the investment. Individuals are assumed to be rational beings that maximize their achievement. Investment in human capital will therefore only be undertaken if the predicted increase in the sum of future earnings due to the investment, discounted back to the time of the decision, exceeds the cost of the investment.

Human Capital Theory is first a theory about the conditions under which a person will undertake education or other forms of training. However, it is a theory about the process through which individuals increase their income and thus their occupational achievement.

The total stock of personal resources determines earnings. As long as there are no changes in resources, earnings are assumed to be constant. This is a crucial assumption, since it implies that the occupational achievement process is seen as a question of changes only in a person's level of resources. Becker (1964) thus uses the observed flat earnings profiles of unskilled workers as an indication of their lack of investments in themselves. Of course, human capital analysis would admit to factors other than resources as determinants of earnings, but the theory does not relate such factors to systematic variation in earnings over age.

Generally investments do take place after entry into the labor force and the resultant age profile will be concave to the X-axis with a gradually declining slope. This concaveness is due to a tendency to concentrate investments at younger ages. There are several explanations for this pattern (See Becker, 1964, Ben-Porath, 1967). First, the remaining time

in the labor force will determine the total return on an investment and the investment is therefore more profitable the younger the individual. Second, investments at older ages are more costly since earnings foregone will be larger as a result of earlier investments. Finally, the rate of return may decline with age as a result of a decline in a person's ability to learn. This tendency to accumulate investments at younger ages is counteracted by upwardly sloping marginal costs of investments (Mincer, 1970), so that there will be a tendency to spread out investments.

In order to calculate the precise return on investment activities it is necessary to separate out that amount of the earnings differential that is due to the investment activity as such, and the amount due to "ability." Ability is somewhat nebulously treated in the literature but Becker's definition probably would be accepted by most (Becker, 1964). He defines ability as whatever produces earnings differences holding constant all investments. Since ability will be correlated with investment activities, especially education, it may be difficult to assess whether it is the schooling as such or the ability differences associated with schooling that produce earnings differentials.

The concept of ability as defined by Becker (1964) is very similar to the sociological concept of ascribed status determinants. The origin variables that loom so large in the status attainment literature may be seen as indirect measures of characteristics that would be subsumed under "ability" in the economic literature. The effect of parental education and father's status on occupational achievement thus would be explained by most as reflecting the differences in I.Q., motivation, and values

associated with these background variables. The linear models (path models) developed in sociology thus may be seen as an attempt to specify the interrelationship between "ability" as measured by background variables, and one crucial investment, education, in producing occupational achievement. Griliches (1970) has in fact argued for the formation of such models in the economic literature in order to overcome some of the difficulties encountered when attempts are made to take ability into account.

Although the status attainment literature and human capital theory are similar in the distinction between ability and investment and achieved and ascribed individual characteristics, the two research traditions tend to focus on different attributes of occupational achievement. Human capital theory focuses on earnings, the status attainment literature on status or prestige. This difference however seems to be mostly a difference in tradition. It is difficult, if not impossible, to argue that the propositions for attainment of income developed in human capital theory are not as valid for prestige. Similarly the models developed in status attainment literature for the interrelationship of ascribed and achieved characteristics should be as valid for income as for prestige.

The two approaches complement each other in that the status attainment literature primarily deals with the development of resources up to the entry into the labor force while human capital theory's concern for on-the-job training and the like enables predicting how the achievement process develops after entry into the labor force. The concern for age-variations in achievement is an important one. First a systematic

age-variation in achievement is an important phenomenon in itself and a comprehensive theory of achievement should of course address itself to the explanation of change in achievement over time. Secondly, even if the explanation of age-change is not deemed essential, as the sociological literature will have it, the existence of such change will make the parameters in models of the achievement process dependent on the age-distribution of the population. This, of course, adds to the difficulty in making comparisons over time or between places and therefore hinders the development of satisfactory social indicators.

Human capital analysis shares with the status attainment approach a lack of concern for structural sources of variation in occupational achievement. The only systematic source of variation in achievement is changes in personal resources, according to human capital theory. If no such change takes place, the earnings profile will be flat. As in status attainment literature, individual characteristics are the only ones deemed relevant for achievement.

It would be futile to deny that a person may increase his prestige and income by undertaking additional training and education. Human capital analysis provides a theory about how such additions to a person's level of resources come about. As a theory about the achievement process it is only partial since it seems equally futile to deny that at times a person may experience a gain in prestige and income because an opportunity for advancement presented itself as a result of the creation of a new job or the retirement of the incumbent of an old job. Also, at times people are fired or pressured out of their job without an apparent change

in resources but with losses in prestige and income as probable consequences. In these instances there are structural sources to the variation in achievement. A comprehensive theory of occupational achievement should take both individual and structural influences on the achievement process into account. We will in the next section try to carry out an analysis that fulfills this demand.

4. A Model for Job-shifts

We have seen that the answer to the problem of what determines occupational achievement is given by Human Capital Analysis as well as by the status attainment literature in terms of individual characteristics--achieved or ascribed resources. The human capital approach goes further than the status attainment literature in one crucial respect: the economic approach does attempt a specification of the mechanisms that produce growth in achievement, these mechanisms being acts of investments. The occupational achievement process in the investment approach is clearly conceived of as an age dependent process. Earnings profiles or careers therefore are most important variables on which data are needed in order to apply the theory.

The attempt to relate mobility to the formation of vacancies by White (1970) uses a data base that indirectly stems from the intragenerational mobility of individuals. We have argued in general, that if more successful attempts to specify the structural sources of variation in mobility are to be made, data on the careers of individuals are needed, as intergenerational data do not give enough information to identify the structural sources of variation. It is apparent then, that a more comprehensive approach to the

achievement process that incorporates the analysis of structural mechanisms as well as mechanisms for change in resources, will need to rely on repeated observations of individuals' careers. Such data are available in the form of a set of retrospective life-histories, that are occupational, familial, educational, and residential experiences, on a sample of 30-39 year old men.[2]

The data available gives us detailed information on every change in the respondents' occupational careers. We shall argue that the best way to utilize all this information is to analyze the outcomes of the job-shift undertaken by the respondents. This will enable us to make most efficient use of the information available, and also enable us to identify individual as well as structural sources of variation in careers.

The analysis of job-shifts is the most efficient use of the information on careers if all major variations in achievement take place through job-shifts. This is certainly true for variations in prestige, as prestige is an attribute of an occupational category; and we believe it is the case for earnings too. Every change in duties, tasks, or firm were supposed to be registered as job-shifts in the life history data. It follows that except for general increases in wages--real and inflationary--that can be controlled for, no major change in earnings should occur within a job.

The analysis of job-shifts may enable us to identify the influence of structural forces on the achievement process since job-shifts are elementary acts of mobility. They are the response of individuals either to opportunities for gains in achievement or to pressures to leave their job, that is, job-shifts represent an interplay between structural and

individual characteristics. By making some simple assumptions about individual behavior we hope to be able to specify this interplay.

As already indicated, we shall use the term resources in the following discussion to label all individual characteristics that have a bearing on a person's value in the job market. It will be crucial in the following analysis to distinguish between the situation where the job-shift is preceded by an increase in resources obtained during the job-left, and the situation where resources remained at a constant level. The former case will be one where the job-shift is a result of an investment activity, the latter is a case of "pure" mobility--the job-shift is a response to an opportunity for a better job that does not demand increased resources. We shall characterize every job by its level of achievement, measured by prestige or income. A job-shift will ordinarily produce a change in achievement, and we may form this outcome as the difference between the new and the old level of achievement. The simplest model for this outcome is a linear difference equation:

$$\Delta X_1 = b_1 X_{11} + b_2 X_2 \qquad (1)$$

where $\Delta X_1 = X_{12} - X_{11}$

where X_{11} stands for the achievement of the job-left, X_{12} is the achievement of the job entered. The variable X_2 stands for an (assumed) comprehensive measure of a person's level of resources. This is a correct notation only if resources remained unchanged prior to the job-shift. If the job-shift is a response to increments in resources only, then X_2 should

be replaced by a term $\Delta X_2 = X_{21} - X_{20}$, where X_{20} is the level of resources at entry into the job, and X_{21} the level of resources when the job-shift occurs. The distinction is crucial for the interpretation of b_2. If the job-shift is strictly a response to opportunities ($\Delta X_2 = 0$), then b_2 measures the increment in return on resources. If the job-shift is a response to increased resources, then b_2 measures the return on the increment in resources.[3] This difference in interpretation is of major importance when we want to distinguish between the relative importance of investment activities to mobility as a source of variation in occupational achievement. We shall proceed with a theoretical analysis of the case where resources did not change prior to the job-shift, since a model for the career pattern in that case may be developed from equation (1). In the empirical analysis, to follow, the difference in interpretation of b_2 becomes crucial, however. Where a_2 is the maximum increment in return on his resources a person may obtain, or the maximum return on the increase in resources if the job-shift is a response to a gain in resources prior to the job-shift. Suppose now instead that a person was forced out of his job, that is, he had no control over the decision to leave. He will then be expected to suffer a loss, since he should have left his job before getting forced out, if a gain was available. The loss will constitute a fraction of the achievement of the job-left; and increment in return on resources will be zero:

$$\Delta X_1^{11} = -d_1 X_{11} + 0 \cdot X_2 + d_o \qquad (3)$$

or $$X_{12} = (1 - d_1) X_{11} + 0 \cdot X_2 + d_o$$

may be seen to determine a person's control over the decision to leave. When the level of employment is high and there are many job opportunities we will expect that job-shifts are likely to be undertaken voluntarily. When the level of employment is low, and there are few opportunities, most job-shifts may be expected to take place when the job-holder has little or no control over the decision to leave.

Suppose now that a person, in fact, has full control over the decision to leave. If a job-shift is undertaken, the new level of achievement should at least equal the old level of achievement plus an increment determined by the level of resources.

$$X_{12} = X_{11} + a_2X_2 + a_o$$

or

$$\Delta X_1 = a_2X_2 + a_o \qquad (2)$$

Where a_2 is the maximum increment in return on his resources a person may obtain, or the maximum return on the increase in resources if the job-shift is a response to a gain in resources prior to the job-shift. Suppose now instead that a person was forced out of his job, that is, he had no control over the decision to leave. He will then be expected to suffer a loss, since he should have left his job before getting forced out, if a gain was available. The loss will constitute a fraction of the achievement of the job-left; and the increment in return on resources will be zero:

$$\Delta X_1^{11} = -d_1X_{11} + 0 \cdot X_2 + d_o$$

or

$$X_{12} = (1 - d_1)\, X_{11} + 0 \cdot X_2 + d_o \qquad (3)$$

The parameter d_1 measures how far down the occupational ladder a person will have to go in order to find a vacant job. This parameter then is determined by the distribution of vacancies according to occupational achievement.

In the general situation a person will have some degree of control, c, that may be assumed to vary between 0 and 1. The expected outcome of the job-shift can now be written as:

$$\Delta X_1 = (1 - c)\ \Delta X^{11} + c\ \Delta X$$

or $$\Delta X_1 = (1 - c)\ (d_1 X_{11} + d_o) + c\ (a_2 X_2 + a_o) \qquad (4)$$

that may be written as:

$$\Delta X_1 = b_1 X_{11} + b_2 X_2 + b_o$$

where $$b_1 = (1 - c)\ d_1 \leqq 0 \qquad (5)$$

and $$b_2 = c \cdot a_2 \geqq 0.$$

As a person gains control over the decision to leave his job the coefficient b_1 gets closer to zero and the coefficient b_2 approaches its maximum a_2. In this way characteristics of the occupational structure will have an impact on the outcome of the job-shift and therefore on the achievement process that is a succession of job-shifts.

The respondent to the life history study was asked for every job whether they left it voluntarily or not. This information offers an opportunity to test the above ideas, although the validity and the reliability of the item may be less than desirable. First we may test whether job-shifts where the individual had control, result in a gain, as argued above.[4] All job-shifts undertaken by all respondents in the

national samples were divided into two groups according to stated control,[5] to produce Table 1.

TABLE 1

Mean Prestige and Income and Mean Gains in Prestige and Income According to Stated Control over the Decision to Leave

	Own Decision	Not Own Decision
Mean Prestige	336.59	388.35
Mean Gain Prestige	20.26	1.47
Mean Income	397.96	378.79
Mean Gain in Income	28.39	-11.96
Mean Occupational Achievement	369.83	325.40
Mean Gain in Achievement	24.66	-5.80
N	3179	689

Note: Occupational achievement computed as a weighted average of income and prestige with weights obtained from a canonical analysis.

The overall gain in achievement is obtained by weighting prestige in income gains by canonical weights obtained from an analysis of simultaneous gains in prestige and income (see Sorensen, 1972 for detail). This measure of achievement clearly shows the expected difference between those who said they had control and those who did not claim so.

The data also enable a test of the predictions concerning the behavior of b_1 and b_2 according to amount of control. A reformulation of equation (1) is advantageous:

$$X_{12} = (1 + b_1) X_{11} + \sum_{i=2}^{n} b_i X_i + b_o \qquad (6)$$

The reformulation permits us to have a set of independent variables rather than a single comprehensive one. Also, the parameter $(1 + b_1)$ will vary as b_2 according to control over the decision to leave. This means that we may use the amount of variance explained by equation (6) to test our predictions, i.e., as $(1 + b_1)$ and b_2 increases with amount of control so will the amount of variance explained by X_{11} and resource variables X_i's increase.[6]

TABLE 2

Amount of Variance Explained by Prestige and Income of Job Left and Resources, by Stated Control over the Decision to Leave Job

	Prestige Equations	Income Equations
Own Decison	.467	.504
Not Own Decision	.366	.416

The test seems satisfactory: there is a clear difference in R^2's between the two groups.

5. Career Patterns

We have shown how the outcome of job-shifts is a function of a person's level of resources and the impact of structural characteristics that affect the level of control a person has on job-transitions. Successive outcomes of job-shifts constitute a person's occupational career. How the structural and individual characteristics determine the career through their impact on the outcome of job-shifts can be seen by solving the difference equation (1).[7] This is possible if we assume that a person's

level of resources does not change over time, that is, we assume that job-shifts are a response to only opportunity. The solution depends on the value of b_1. If $b_1 = 0$ we get

$$X_{1r} = X_{10} + {}_r(b_2 X_2) \tag{7}$$

when X_{1r} is the achievement of job no. r and X_{10} is the achievement of the first job. If $b_1 \neq 0$ we get

$$X_{1r} = (1 + b_1)^r \left(X_{10} + \frac{b_2}{b_1} X_2\right) - \frac{b_2}{b_1} X_2 \tag{8}$$

The form of the resulting career pattern[8] depends on the value of b_1. A value of $b_1 > 0$ is unreasonable since it implies that every job-shift results in a greater gain than the achievement of the job-left. A value of $b_1 < -1$ is also unreasonable since the resulting career line will be oscilliating. In the situation $-1 < b_1 < 0$ the career line will be a concave curve gradually approaching an equilibrium. The equilibrium value equals

$$X_{1e} = -\frac{b_2}{b_1} X_2 \tag{9}$$

The approach to equilibrium is faster, the closer b_1 is to -1. If $b_1 = \pm 1$ the career line will be flat, parallel to the X-axis; no increase in achievement takes place. This contrasts to the other extreme when $b_1 = 0$ and every job-shift produces a gain in achievement.[9]

The impact of b_1 on the career pattern corresponds well to what should be expected from the interpretation of b_1 given earlier. If $b_1 = 0$ every job-shift produces a gain. This would be a situation where there, in fact,

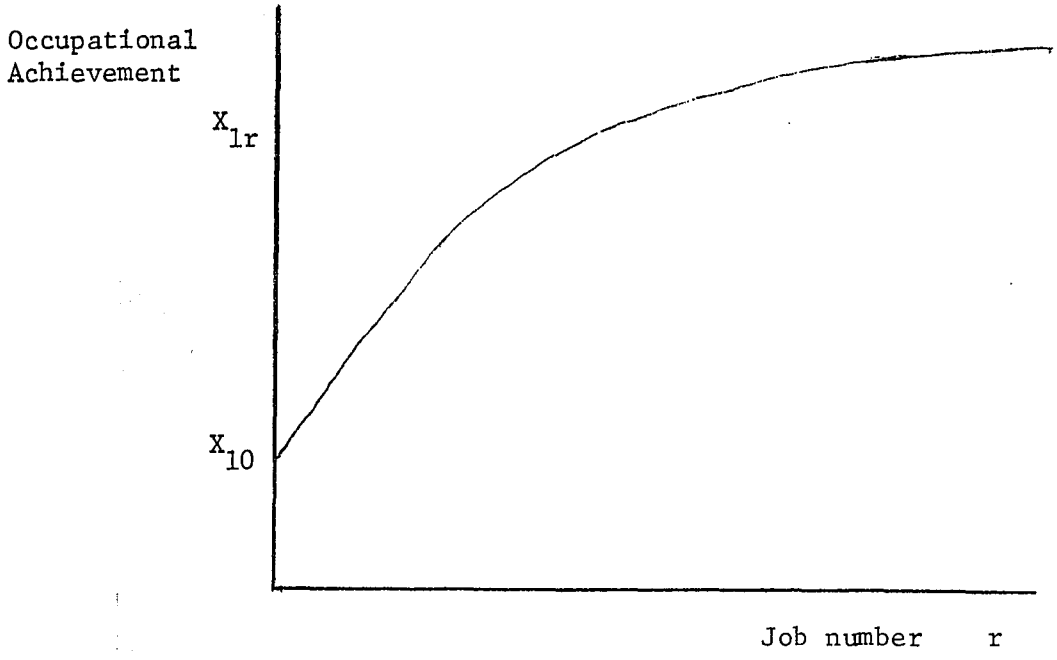

Figure 1

Expected occupational achievement by job number for the situation when b_1 of equation (8) is less than zero and greater than -1.

were unlimited job opportunities. Unlimited opportunities would mean many vacancies with little demand for them. There would therefore be no pressure on individuals to leave jobs, and people would have full control over their decision to leave. Estimates of b_1 from job-shifts taking place in such an occupational structure would therefore give the expected value $b_1 = 0$.

The situation where $b_1 = -1$ is one where there are no opportunities for gains in achievement. This implies that nobody should undertake

job-shifts voluntarily. Job-shifts that do take place in such a structure are therefore a result of being pushed out of jobs and b_1 would be estimated as -1.

The general situation $-1 < b_1 < 0$ means that there are some opportunities for improvement in achievement, but that they are finite. As the respondent takes advantage of these opportunities his career will stabilize. The form of the resulting career line is exactly as predicted by human capital theory, but for very different reasons.

Human capital theory, it will be recalled, predicts career curves concave to the X-axis as a result of investments after entry into the labor force--these investments being undertaken at a declining rate as the individual gets older. It is argued that if there are no investments and hence no additions to a person's level of resources the curve would be flat. Human capital theory in fact assumes an occupational structure that could be characterized by a $b_1 = -1$. All variations in achievement are caused by changes in levels of resources; the human capital theory does not allow for opportunities to improve achievement without changes in resources.

Empirically observed career curves have the general concave form (shown by Blum and Coleman [1970] for the life history data). This would be explained by the career model developed here as a reflection on the existence of opportunities for gains in achievement without preceding changes in resources. The human capital theory on the other hand would explain it as a reflection of changes in resources only, that takes place in an efficient job market. The existence of concave curves clearly is no

indication of which theory in fact is the valid one--the same pattern can be predicted from both theories on very different grounds.

It may be admitted that human capital theory would allow for other factors in addition to individual resources that influence earnings. What they do ignore is that the existence of structurally created opportunities, rather than being a random influence on achievement, will have a systematic impact on the age-variation in achievement. This impact, furthermore, is identical to the one predicted as due to investments in on-the-job training and the like.

It is important to be able to identify which of the two mechanisms produces achievement since the two mechanisms point to different policies--structural change as opposed to change in the distribution of resources as a means to affect occupational achievement. Analysis of the overall career pattern clearly cannot identify the mechanisms. The next section will instead give an analysis of the outcome of job-shifts using the basic equation (6) in an attempt to establish what in fact are the mechanisms that produce career lines.

6. Returns to Job-Shifts.

The life history data provide us with a variety of data on respondents' background and achievements. From these data variables may be formed that can act as independent variables in equation (6), with income and prestige of the job entered as dependent variables. A detailed analysis of all job-shifts, irrespective of when they occur in age is carried out elsewhere (Sorensen, 1972). The result of this analysis shall be briefly summarized

in the first part of this section in order to give a background for an analysis that more directly relates to the problem of this paper.

The average job-shift produces a gain of 18 prestige points or 5.5% of the average prestige of the job-left, 325 points. The standard deviation of the prestige of the job-left is 134 points; for the prestige of the job entered it increases to 138 points. For income, the mean income of the job-left is $391.84 with a standard deviation of $220. The average job-shift causes this income to increase by $19.23 or 4.9%, and the standard deviation is increased $12 to $232. Taken together this means that as a person passes through job-shifts, the achievement level will increase on the average and the variance between persons in achievement will increase, especially the variance in income. The variance in achievement is a measure of inequality in achievement so that we find that as our cohort gets older the level of achievement increases, but also the inequality of prestige and income increases.

The gains in achievement are related to a person's background and achievements as shown in Table 3.

Education is the dominant resource variable for gains in both prestige and income. The other variables all have a relatively modest contribution, that should be evaluated however in light of a substantial collinearity among the variables. The collinearity is highest among the three variables, calendar year, labor force experience and age. Labor force experience is measured as the amount of time spent in the labor force before the job-shift and may be interpreted to reflect skills and experiences acquired in jobs.

TABLE 3

Summary of Regression of Gains in Prestige and Income on Characteristics of the Job-Holder

Independent Variable	Standardized Regression Coefficients: Prestige	Prestige t-value	Income	Income t-value
Prestige of Job-left (X_{11})	.396	27.97	.577	48.59
Education	.224	12.13	.079	5.03
Labor-force Experience	.061	2.23	.053	4.22
Father's Prestige	.067	5.01	.050	3.48
Verbal Ability	.075	4.82	.032	2.50
Marital Status	.049	3.69	.027	2.08
Race	.054	3.52	.020	1.67
Mother's Education	-.012	-.81	-.010	-0.79
Number of Siblings	-.011	-.74	-.007	-0.48
Father's Education	-.008	-.55	-.001	-0.05
Age	.017	.46	.025	0.77
Calendar Year	.050	1.83	.089	5.03
R^2	.454		.491	

N = 4203

Calendar year is the year in which the job-shift took place. Its effect reflects the impact of an overall expansion of the economy in the period lived through by our cohort, insofar as this expansion is linear. Age in itself does not appear to have an impact on the outcome of the job-shift. What might be observed as an effect of age if this variable had been alone in the equation is thus due to experience and the economic conditions when the job-shift took place (especially for income gains).

The partial effect of marriage means that married respondents (ceteris paribus), gain more in job-shifts than unmarried respondents. This may signify the blessings of marriage but probably also reflects unmeasured ability differences not picked up by other individual characteristics. The effect of verbal ability reflects ability not translated into educational attainments; the same interpretation may be given to the effect of family background as measured by father's prestige. This is the only family background variable that is significant, but the collinearity among these variables again is of importance.

Race has only a modest effect on prestige gains and no significant effect on income gains. This is in contrast to the finding in an analysis of the determinants of the frequency of job-shifts when it was found that Black-White differences were substantial (Sorensen, 1972). While Blacks are less likely to shift jobs than Whites (ceteris paribus), the outcome of these shifts is not much affected by a unique effect of race.

The effect of the prestige and income of the job-left measures the term $(1 + b_1)$ in equation (6). The parameter b_1 is hence -.59 for prestige and -.39 for income. According to the model for job-shifts presented above, the size of b_1 reflects the amount of control and the distribution of job-opportunities (d_1 of equation (3)). Measurement error producing a regression toward the mean is also of importance for the size of b_1. It is not possible to identify precisely these three sources of variation. The difference between prestige and income in the size of b_1 is therefore difficult to interpret.[10] However, the overall magnitude does indicate some control over the decision to leave in the average job-shift.

The coefficients to the various resource variables, except labor force experience, represent increments in return on these resources. They are different from the returns dealt with in human capital theory. Returns could be measured by the regression coefficients to the resources with the level of achievement, that is the prestige and income at a point in time, not the growth in these quantities, as the dependent variable. The coefficients presented in Table 3 are in contrast to the increases in the coefficients measuring returns. Increments in returns are not dealt with in human capital analysis, rather all growth, as described above, is attributed to changing resources.

The increments in returns on resource variables can be explained by the model for job-shifts as reflecting the existence of career opportunities that enable a person to increase the return on his resources. If the coefficients in Table 3 are constant in age, and if the level of resources is unchanged after entry in the labor force, we would predict the career line shown in Figure 1. This career line would be the same as the one predicted by human capital analysis but predicted under the assumption of changing resources. Changing resources would produce positive coefficients to resource variables proportional to the amount of change in these variables. But we have observed significant coefficients to resource variables such as family background, education and ability that do not change after entry into the labor force. The results presented in Table 3 thus seem to indicate that at least a substantial part of the increase in prestige and income after entry into the labor force cannot be explained by the human capital theory. The exception is the contribution of labor force experience to gains in achievement that best can be interpreted

as reflecting an increase in experience and training between job-shifts. Labor force experience is however far from being the dominant resource variable.

The above conclusion is based on the analysis of all job-shifts irrespective of the age at which they occur. The result may conceal an age variation in the increments of return that would modify the above conclusion. If the effect of labor force experience increases with age, while the increment in return on the resources determined before entry into the labor force decreases, this would be evidence that investment behavior is of increasing importance for the career. Table 4 a and b therefore gives an analysis of gains in job-shifts in three age groups determined from the age of the job-holder when engaging in the shifts.

To enable comparisons across age groups unstandardized regression coefficients are given. For prestige gains an increase in the coefficients of resource variables can be detected from the youngest to the middle age group, while the coefficients remain constant from the middle to the oldest age-group. The exception to the general pattern is race. The difference between Blacks and Whites in prestige gains per job-shift decreases with age. As mentioned above, the frequency of job-shifts is lower for Blacks; and we are dealing with a difference in gains so this result does not imply a decreasing difference in average achievement level. Quite to the contrary, the implication is that the difference in prestige level is increasing.

The increase of the coefficients to resources for income gain continues through all three age groups. The increase is substantial for the three

TABLE 4a

Regression of Gains in Prestige per Job-Shift
on Individual Characteristics in Three Age Groups

Independent Variable	Raw Regression Coefficients Age Group		
	I	II	III
Prestige of Job-Left	.261*	.372*	.515*
Education	12.21*	22.59*	20.39*
Verbal Ability	2.72*	5.74*	5.40*
Labor Force Experience	-.01	.04	.25*
Father's Prestige	.65*	.81*	.65*
Marital Status	2.07	17.79*	15.25*
Age	.39*	.21*	-.16*
Race	27.43*	18.15*	11.42*
Size of Household	-3.15*	.28	.18
Number of Siblings	.35	-1.35*	1.25*
Mother's Education	.22	5.92*	3.67*
Father's Education	2.69	-.78	-2.72*
Calendar Year	.24	.40	.05
Mean Gain in Prestige	18.88	18.95	14.52
R^2	.24	.39	.53

Note: Mean age in age-groups 20, 25 and 33 years, respectively.

*Significant at .05 level.

TABLE 4b

Regression of Gains in Income Per Job-Shift
on Individual Characteristics in Three Age Groups

Independent Variable	Raw Regression Coefficients Age Group		
	I	II	III
Income of Job-Left	.372*	.655*	.628*
Education	7.004*	8.015*	13.080*
Verbal Ability	.870	4.195*	11.401*
Labor Force Experience	.498	.090	.592*
Father's Prestige	.196	.148	1.323*
Marital Status	11.340*	25.209*	44.145*
Calendar Year	1.267	3.591*	5.155*
Race	17.182*	22.882*	-1.188
Age	.015	.028	-.023
Size of Household	-1.278	1.294	7.151*
Number of Siblings	2.094*	-.536	-1.680
Mother's Education	2.843	-2.315	3.267
Father's Education	1.940	1.102	6.108*
Mean Gain in Income ($)	15.84	16.32	27.36
R^2	.22	.43	.50

*Significant at .05 level.

major resource variables, education, fathers' prestige, and verbal ability. The increment in return on education is thus almost twice as large in the oldest age group as in the youngest.

The change in coefficients presented in Table 3 does not conform to the pattern one would expect if investment behavior was the major source of growth in achievement. We do not find a reduction in the increments in return on such resource variables as education, ability, and family background, that are determined prior to entry into the labor force. The exception is a constant (for income gains) or increasing (for prestige gains) coefficient to labor force experience that can be interpretated as reflecting investment behavior. However, inspection of the standardized regression coefficients (not presented) shows that labor force experience never attains a dominant influence on the gain. Unfortunately, the high collinearity between the three time measures does depress the coefficients to all of them. It does not seem likely however that the above conclusion would be altered had this collinearity not existed. Collinearity seems responsible for the somewhat irregular pattern for the various measures of family background.

The overall gain for job-shift is roughly constant for prestige and increasing for income. Had all coefficients been constant in age we would have expected a decrease in the overall gain since job-holders would be approaching their equilibrium value of achievement as they get older. Investment behavior might be held responsible for this result if job-shifts occur only after a certain increment in resources. However the above results concerning the behavior of the coefficients to resources and the pattern of the overall gain can both be explained by the model for job-shifts without

recourse to an explanation in terms of investment behavior. It will be noted that R^2's increase with age for both prestige and income gains. According to our model this can be interpreted as indicating an increase in the amount of control for job transitions. Also the pattern of the coefficients to the achievement of the job-left (equal to $1 + b_1$ of equation (6)) supports this conclusion. Hence although we will deny that an increase in resources may have contributed to the increase in gains, an increase in the amount of control appears operative and to be the most parsimonious explanation.

The above results are obtained on job-shifts and could lead to misleading conclusions if interpreted as reflecting age variation in increments of returns per unit time. The frequency of job-shifts is strongly dependent on age and Table 5 a and b therefore gives the increment in returns for unit time. Thus coefficients are obtained simply by dividing the increments per job-shifts by the average duration of jobs.

As would be expected there is an overall decrease in the increments per unit time for the returns on a person's resoucres. This result is still consistent with our previous analysis. It indicates a gradual approach to an equilibrium level of occupational achievement that is produced by an exhaustion of opportunities for gains as predicted by the career model of equation (8) in combination with the impact of age on the frequency of job-shift.

We have shown that throughout the part of the career covered with our sample, a major part of the increase in achievement can be explained as a result of increments in return on resources rather than by increases in

TABLE 5a

Increment in Returns in Prestige per Month in Three Age Groups

Independent Variable	Raw Regression Coefficients Age Group		
	I	II	III
Prestige of Job-Left	.019	.017	.015
Education	.907	1.022	.593
Verbal Ability	.202	.260	.157
Labor Force Experience	-.007	.002	.007
Father's Prestige	.048	.037	.019
Marital Status	.154	.805	.444
Age	.029	.010	-.005
Race	2.038	.821	.332
Size of Household	-.235	.013	.005
Number of Siblings	.026	-.061	.036
Mother's Education	.016	-.268	.107
Father's Education	.199	-.037	-.079
Calendar Year	.018	.018	.001
Average Gain in Prestige	1.40	.86	.42
Average Duration of Job (in months)	13.46	22.16	34.38

TABLE 5b

Increments in Returns in Income per Month in Three Age Groups

Independent Variable	Raw Regression Coefficients Age Group		
	I	II	III
Income of Job-Left	.028	.030	.018
Education	.520	.362	.380
Verbal Ability	.065	.189	.332
Labor Force Experience	.037	.004	.017
Father's Prestige	.015	.007	.038
Marital Status	.843	1.138	1.284
Calendar Year	.094	.162	.150
Race	1.276	1.033	-.035
Age	.001	.001	-.001
Size of Household	-.095	.058	.208
Number of Siblings	.156	-.024	-.049
Mother's Education	.211	-.104	.093
Father's Education	.144	.050	-.177
Average Gain in Income ($)	1.18	.736	.796

levels of resources brought about by investments in human capital. The increments in return we explain by the existence of career opportunities that are created by the structure of the labor market. One might object to this conclusion that we have only rather poor measures of investments after entry into the labor market. It is argued in human capital theory that the frequency of investments correlate with ability since returns are higher for those with greater ability (Becker, 1964). Unmeasured investment would therefore show up as increasing returns on measured resource variables conforming to our results. Also part of the increments in return could be explained as due to earnings and prestige foregone in the job-left and as a result of training. These are possible alternative explanations, but it seems unlikely that we would have to completely reject the previous analysis as a result. Further research with direct measurement of investment behavior is needed. We shall however proceed and discuss some implications of the previous results assuming that the parsimonious explanation given in terms of the model for job-shifts will retain its validity as a model for one important mechanism in the achievement process.

Conclusion

We have presented two contrasting viewpoints on the growth in achievement after entry into the labor force. Human capital theory explains such growth as resulting from changes in a person's level of resources due to on-the-job training experience and so forth. The social mobility approach sees changes in achievement as a result of job-opportunities which allow for gains in prestige and income without changes in levels of personal resources. We have shown through a model for career lines that

the structural opportunities will have a systematic impact on the age profile of earnings and prestige as the person gradually approaches his equilibrium level of achievement. This age profile has the same form as the one predicted in human capital theory. The age variation in prestige and income therefore cannot in itself be taken as evidence for investment in human capital after entry into the labor force, nor can it of course be used to claim the exclusive operation of structural opportunities.

The empirical analysis of the outcome of job-shifts gave evidence for the operation of changes in level of resources and opportunity as a source of variations in achievement. Furthermore, although definite evidence has not been given due to our rather poor measure of change in resources after entry into the labor force, our result strongly indicates that a major part of the age variation in achievement is due to mobility to better jobs that increases the return on a given level of resources rather than being a result of increases in resources. Returns on a person's background, ability, and major investment (education), are therefore obtained gradually through age, that is, we have shown that in all age groups there is a positive <u>increment</u> in return on a person's major resource variables.

The increments in returns on major resource variables signify that the assumption of an efficient labor market made in human capital analysis is an unrealistic one. More important it is a misleading assumption because labor market inefficiencies have a systematic impact on the career pattern that results in an age pattern similar to the one explained in human

capital theory by investments in on-the-job training. Our result thus points to a necessary modification of human capital theory.

Structural opportunities also produce increments in return on the background characteristics that are such an important topic in the status attainment literature. This means that the estimates of effect of background variables on achievement obtained from cross-sectional data will be influenced by the age distribution of the sample as well as by characteristics of the occupational-industrial structure in the periods in which respondents achieved their status. The confounding of the effects of age and structure in cross-sectional data obviously do present difficulties in identifying sources of variation in the parameters of the status attainment models.

Our analysis points to two alternative policy instruments for affecting the occupational achievement of a population group. A policy that affects the distribution of personal resources is one such instrument and the existence of education and training programs obviously testifies to the recognition of such an instrument. However our analysis indicates that the results of such programs are determined by structural forces that determine the return on training, education, and other personal resources. Evaluation of a policy to affect resource distribution therefore needs to take into account the labor market conditions that determine the result of these programs. Policies that affect the structure of the labor market are themselves alternative policies to those affecting resource distributions. Such policies may affect the occupational achievement resulting from a given level of personal resources.

That policies that affect the occupational structure as well as policies that affect individual characteristics are possible instruments for affecting occupational achievement is of course well known. The contribution of an analysis like the one given here lies in its attempt to specify the interplay between structural and individual characteristics in producing achievement. The model for job-shifts presented above is a step toward obtaining measures of the influence of the occupational structure on the return on personal resources. The model should be extended to take into account changing resources.[11] The parameters of such a revised model would constitute indicators of the occupational achievement process that seem superior to the simple return rates that are obtained from the status attainment literature and human capital theory.

FOOTNOTES

[1]The life-history study was conducted as part of the Social Accounts Program at the Center for Social Organization of Schools, The Johns Hopkins University. The Social Accounts Program was initiated by James S. Coleman and Peter H. Rossi, with Zahava P. Blum as co-director.

[2]The universe for the life-history study is the total population of males 30-39 years of age, in 1968, residing in the United States. Two samples were drawn: (a) A national sample; and (b) A supplementary sample of Blacks. The total number of interviews obtained was 1,589: 738 Blacks and 851 Whites. The completion rates were 76.1% for sample (a) and 78.2% for sample (b). The 973 cases constituting the national sample are used in the analysis here.

[3]If there are earnings and prestige foregone in the job-left due to training then there will also be an increment in return on the level of resources at entry into the job (X_{20}).

[4]Prestige is measured by a 3 digit score on all census occupations obtained from the NORC Study (Siegel, 1971). Income is monthly earnings in the job price adjusted to the base 1957-1959 = 100.

[5]Deleted from the analysis were job-shifts into and out of unemployment, and job-shifts where there were periods of full-time schooling or military service in between the job-left and the job-entered. The 4203 job-shifts analyzed gives an average of 4.3 shifts per respondent.

[6]The resource variables are those presented in Tables 3 and 4 below.

[7]The model for careers that is given as a solution to equation (1) is the topic of another paper (Sorensen, 1972c) and more fully treated there.

[8]Equation (8) gives the career as a function of job number. There is a remarkable regularity in the relationship between age and frequency of job-shifts. This regularity may be embodied in an expression that gives the relation between job number and age (see Sorensen, 1972b for detail). The career in age will be given as:

$$X_{1t} = (1 + b_1)^{\frac{1}{\gamma}(1 - e^{-\gamma t})} \left(X_{10} + \frac{b_1}{b_2} X_2\right) - \frac{b_1}{b_2} X_2$$

where γ is a parameter that measures the impact of age on the frequency of job shifts. There will still be an approach to equilibrium in age, although more complicated, and the age profile will have the same general form as that produced by equation (8).

[9]Even when $b_1 = 0$, there still will be an approach to an equilibrium but produced by age only. Inserting the relationship between age and the frequency of job-shifts used in footnote (8) into equation (7) we get:

$$X_{1t} = X_{10} + \frac{1}{\gamma}(1 - e^{-\gamma t}) b_2 X_2$$

[10]It can be argued with support in Table 3 that there is a systematic bias in the income reporting so that earnings are given as too consistent across jobs. This explanation would account for the smaller amount of variance explained by resources for income gains and for the difference in b_1's (see Sorensen 1972a, for details).

[11]By adding an equation to equation (1) that gives the change in resources as a function of the job left and then try to solve this system of equations.

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