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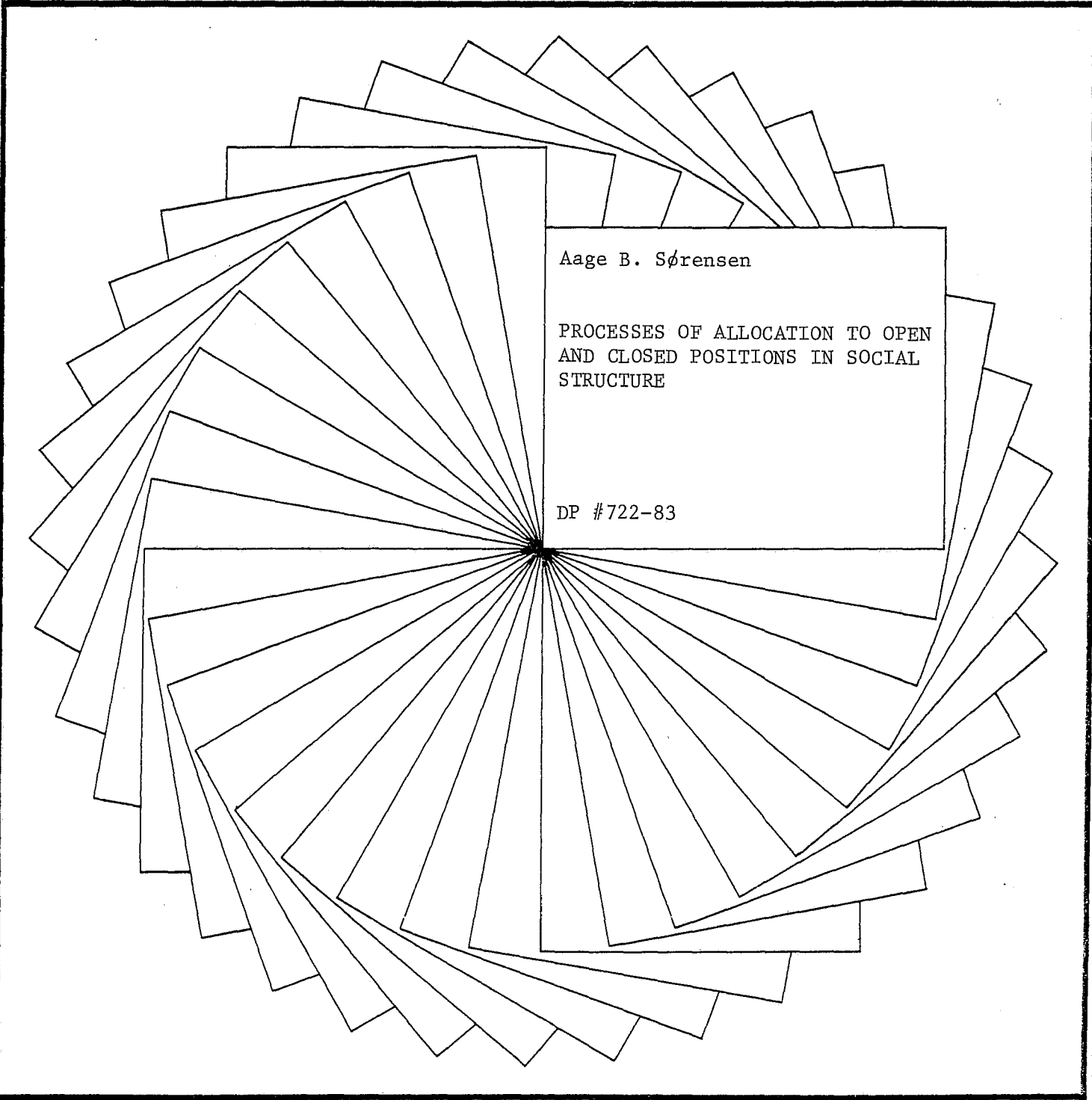
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PROCESSES OF ALLOCATION TO OPEN
AND CLOSED POSITIONS IN SOCIAL
STRUCTURE

Processes of Allocation to Open and Closed Positions
in Social Structure

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ABSTRACT

This paper analyzes mechanisms of allocation to closed positions in the social structure. Closed positions are characterized by being available only when vacated by the previous incumbent, so that new allocations resulting in new matches between people and positions cannot be linked to changes in performance or the availability of more qualified candidates. The mechanism of allocation in closed-position systems, called vacancy competition, is contrasted to the allocational mechanism that operates in open-position systems, which are competitive markets. This paper also describes the conceptual and methodological implications of vacancy competition for research on the labor market, and gives an illustration using allocation to instructional groups in schools.

INTRODUCTION

Certain sociologists may, at times, doubt whether or not they are in fact engaged in sociology. Quantitative sociologists, relying heavily on sample surveys, tend to use individuals as units of analysis, and they pursue the causal analysis of individual outcomes determined by individual-level antecedents resulting from past experiences and demographic characteristics. It is often difficult, if not impossible, to differentiate the sociologists engaged in such pursuits from social psychologists, when the focus is on mental states; and from economists, when the focus is on socioeconomic outcomes.

The boundary between sociology and social psychology is blurred for a number of reasons other than the design of survey research. Even when that boundary is emphasized, social psychologists can usually be counted on to cooperate and to collaborate, rather than to compete, with sociologists for grants, recognition, and academic resources. This is not so with resepct to economists. Here the boundary is sharp. There are few shared areas in curricula, in publication outlets, or in research personnel. To make matters worse for sociologists, economists are known to consider economics the queen of the social sciences, and some economists have been heard whispering that there are few sociological problems that a bit of economic theory could not straighten out.

Grand sociological theory sees the economy as a subsystem of the social system. But grand sociological theory usually does not deal with individual-level outcomes; it is here that the boundary problem is most acutely felt. A large and important sociological literature that contains this problem has come into being over the last 15 years. The

literature concerns the determinants of socioeconomic outcomes of individuals, measured in occupational status, income, or earnings. The first wave of this research focused on the intergenerational transmission of personal resources that are important for individual socioeconomic outcomes. Its beginning is usually dated to Blau and Duncan (1967). The second--and current--wave emphasizes the importance of labor market structures, in the form of dual or segmented labor markets, for socioeconomic outcomes. In this research, "structural" variables are added to the background variables that were employed in the first wave of sociological attainment research. (For a review, see Kalleberg and Sørensen, 1979.)

Socioeconomic attainment research has been a successful enterprise in sociology, and it is perhaps the closest thing to "normal science" in the discipline. There is a substantial amount of cumulation of knowledge, publications replicating earlier research or introducing additional variables, and disputes over measurement procedures and the proper role of variables in causal sequences. The area has its critics and detractors: it has been argued that the emergence of labor market research to replace status attainment research represents a change of paradigm (e.g., Beck et al., 1980). It seems, however, that the second wave of attainment research consists primarily of the addition of a new set of variables. No fundamental change in the structure of models employed, or in the basic conception of what takes place, seems to be implied by the new sociology of labor markets. In fact, that research and the earlier status attainment research share the failure to give attention to conceptual problems regarding what accounts for observed effects of structural as well as of individual-level variables (Baron and

Bielby, 1980; Sørensen, 1983). Most theory in the sociology of labor markets is about the organization of the economy into dual and other divisions, and not about what models should look like and which mechanisms generate observe outcomes.

The neglect of specification of mechanisms accounting for observed outcomes and the nature of the dependent variables makes sociological attainment research vulnerable to imperialistic forays by economists. The economic nature of the dependent variable is clear with respect to earnings and incomes, which are increasingly employed as dependent variables in sociological attainment research. Socioeconomic status is usually not seen as an economic variable; it is a somewhat nebulous concept. Despite the frequent use of "prestige," a relational concept, to denote this variable, Goldthorpe and Hope (1972) have convincing argued that prestige is not what is measured. It seems instead to refer to a quality of "goodness" of occupational positions. If economics is about the allocation of scarce resources and goods, then socioeconomic status is an economic variable.

The proposition that sociological attainment research concerns an economic process that can be specified by economic theory is admitted in one of the few explicit statements on the subject, presented by Berg (1981), who asserts that the sociology of labor markets is about the specification of the demand side of labor markets. A similar implication follows from the discussion represented by Grannovetter (1981). This certainly appears to be what most economists believe sociologists are doing.

There is, however, another way to perceive the matter. The classic sociological idea of seeing the economy as a subsystem should mean that

sociologists have something to say about the boundaries for the operation of market mechanisms and about alternative mechanisms for the allocation of valued resources and goods. This paper endeavors to perform that task. It argues that basic sociological concepts and ideas provide the ingredients for a theory about nonmarket allocation mechanisms that are of particular relevance for the study of attainment processes. Of course, if all allocation processes are seen as economic, then this theory is also an economic theory. It is, however, a theory about what should happen when markets are of only indirect relevance for allocation. This seems to be a situation quite difficult for standard economic theory to depict.

The basic ideas derive from Weber's distinction between open and closed relationships, which he presented in Economy and Society (1925).[1] This distinction is applied in this discussion to positions in the social structure. Open positions are seen as characterizing competitive markets with the properties assumed in neoclassical economic theory, and the mechanisms that allocate people to positions in such markets are those described by orthodox theory. The main task of this paper is to specify the allocational mechanisms operating when positions are closed, so that market mechanisms cannot operate. The mechanism argued to govern allocations when positions are closed—not easily accessible to outsiders—will be referred to as "vacancy compeition." I shall try to show that vacancy competition differs from market competition in three important ways: with respect to the specification of models for attainment processes; with respect to the interpretation of observed effects of independent variables on attainment; and with respect to the measurement of variables.

The next section will develop more fully the idea of closed and open positions. It is followed by a description of the vacancy competition mechanism allocating people to positions in a closed system. In this discussion, many of the illustrations are labor market examples. I then give an explicit treatment of the labor market application of these ideas. Because it seems useful to show that the ideas are not specific to this particular area of application, I shall illustrate how the ideas of closed positions and vacancy competition also can be used in the analysis of school systems and the educational attainment process.

Several of the ideas presented in this paper are drawn from other sources. Some of the characteristics of the allocational mechanisms that operate in closed-position systems have been described by Boudon (1974) and Thurow (1975). The latter's notion of job competition is quite close to the idea of vacancy competition. The vacancy concept and the idea that vacancy chains define the opportunity structure of organizations is derived from White (1970). Important ideas about the operation of internal labor markets—the main labor market structure thought to have the property of a closed-position system—are owed to Doeringer and Piore (1971) and, especially, Williamson (1975). Hirsch's (1976) notion of "positional goods" is also similar to the ideas presented here.

This paper emphasizes to a greater degree than in previous work the importance of ideas concerning how empirical research is to be conducted. It is ultimately difficult to argue that suggestive ideas are important if they do not have operational consequences. A few empirical results are available to illustrate these consequences; examples are described more fully elsewhere (Sørensen, 1979; Sørensen and Hallinan, 1982), and elements of the theoretical development have also been reported in other works (Sørensen, 1977; Sørensen and Kalleberg, 1981).

SYSTEMS OF CLOSED AND OPEN POSITIONS

This paper is concerned with mechanisms of access to positions in labor markets and educational structures. These positions should be conceived of as defining tasks and activities for incumbents to carry out. In labor market applications, the positions are jobs. In educational applications, positions are places in instructional groups or classrooms. The labor market application shall be used here in the development of the main arguments. The schooling application, which requires certain modifications and elaborations, will be described in the context of the labor market application.

Incumbents of positions are assumed to receive benefits in return for execution of the tasks and activities of positions. The benefits may be a direct payment for the execution of a specific task; or a stream of payments over a period of time in the form of wages; or it may consist of opportunities for future rewards resulting, for example, from participation in educational activities. Tasks and activities associated with positions, and benefits and rewards obtained as a result of occupying positions, make individuals care about which positions they occupy. They are assumed to have interests and preferences related to the distribution of benefits and the distribution of individuals among positions (in particular themselves).

Thus, the concern here is for hierarchically organized positions where individual attainment of unequally distributed rewards and opportunities depends on obtaining access to positions. The process of acquiring access will be argued to depend on whether positions are open or closed. Weber defines the concepts of open and closed social relationships as follows:

> A social relationship, regardless of whether it is com-
> munal or associative in character, will be spoken of as
> "open" to outsiders if and insofar as its system of order
> does not deny participation to anyone who wishes to join
> and is actually in a position to do so. A relationship
> will, on the other hand, be called "closed" against out-
> siders, so far as, according to its subjective meaning and
> binding rules, participation to certain persons is
> excluded, limited, or subjected to conditions (1968, p.
> 43).

Weber goes on to argue that competitive markets are characterized by open relationships, while the establishment of the worker's right to and possession of particular jobs is an example of a closed relationship. The characterization of market relationships as open, and of closed relationships as involving control over access to positions, is basic for the arguments that are developed here.

Whereas Weber speaks of closed and open relationships, here the terms open and closed will be applied to positions. No change in meaning is implied. Positions are nodes in social relationships and are defined by these relationships. Closed and open positions thus refer to the ease of access to the basic relationships defining the position. In labor market applications this means access to the employment relationship.

The distinction between open and closed positions or relationships is used here in a more specific sense than that provided by Weber. Positions are referred to as closed when they are avilable only after being vacated by the previous incumbent. This means that in closed-position systems new allocations can only take place when positions become vacant, so that the timing of allocation is governed by the timing of the occurrence of vacancies. In contrast, incumbents of positions in open-position systems can be replaced at any time, and the occurrence of vacancies has no bearing on the timing of new allocations.

The causes of the emergence of closed-position systems are here illustrated by specific applications. Certain general properties of such systems are noted because of their relevance for the allocational process. Three properties have particular relevance: (1) the predetermined and well-specified nature of positions in closed-position systems; (2) the indefinite duration of matches between people and positions when positions are closed; and (3) allocations to closed-position systems that represent the outcomes of authority decisions rather than market exchanges.

The predetermined and well-specified nature of positions in closed-position systems means that those systems have "more structure" than open-position systems. In labor market systems this results from inter-dependencies among jobs in different divisions of labor, from the existence of training ladders and on-the-job training arrangements, from the existence of promotion ladders, and from the nature of such systems as hierarchically organized authority systems. Some of these features are linked to the reasons causing positions to be closed (on-the-job training arrangements); others may be seen as consequences of closed-position systems (promotion ladders). Regardless, these features mean that relationships among positions are so well established that positions come to exist independently of people. In Simmel's apt formulation in 1908, in his discussion of super- and subordination or authority relationships:

> The division of labor is everywhere correlated with the
> codification of actions and conditions. The a priori ele-
> ments of the relationship are no longer individuals with
> their characteristics, out of which the social rela-
> tionships develop, but, rather the relations themselves, as
> objective forms, as "positions," empty spaces or contours
> (as it were) which must merely be "filled" by individuals
> (1950, p. 293).

Simmel goes on to discuss one of the main issues of this paper: "The inevitable disproportionate distribution of qualifications and positions."

It is the predetermined and well-specified nature of the positions in closed systems that makes it meaningful to speak of vacant positions to be filled. It should further be noted that the linkages among positions in closed systems imply that in general it is impossible to adjust in a fluid manner the number of positions to cycles in product markets (or funding levels) or to changes in the supply of candidates for positions. The existence of a single position is linked to the existence of other positions so that single positions usually cannot be created or eliminated at will.

It follows from the definition of "closed" that the duration of matches in the closed-position system reflects the fact that no one can have access to a position unless there is a vacancy. In closed-position labor market systems, new allocations only can be made when the previous incumbent has left voluntarily. Unless the incumbent is forced to retire, voluntary departures should only be made to move to a better position. In closed systems, the duration of matches will therefore be governed by upward mobility regimes, or promotion systems. It will be shown in the next section that these mobility regimes are organizationally and historically specific. The timing of new allocations is generally not under the control of the authority (employer) who makes the allocation. This has two important consequences. First, new matches usually cannot be established when changes in individual performance, or the availability of a candidate with qualifications believed to be superior to an incumbent, would make it desirable. Second, when a new

match is established, there is considerable uncertainty about how long it will last.

The indefinite duration of matches in closed-position systems, and the constraints on the creation of new positions, combine to produce only a limited number of vacancies in a system at any moment of time. Also, a limited and usually well-defined set of candidates will exist for these vacancies as a result of the supervisory, technical, incentive, and learning relations that exist among positions. The authority decisions that establish matches between individuals and positions in closed-position systems are thus single decisions involving the choice between a limited set of candidates in a particular system.

Open-position systems, being markets, are polar opposites to closed systems in terms of the attributes described above. Specifically: (1) open-position systems lack "structure," i.e., positions cannot be said to exist independent of incumbents; (2) the duration of matches in open-position systems is short and definite; and (3) matches are established in market exchanges rather than as a result of authority decisions.

Open-position labor markets are like markets for other goods. Buyers, who are employers, offer wages for the execution of specific tasks and activities. Sellers, who are workers, decide how much leisure time they are willing to give up at the going wage rate in order to perform tasks for employers. This results in schedules of work demanded at given wage rates and work supplied at given rates. The intersection of these two schedules establishes a market wage rate or price for the particular type of work transacted for. The conception of labor market that is implied by this application of standard price theory is one where transactions result in employment contracts that are like sales contracts for

ordinary goods (see Simon, 1957). Employments are established for the (brief) periods of time it takes to complete specific tasks. New tasks produce new transactions or employment contracts. In other words, matches between individuals and tasks are reestablished continuously. Positions, conceived of as sequences of tasks, are open because new contracts, available to anyone, will be established for each new task in the sequence of tasks.

In labor markets that conform to this conception, the separation of individuals and positions is of little relevance. The number of positions is determined by the amount of work demanded at given wage levels. In a labor market that is in equilibrium, no more work will be demanded at the given wage and it makes little sense to speak of vacant positions. The level of employment and hence the number of positions respond in a fluid manner to changes in the market. Positions are assumed to be unrelated to each other, or "unstructured."

Market transactions result in matches of individuals to well-specified tasks. New matches are established when tasks are completed, and these new matches need to involve the same persons. Durations of matches are therefore short and definite. There is no uncertainty about how the task is to be carried out and no need to be able to predict future performance since the match is of short duration--or can be made of short duration without adverse consequences.

The market transactions that allocate people to positions in open-position systems are exchange relations rather than authority decisions, as in closed-position systems. In the neoclassical economic conception of labor markets, a very large number of such transactions are assumed to occur simultaneously and independently of each other. They establish

market prices or wage rates for different types of labor, and no one is prevented from working at some wage rate. No single transaction will influence these wage rates. Employers can rely on competition among workers to minimize labor costs, and workers can rely on competition among employers to ensure they get the market wage. While they cannot influence that market wage, they can increase their earnings by working more or by supplying a different and higher quality of work.

Open and closed positions are end points on a continuum: no labor market is completely open; there is involuntary unemployment. Nor is any labor market structure completely closed; dismissals do take place, and they sometimes are carried out because a candidate with better qualifications than the incumbent is available. Nevertheless, it is the contrast between open and closed that matters for the allocational process. For the open-position scenario, this allocational process is well described by standard economic theory. The mechanisms that govern allocations in closed-position systems are described in the next section.

Those who apply the open-position market assumption to labor markets are likely to argue against the importance of the distinction made here. They would claim that closed-position systems are short-term imperfections; that the arguments presented here ignore the role of competition; and, in the long run, competition will eliminate whatever implications are drawn from the nature of closed positions. Two comments are in order. First, it is unreasonable to see competition as a monopoly of markets. In fact, a great believer in markets, Hayek, has argued that if markets completely conform to what is assumed in (neo)classical economic theory, there would be no competition according to the definition provided by Samuel Johnson, "the action of endeavouring to gain

what another endeavours to gain at the same time" (Hayek, 1948, p. 96).
Complete information, uniform and well-specified goods, and other
attributes of perfect markets, would make this action quite unfeasible.

Competition for access to positions in a closed system can indeed be
ferocious; one has only to ask French students. In the long run, the
argument here is that the distinction between open and closed positions
determines the structure of the processes allocating people to positions.
Once determined, it is difficult if not impossible to imagine why basic
mechanisms would change from one form to another over a long time.

Second, it is not argued here that competition in product markets
does not exist, or that firms could not behave as they are supposed to
with respect to equating the marginal productivity of some aggregate of
their labor force to the wage bill. Of interest is the internal pricing
and allocation of labor, for these elements are observed in research on
the socioeconomic attainment process.

VACANCY COMPETITION: MOBILITY REGIMES AND QUEUES

The indefinite duration of matches in closed-position systems and the
limited number of vacancies, and candidates for vacancies, appearing at
any moment in time are of fundamental importance for the nature of the
allocation process that emerges in such systems. These attributes
imply that occurrences of new allocations, created by vacancies, are
governed by mobility regimes in systems of closed positions; and that
outcomes of allocation will be determined by ranking candidates, who, for
this reason, may be seen as forming queues for the opportunities presented
by vacancies.

New vacancies are created when people leave the system or when new positions are added. New vacancies may set in motion vacancy chains (White, 1970). When a vacancy is created, either a person from outside of the system fills the vacancy, or a person from within the system moves, or is moved, into it. The latter creates a new vacancy, which again may be filled from the outside or from within. Vacancies filled from within may be filled either by a person at the same level or from the level below. In the latter case a promotion occurs. In a hierarchically organized system, the filling of vacancies from within the system may be conceptualized as a process in which a vacancy moves down as a person moves up. The chains thus formed are then vacancy chains moving in the opposite direction of promotions, to be terminated by someone entering form the outside, or by a position being eliminated.

The rate at which new vacancies are created either by people leaving the system or by new positions being added, together with the distribution of positions, determines how many vacancies are created in a period of time. This quantity, and its distribution, form the opportunity stucture of the system; i.e., in Simmel's terms, the number of empty spaces to be filled at the various levels.

There are two important aspects of this conception of opportunity structure. First, as already noted, the timing of the creation of vacancies has nothing to do with the performances and qualifications of the candidates for these vacant positions, or with whatever changes take place in qualifications and perfomances. One may work hard for a promotion but not get it because there are no promotions to be gotten. One may also work not so hard and still get a promotion because one was at the right place at the right time. In open-position market system, one can move freely to whoever offers more for one's additional qualifications; and

one should do so, to get the benefits of market competition. In open-position system, life-cycle changes in socioeconomic outcomes reflect additions to one's productivity. In a closed-position system, life-cycle changes in socioeconomic outcomes may come about without any changes in performance, skills, or knowledge.

Second, the opportunity structure in a closed system reflects the past history of the system or organization to which one belongs. People do not leave closed-position systems randomly over time, but tend to leave in certain age intervals (for retirement). Growth in the number of positions follows cycles in product markets or in funding levels (for public bureaucracies). This will strongly influence the rate at which vacancies are created and induce accidental differences in the age distributions at various job levels. The organizational and historical specificity of the opportunity structure again contrasts to the situation in open-position systems, where turnover is independent of past business cycles. In market systems, a person's attainments in no manner depends on what happened to his or her employer in the past or on the composition of the particular labor force of the employer.

It is difficult to characterize the opportunity structure in concrete empirical systems. Information on vacancies is often not available; the impact of history and the organization of positions may be difficult to specify. A considerable amount of work has been done, however, on the mobility regimes of organizations (see, for example, Bartholomew, 1973), particularly in the area of manpower and educational planning.[2] Using strong and simplifying assumptions, it is possible to characterize the opportunity structure by a single parameter. This will be described in the next section.

Specifying the mobility regime does not answer the question of who will take advantage of the promotion opportunity. The simple, but important, answer is that it depends on the set of candidates. Because of the indefinite or arbitrary duration of matches, there is considerable uncertainty about future performance. This uncertainty is reduced by relying on past performance, which is one reason why vacancies tend to be filled from within rather than from the outside. The decision by the authority performing the allocation has the objective of finding, among those available, the most qualified candidate for the vacant position (in labor markets, unions may interfere in this by insisting on seniority principles). Therefore, the available candidates are ranked and the position allocated to whoever ranks first.

Ranking may seem an innocuous operation, but the use of rankings has important substantive and methodological implications. Rankings have no metrics for the distances between them and provide no information on these distance. A person may work hard to change his qualifications and performance but the effort may not change his rank order, because the unmeasurable distance to the next person in the queue is too great (or because the decision-maker used a weighting scheme that did not give enough weight to the particular performance displayed). Rankings also imply that the outcomes of people's efforts become interdependent. Thus, the efforts of other candidates become a very important consideration. Displaying a great deal of effort to obtain a promotion provides a strong incentive to others to increase their efforts, in order to maintain their rank order. This is one reason why promotion systems are to be conceived of as incentive devices. For the very same reason, however, there can also be an incentive to convince others to reduce effort. Rankings bear

no relation to overall effort levels. The same outcomes in terms of career changes may come about at very low and at very high effort levels. This does not affect the outcome of the allocational process, and presumably this is what matters to individuals; but it does affect the performance of the organization. The strategic behaviors toward reducing efforts by some collective, though informal, agreement may be more serious the more stable the group of candidates. The stability of the group depends on the rate of promotion. One way to increase this rate, since little can be done about the creation of vacancies by people leaving the system, is to increase the number of job levels. Promotion systems therefore become more elaborate than dictated by technical considerations or chains of commands.

Allocation decisions are authority decisions about whom to select for a particular vacancy among a small group of candidates. These decisions therefore pose a "small numbers problem" (Williamson, 1975). The candidates will present themselves in their best light, and, in fact, have incentives to present themselves in a better light than reality may justify. Such opportunistic incentives are checked in market transactions, because of the large number of transactions and the short duration of each match. In closed-position systems there are no similar checks. One result should be heavy reliance on "objective" characteristics, such as educational credentials, and visible attributes, such as race an sex, believed to provide information about future performance (the latter is the source of what has been labeled statistical discrimination by Thurow, 1975: a group attribute is believed to provide information on individual members of the group). There is, in other words, a potential for inequality of opportunity and discrimination inherent in the allocation of

people to vacancies in closed-position systems--a potential not present in open position markets, where competition eliminates discrimination (Becker, 1971).

The small-numbers problem diminishes in the case of internal promotions, and is therefore argued by Williamson to be one cause of the emergence of closed-position internal labor markets. With hirings from the outside the problem does arise. It is possible that some systems can rely on market competition in entry positions; this is widely believed to take place in internal labor markets (Doeringer and Piore, 1971). But for certain organizations this may not be feasible. If new positions are added, recruits from the outside may also be needed at higher job levels.

Rank orders are irrelevant in open-position systems, and small number opportunism checked, as noted, by the market, which provides a price system for individual attributes through an interval metric, that is, money. And the efforts of one can be changed independently of the efforts of others, because outcomes are established in independent transactions.

The use of rankings in vacancy competition has important methodological implications. The measurement strategies employed in research on the attainment process should reflect the mechanisms and procedures governing allocation processes. Conventionally used metrics are not informed by a concept of the allocational process in closed-position systems--for example, education measured in years of schooling. Empirical examples of the usefulness of this insight will be provided below.

Simmel's problem, the inevitable disproportion between the distribution of qualifications and the destribution of positions, is solved by the use of rankings, which may be fitted to any outcome distribution.

This use of rankings also resolves a classic problem in the study of

income distributions dating back at least to Pigou (1932): How can the

well-known skew in the income distribution be compatible with the pre-

sumed normality of the ability distribution?[3] If incomes are allocated

according to vacancy competition, the problem ceases to exist, for the

ability distribution is used without interval metrics.

Simmel points to another solution. One may not even epecify the

qualifications of the position, but assume that the position makes the

person. "Whoever God gives an office, He also gives the mind necessary

for it." This proverbial piece of optimism about the human fate is, in

fact, the rational for internal labor markets provided by Thurow (1975),

though there the minds are created by on-the-job training. It is a good

rationale for promotion by seniority. According to Simmel, this solution

attains its ultimate form in the Catholic clergy, where consecration

creates the special qualifications for the position to which it calls the

individual.

The use of rankings--and in some cases, perhaps, consecrations--to

fill vacancies created by idiosyncratic mobility regimes is then the main

feature of vacancy competition. System size may be seen as a

variable that, to some extent, intercts with the vacancy competiton

mechanisms. In large systems, vacancies may be more predictable and

occur at a more frequent rate. The number of candidates for these vacan-

cies is larger. As a result, the number of allocations to be performed

is larger. It is therefore conceivable that, in large systems, the pre-

diction from market mechanisms corresponds more closely to predictions

from vacancy competition. The importance of this qualification should

not be exaggerated, for large systems are often aggregates of smaller

systems. The next section will describe empirical results obtained from an analysis of vacancy competition in national labor markets.

VACANCY COMPETITION IN LABOR MARKETS

There are long-standing disagreements of the nature of labor markets and the appropriateness of applying the open-position concept to them. As early as 1850 Mill (1848) argued that labor markets were not completely homogeneous and open, and pointed to the importance of "noncompeting" groups that present barriers to entering certain pursuits; an example is occupational groups. In fact, the empirical existence of such imperfections was earlier suggested by Adam Smith. Institutional economists dominated labor economics through the 1950s, and were much occupied by the structural aspects of labor markets (e.g., Dunlop, 1957; Kerr, 1950). They ceded their dominant position in the 1960s to neoclassical economics, particularly human capital theory. This meant a return to the concept of labor markets as open and homogeneous. This change in turn provoked reaction from neo-institutionalist and radical economists, and later from sociologists of the labor market (for a review see Kalleberg and Sørensen, 1979; an important critique of the reaction is provided by Cain, 1976).

The criticism of neoclassical labor economics has largely been directed at the assumption of market homogeneity. A barrier to entry is, nevertheless, not very interesting; it may only give rise to different supply and demand schedules inside and outside the barrier. This does not in itself mean that market mechanisms do not account for the attainment process. Such mechanisms need open positions behind barriers.

This is, of course, quite possible. It is when barriers are posed to closed positions that the arguments of this paper become relevant. Closed-position systems are described in the extensive literature on internal labor markets, which refers to the causes of closed-position systems in labor markets. Of particular relevance are Doeringer and Piore (1971), Williamson (1975), and Thurow (1975).

The Causes of Closed Labor Market Positions

Williamson (1975) considers the difficulty of establishing market contracts for the employment relationship in jobs that are idiosyncratic in nature. He sees this difficulty as the cause of the emergence of internal labor markets. Idiosyncratic jobs are those where most of the skills and knowledge needed to perform a job are acquired on the job. Further, amounts of uncertainty and complexity that are not trivial characterize these tasks, making standard sales contracts for employment impossible (see also Simon, 1957). Therefore, the essential feature of open-position systems—many transactions which are independent and of short duration—does not obtain. Combined with the incentives to behave opportunistically created by the employee's special skills and knowledge, individual-level contracts are unenforceable. The result is collective employment relationships that are authority relations: wages are attached to jobs and not to individuals.

The absence of individual wage bargaining in internal labor markets poses an incentive problem. Supervision is costly and is limited by information problems. As already suggested, the result is the establishment of promotion structures as incentive devices. The use of promotion as a motivational device emphasized by Stinchcombe (1974), in fact goes back to Weber's analysis of bureaucracy.

The link between jobs for which needed skills and knowledge are acquired on the job, and internal labor markets, where employees have a great deal of job security, has been argued by several authors. The classic formulation of human capital theory by Becker (1964) sees specific on-the-job training as having the effect that individuals will not be paid the competitive market wage and that employers (who have to pay for specific training that cannot be used elsewhere) have an incentive to retain the employee as long as possible to obtain the greatest return to the cost of that training. A more extreme formulation is provided by Thurow (1975), who conceives of practically all skills as acquired on the job, so that internal labor markets form a system of consecration. The implication is that it becomes impossible to make a distinction between individuals and jobs (for reasons contrary to those in open-position systems). Thurow also emphasizes the need for job security, or closed positions, to induce trainers to train the workers through on-the-job training ladders. A broader formulation, also stressing interdependence of jobs and the importance of collective action for closed employment relations, is provided by Sørensen and Kalleberg (1981). Whatever the formulation, there is substantial agreement that certain job structures generate matches of people to jobs which are usually dissolved only by the employee (mandatory retirements excepted).

The role of promomtion systems as incentive devices reinforces the closed nature of jobs in internal labor markets. If promotions are to provide incentives, there must be a chance for everyone to obtain them. This is not the case when there is a high frequency of involuntary dismissals or other attempts by the employer to take advantage of market changes in the qualifications of candidates. Nonindividual wage

bargaining is also reinforced by promotion systems. If those at the same level in the promotion hierarchy do not obtain opproximately the same job rewards, the incentive of promotions is diminished.

The closed nature of jobs does not prevent business cycles in product markets from curtailing production. In firms that can be assumed to have closed-position internal labor markets, it is indicative that unemployment typically takes the form of layoffs, in which the individual usually retains the right to the job. Furthermore, when layoffs do occur, they follow seniority.

Doeringer and Piore (1971) link the existence of internal labor markets to labor market segentation. The so-called primary labor market consists of internal labor markets, while secondary markets are conceived of as open-position, competitive markets. This dualism of labor markets has been much cited by sociologists, but it is usually linked to the dual economy concept (Hodson, 1978; Beck, Horan, and Tolbert, 1978), and the earnings models used do not mirror internal labor market mechanisms. It is relevant for the specification of the vacancy competition model, described next, that the secondary market usually is considered a low attainment market, while the primary market, consisting of a set of internal markets, is associated with differentiated, including high, levels of attainment. In other words, most of the variation in attainment is produced by internal labor markets, hence by vacancy competiton.

It should be noted, finally, that internal labor markets provide efficiency gains. This point is much stressed by Williamson (1975)--and by Weber. They are thus sustained and reinforced by competition in product markets and bot aberrations, as some seem to believe.

A Specification of Vacancy Competition in Labor Markets

A main problem is how to obtain evidence to support the idea that different mechanisms work in internal versus competitive labor markets. Neoclassical labor economists have been imaginative in reinterpreting evidence to support scenarios that are alternatives to the open labor market model; or they have been able to point to methodological problems with the evidence for alternative scenarios (Cain, 1976). This indicates in part that very little has been done to operationalize ideas about allocational mechanisms in internal labor markets. Relying on earlier work (Sørensen, 1977, 1979), a specification of the vacancy competition model and some empirical support for that specification will now be presented.

The standard of comparison is, of course, human capital theory. It assumes open-position systems and obtains impressive support for some of its predictions. Human capital theory concerns schooling and training decisions, which are conceived of as investment decisions. Their outcomes depend on the earnings that the market returns to additional training and schooling. Market returns are assumed to be calculated from lifetime earnings streams, which provide a link between the amount of human capital and the earnings of individuals.[4] The theory accounts only for the supply side of the supply and demand mechanisms that determine wages in open-position markets: the predictive power of human capital models depends on the degree to which markets are homogeneous, which is why so much attention has been devoted to this issue.

A major empirical study of the earnings attainment process, informed by human capital theory, is presented by Mincer (1974). With cross-sectional census data, Mincer accounts for a substantial amount of variance in earnings (56%), using only three variables. This is as much,

or more, variance explained as in sociological earnings models that use a large number of "structural" variables in addition to numerous individual attributes. One of Mincer's variables, weeks worked, primarily represents an accounting relation (an important one, as the theory relies on market theory of prices or wage rates; this relation is nevertheless ignored in much of the sociological research that is critical of human capital research). The other two variables are education and experience. Human capital theory is usually seen to center on education, and its relationship to earnings is assumed to reflect the acquisition of skills in schools. The market returns to these skills should cover the costs of acquiring them, for anyone doing so. A major portion of the costs are earnings foregone by staying in school, and these costs are roughly proportional to number of years spent in school. Measuring educational attainment in years of schooling therefore provides an appropriate metric.

Education actually accounts for only a modest portion of the variance explained in earnings. Work experience is much more important, using the somewhat ambiguous criterion of variance explained. Experience accounts for earnings variation, according to human capital theory, because it represents additional skills and knowledge acquired on the job (and transferable to other jobs so that individuals have to pay the costs of training themselves). Because of finite lifetimes in the labor force, and because investments become more costly as earnings increase, the rate of investment will be highest in the younger years and gradually taper off. Earnings should therefore show the same nonlinear growth by time in the labor force, through vacancy competition also can account for this. It is important to note that in human capital theory experience

reflects changes in individuals that can be observed in the cross-section, as the process is assumed to be in equilibrium.

A specification of the vacancy competition model should capture such empirical observations and will it is hoped, provide new insights into the process. The specification described by Sørensen (1977) relies on strong, but not completely unrealistic, assumptions. One is that attainment levels are exponentially distributed. This is an assumption concerning the distribution of empty spaces or positions, not about individuals. Nevertheless, the distribution of individuals corresponds roughly to the distribution of positions, as most positions are filled. In a discrete variable representation of attainment levels, the exponential distribution corresponds to the geometric distribution, often assumed to describe hierarchical structures where there is a fixed ratio of superiors to subordinates.

If y denotes the attainment level, the distribution of jobs thus can be characterized by the distribution function $F(y) = 1 - e^{\beta y}$, where β is assumed to be negative. The parameter governs the shape of the pyramid. The larger β is in absolute magnitude, the fewer positions will exist at higher levels of attainments. In this distribution, vacancies are assumed to be created at all levels and at a constant rate by people leaving the system. The rate at which vacancies are created is characterized by a parameter, h.

Vacancies not immediatedly filled from the outside set in motion vacancy chains, providing oportunities for people in the system to move up. Positions are assumed to be closed and downward moves to be infrequent, and so ignored. The exponential distribution and the assumption of a constant rate result in a very simple mobility regime. It can be

derived that, at each level, new vacancies will arrive at a constant rate, q, where q further can be shown to be $q = -h/\beta$. The quantity q thus represents the opportunities for advances in attainment, or promotions, that are present at each level. It is determined by the shape of the distribution (governed by β), and the rate at which new vacancy chains are created (governed by h).

People are not equally likely to take advantage of the mobility or promotion opportunities present at their level. Their qualifications are taken into account in promotion decisions. Assuming that these qualifications do not change over time after entry into the labor force (in sharp contrast to human capital theory), the probability of a discrepancy between a person's current level of attainment and these qualification should be highest at the start of the career. For all individuals at a given attainment level, individual rates of getting promoted should sum to the overall rate at that level, q. If this rate is denoted $r(t)$, then

$$\int_0^\infty r(t)dt = q. \tag{1}$$

A simple specification of $r(t)$ that will solve this integral equation for the individual rate is:

$$r(t) = e^{bt} \tag{2}$$

where t is time since entry into the labor force, or experience as conventionally measured. The parameter b is equal to β/h and measures the magnitude of opportunities for gains in attainment provided by the system. The smaller b is in absolute magnitude, the more opportunities for gains the system provides. In empirical research using these ideas, major attention is focused on this interpretation of b.

Moves to higher levels are jobs shifts and the number of shifts in a
period of time can be derived by integration of (1). A person will start
with a certain level of attainment y(0). By time t, attainment can be
shown to be:

$$y(t) = \frac{z}{t} (e^{bt} - 1) + e^{bt} y(0), \ b < 0 \qquad (3)$$

Here, z is a measure of a person's resources or qualifications, as
determined, for example, by educational credientials. This attainment
model has some of the same features, though not the same fuctional form,
as Mincer's human capital model. The human capital model does not
include y(0), since it assumes that the earnings attainment process is in
equilibrium at all times. Both models provide the same general predic-
tion about the shape of the attainment curve by time in the labor force.
It is nonlinear, rapidly growing in the early years and then gradually
tapering off.

Since the human capital theory assumes equilibrium, it can be esti-
mated from cross-sectional data. The parameters of (2) cannot be iden-
tified unless data on change in attainments are used. Equilibrium
attainments, which will be maximum attainments because of the absence of
downward mobility, can be obtained by letting $t \to \infty$.
This produces:

$$y(e) = -\frac{z}{b}. \qquad (4)$$

This expression can be made to look like a conventional attainment model
by expanding z linearly in measures of individual attributes, so that
$y(e) = -\frac{1}{b} (c_0 + \Sigma c_i x_i)$. The ratio $d_i = -c_i/b$ is estimated as coef-
ficients in this additive model, assuming the process is in equilibrium

The observed effects of independent variables thus confound the contribution of individual attributes to a person's overall level of resources and the number of opportunities determined by b.

Empirical Results

Information about the usefulness of the vacancy competition model in this specification is not obtained by observing the effect of education on attainment, or by demonstrating the shape of the life-cycle attainment profile. These features could equally be explained by human capital theory. More information is provided by obtaining evidence for the validity of the interpretation of parameters; the explanatory power of the model; and the implications of the vacancy competition theory for metrics of variables.

The mathematical specification of the vacancy competition model assumes an exponential distribution of attainments. Socioeconomic status can be seen as a comprehensive measure of the rewards provided by positions in the social structure. It has, as usually measured, an ordinal metric (though it also usually is treated as an interval-level variable). The assumption about the exponential distribution can easily be implemented. Nothing prevents assigning a metric to socioeconomic status that generates this distribution, as long as this metric preserves rank order. This results in a metric called SAS; its derivation is described in Sørensen (1979).

The distributional assumption is of course not essential for the conception of vacancy competition, though it is essential for the mathematical specification. The conception of vacancy competition implies that attributes of individuals used in allocating them to vacant positions are

used to form rankings; thus, only ordinal metrics are implied for these variables. The mathematical specification does, however, need a measure with a stronger metric. One may assign these variables a metric reflecting the outcome distribution, that is, the exponential distribution, provided the metric preserves rank orders.

In the vacancy model, education should be considered a key individual attribute in allocating people to closed positions. The measurement of education in years of schooling has a justification only in human capital theory. In vacancy competition, education only establishes rank orders.

There has been a dramatic secular change in educational attainment in recent history. This means that the rank order, or competitive advantage, provided by a given level of educational attainment, say high school, has declined. This can be captured by standardizing the educational distribution by cohorts of entrants into the labor market. Using this strategy, and imposing the exponential distribution on the educational attainment distribution for each (five-year) cohort, results in a metric for education called EDR (Sørensen, 1979). This metric measures competitive advantage, assuming that most people compete with those who enter the labor force at roughly the same time (these are not cohorts of people born in the same period because of the considerable differentials in school-leaving ages). The metric assigns higher values to, say, high school education for those who entered years ago and who compete with others having lower levels of education, that to high school education in more recent cohorts.

In these new metrics the correlation between education (EDR) and socioeconomic status (SAS) is .625 for a very large sample of white men, aged 20-64 in 1970 (Sørensen, 1979).[5] In the conventional metrics of

Duncan's SEI and years of schooling, the correlation is .552. It should be noted that these correlations, assuming a linear relation, is a misspecification of the vacancy competition mode. It assumes the process to be in equilibrium, presumably not the case for the youngest age groups. Still, the difference is noteworthy in support of the vacancy competition model, for most of the difference is due to the treatment of education—the correlation between EDR and SEI is .600.

A conventional status attainment model with only two variables, education and experience, produces results consistent with the zero-order correlations. The R^2s in the new metrics are .394, as opposed to .328 in the conventional metrics. The R^2s are higher than any reported in the status attainment literature for models that include measures of family background. These models do not include experience. In Sørensen (1979), both a linear and a squared term for experience are included in models in both metrics, and experience has a substantial effect. Still, the metrics provided by the vacancy competition model produces a larger R^2 than obtained in a status attainment model that includes age and age squared (Bielby, Hauser, and Featherman, 1977).

In may be argued that, at the outset, we said that the standard of comparison would be human capital models in terms of earnings. Cross-sectional earnings models have not been estimated using the vacancy competition model, and in any event the use of the vacancy competition model as specified in (2) would be a misspecification of data such as those used by Mincer (1974). Nevertheless, the status and earnings attainment models are structurally equivalent, even though status attainment research cannot be said to be informed by human capital theory. The relation between education and socioeconomic status, seen as measures of

the "goodness" of jobs, should be explained by human capital theory if it explains attainment processes, with education measured in years of schooling.

Performance, measured by R^2s, is dependent on population variances and measurement reliabilities. A more informative test of the usefulness of the vacancy competition model would be obtained by direct estimation of the parameter b, assumed to measure the number of opportunities in closed-position systems. Using information on change in attainments from 1965 to 1970, such estimates are presented in Sørensen (1979) for national samples of population groups defined by sex and race. Racial and sexual inequalities are widely believed to reflect differences in opportunities. This estimation therefore provides a way of validating the interpretation of b.

The predicted differences occur. For white men, b is estimated to be .222; for white women, b = -.264; for black men, b = -.282; and for black women, b = -.324. Interestingly, the opportunity structure for black women seems the most unfavorable of all, even though they have average levels of attainment higher than those for black men. The reason for the discrepancy in that black women have higher levels of education than black men. Their higher resources thus compensate for their less favorable opportunities.

These estimates again pertain to status attainment. For earnings, direct estimates of b are presented by Rosenfeld (1980), who finds the same differences among racial and sexual groups as those reported here. She does not find the same pattern for status attainment, but she does not use the appropriate metrics for status.

Direct estimates of rates of job mobility provide another way of obtaining empirical support for the model. Such work is reported in Sørensen and Tuma (1981) and in Sørensen (forthcoming, a). The same impact of change in metrics has been established for analysis of rates of upward shifts in status as measured by the fit of the continuous-time stochastic process model used in the analysis of job shifts (Sørensen, forthcoming, a).

Of particular interest are the results obtained in the research on job shifts regarding the role of experience. In human capital models, experience measures skills. In the vacancy competition model, experience is simply amount of exposure to mobility or promotion processes; no change in performance is implied. Job shifts can be seen as generated by the discrepancy between the current level of attainment and the ultimate level that is determined by a person's resources (given the opportunity structure). In vacancy competition, time in the labor force is an indicator of the magnitude of this discrepancy. Hence, with the proper specification of the effect of current job rewards and individual resources on the rate of shift, experience should have no effect. This is indeed observed (Sørensen and Tuma, 1981) when models where only experience is included (like equation (1) here) are compared to models including measures of current rewards and resources.

Overall, there seems to be some support for the vacancy competition model in labor markets. The illustrations, however, all pertain to national labor markets. Though this can be justified as focusing on the aggregation of internal labor markets, the historical and organizational specificity of mobility regimes is lost. Other research on organizational mobility suggests the importance of this; see, for example, Konda and

Stewman (1980) and especially Rosenbaum (1979), who shows the importance for career trajectories of growth and decline periods of organizations.

VACANCY COMPETITION IN SCHOOL SYSTEMS

There are strong similarities between the educational attainment process, conceived of as a flow among closed positions in educational structures, and the socioeconomic attainment process, conceived of as a flow among closed positions in labor market structures.

The conception of educational systems as structures of closed positions is not common in sociological research on the educational attainment process. The notion of schools as hierarchies of instructional groups is usually not made explicit, either. These concepts will first be specified.

Schools as Hierarchical Educational Structures

The conception of a school as a structure sees instructional groupings as the elements or positions in the structure. The empty spaces to be filled are places in these instructional groups as they appear when groups are formed or reorganized. Grouping of students is a universal feature of formal schooling. All school systems use some form of classroom grouping, at least in the form of age grading. But a number of other grouping systems exist, over and above those of classrooms and age grades. If a group of students assigned to a curricular unit is seen as the basic unit in educational systems, these units may be organized in one of several ways. They may be organized to form tracks or programs, as in U.S. high schools, or to form separate schooling systems, as in traditional European system. Groupings within classrooms may be performed with some differentiation among groups in curricula. This kind of

ability grouping will provide our empirical example of the allocational process in schools, described below.

Grouping students for instructional purposes forms a structure. Two types of relations can be defined among instructional groups. One is the curriculum relations that link instructional groups, since it is necessary to cover some particular material before going on to some other material (e.g., in a sequence of mathematics); or different parts of a curriculum are taught in specific combinations to implement the school's instructional goals. The second type of relations consists of the flow of students created by their movement in definite patterns among curricular units. These flows often reflect curriculum relationships.

The relations that thus define the educational structure are temporal ones. It appears, therefore, that educational structures differ from labor market structures, where static relations, such as those of authority, are usually emphasized. Labor market structures could also be described as mobility patterns that are promotion schedules, but the static relations existing among positions in labor market structures usually identify the hierarchical nature of such systems. Among educational structures, the hierarchical characteristic resulting from temporal relations needs to be defined.

One may describe flows of students in an educational structure in a matrix resembling a population matrix: rows and columns are instructional groups identified by listings of classrooms, ability groups within classrooms, tracks, or courses at higher educational levels. One row denotes the "outside" of the school system that eventually absorbs the process. The elements of the matrix are the quantities of a_{ij}, which measure the probabilities that students will move from one group to

another in the period of time that defines the minimum lifetime of an instructional group (an academic year or a semester).

Using well-known results from the mathematical theory of Markov chains (e.g., Kemeny and Snell, 1960), one may, from such matrices, define a fundamental matrix $(I - A)^{-1}$, where A is the matrix of a_{ij}'s and I is the identity matrix. This matrix reveals several properties of the system. In particular, it can be used to calculate quantities technically referred to as expected time to absorption, or, in this application, the number of years to school leaving. Such quantities, c_{ij}'s, can be defined for any instructional group and would, for each group, reveal the career consequences of being assigned to that group. In principle this could be done for all instructional groups in a school system (for a simple example, see Sørensen, forthcoming, b). Since the educational attainment level is heavily dependent on time spent in the system, the c_{ij}'s measure the educational ranks of instructional groups and thus provide a metric for assigning a vertical dimension to the educational structure.

For many instructional groups, these elaborate procedures are not needed. In ability grouping, it is usually clear what is up and what is down. High school tracks, such as college preparatory programs, leave little doubt about their intended career implications. There are, however, grouping systems where the career assignments are not explicitly defined--or are they widely communicated to students. For these systems the more elaborate procedure is needed.

The educational rank of an instructional group provides the measure of the "reward" provided by a match of a student to an instructional group. It is the analog to the job reward in labor market structures.

Causes of Closed Positions in Educational Structures

In the general discussion of closed and open positions, three aspects of closed-position systems were emphasized as particularly relevant for the allocation process: (1) the number of positions within them is predetermined; (2) duration of matches of individuals and positions is indefinite; and (3) the allocational decisions are authority decisions. The reasons that the first two of these properties emerge in educational systems differ somewhat from the situation in labor markets.

The predetermined numbers and types of instructional groups result from the particular characteristics of educational systems. First, educational ideologies, as implemented in curriculum requirements fixed by governments and educational authorities, imply that a minimal set of curriculum units should be provided. Resources, in the form of number and qualifications of teachers, set other constraints. Most educational systems also require that the number of students in instructional groups not go below or above certain limits. Moreover, the physical layout of school buildings constrains the number of places available in instructional groups, and the available equipment sets other constraints. Together, these constraints limit the ability of schools to vary the kinds of instructional groups that may be offered and the number of places in the groups.

Schools usually draw their students from a specific geographical area. Considerable variation may exist in the composition of student bodies with respect to abilities and interests. The size and type distributions of instructional groups usually do not closely reflect this composition. The number, types, and sizes of instructional groups is determined quite, though not totally, independent of the characteristics

of those who are to fill the empty places. This proposition should not
be controversial as applied to classroom and track groupings in most pri-
mary and secondary shcools (higher education may to some extent be an
exception, though student interests do not solely determine course
offerings either). It is, perhaps, more intriguing that in the case of
groupings within classrooms, the size distribution of groups is indepen-
dent of the student body from which ability groups and the like are
formed.

When teachers form groups within classrooms, they can in principle
let the number and sizes of groups accommodate the composition of stu-
dents in the class. In ability grouping, this implies that the size
distribution of groups mirrors the ability distribution of students.
Ability groups are of unequal sizes (unless by some fiat the ability
distribution is uniform), as small or large as needed to maximize homoge-
neity. But that arrangement runs counter to other considerations the
teacher must take into account. One is the ability to manage inatten-
tion, which precludes large groups or too many groups. The other con-
sideration is the need to divide instructional time roughly equally among
students and groups. These considerations mean that there are few, not
many, groups within the classroom (three to five, it appears) and that the
groups are of roughly equal size. There is evidence that managerial
considerations in fact override any attempt to make the size distribution
of ability groups mirror the ability distribution of students (Hallinan
and Sørensen, 1982; Eder, 1979). In other words, instructional groups
formed within the classroom may be seen as representing a set of prede-
termined places to be filled by students when they become vacant.

The relative independence of the instructional grouping system and the compostion of the student bodies allocated to these groups is a necessary, but not a sufficient, condition for places in instructional groups to be considered closed positions. The closed nature of instructional groups reflects curriculum relations and organizational constraints on mobility among existing groups.

If instructional groups are arrayed by their educational ranks, as defined earlier, access to higher groups from lower groups is often prevented by curriculum differences between high and low groups. This holds true both for between-classroom and within-classroom groupings. In the latter case, the very rationale for ability grouping usually is to accommodate teaching materials to the aptitudes of students.

Downward moves from high to low groups during the year are not always prevented by different teaching materials in different groups. Nevertheless, there are strong limits to how frequently it can be done. Creating downward mobility alone would change the size distribution of instructional groups. Too many moves are prevented by the forces that initially created this distribution. In addition there is the influence of parental pressures and uncertainty about the reliability of performance fluctuations, making it uncomfortable for teachers to demote students. These organizational constraints on mobility, after groups are established, have been documented for within-classroom groupings by Hallinan and Sørensen (1982). In fact, in her qualitative study, Eder (1979) found that teachers would rather reinterpret performance than move students. Rosenbaum (1976) appears to provide a picture of much ownward mobility among high school tracks, but confounds moves within and between academic years. The process might as well be described as a

promotion system that leaves more and more students without chances for promotion, in a process that Rosenbaum refers to as "tournament mobility."

In sum, once assigned to instructional groups, students are unlikely to be reassigned. Their stay in these groups is not indefinite, as it is in labor market positions, where jobs are vacated only when incumbents leave because of promotion. But the duration of a match is arbitrary in relation to the performance and efforts of students.

The analogy between the closed nature of positions in labor market strutures and the closed nature of positions in schools may be strengthened. Recall that the relations defining educational structures are temporal. One may define particular temporal configurations of instructional groups, or educational trajectories, as elements of this structure. These trajectories may be considered relatively closed for two reasons.

First, the curriculum relations existing between instructional groups constrain and define assignments over time, including before and after the times instructional groups are formed. Earlier curricula are requirements for later curricula. this prevents access to "higher" trajectories from "lower" trajectories over the schooling period. Movement in the other direction is perhaps more feasible, though again the basic constraints imposed by the inflexibility of the size distribution of instructional groups are of some importance. This still provides a concept of schools as characterized by mobility in the opposite direction of what is observed in closed labor market structures, where promotions are the rule. However, when we move from lower to higher educational levels we also move from more comprehensive instructional groups to less comprehensive groups. Those groups with the highest rank thus typically have

the most elaborate requirements. Viewed in this manner, the sorting of students in schools may be seen as a promotion system.

Second, early assignments provide signals about competencies and abilities influlencing later allocations to instructional groups, even when formal curriculum requirements are not present. As in other closed systems the ability to predict performance is of the essence in assignments to instructional groups of different educational ranks. Those performing assignments are subject to considerable uncertainty and, in some cases, much outside pressure. Past assignments form one, apparently reliable, indicator of what the student can do, and they create expectations in students and parents that teachers can be made aware of.

Perfectly closed educational trajectories run counter to ideology, especially in the United States. Schools may institute procedures to modify the long-term effects of early asignments on later assignments. Even though it is common to change teachers at every grade level in U.S. schools, the receiving teachers obtain information from the previous teachers. Eder (1979) reports that first grade teachers relied heavily on information provided by kindergarten teachers when forming reading groups in first grade.

The use of elective assignments at secondary educational levels is another device to reduce the effect of early assignments on later assignents. Nevertheless, the freedom of choice may appear greater than it is in reality. Cicourel and Kitsuse (1963) vividly describe the strong influence in high school that counselors and teachers have on student choices, and show how they direct these choices so that available places are filled without changing the size distribution of instructional

groups. To this is added the role of curriculum requirements, discussed earlier.

Assignment to Instructional Groups as Vacancy Competition

Configurations over time in sizes of instructional groups define opportunities for students as they move through the educational structure. There are particular historical and organizational circumstances that may strongly influence these opportunities. Variations among schools in curricula and size distributions of instructional groups interact with student body composition to produce historical and organizationally specific opportunity structures. For example, a student with a given level of ability may achieve placement in a college-bound trajectory in one setting and not in another, simply because the number of places providing access to higher education differs in the two settings; or, differences in the compositions of student bodies may make access to a particular set of instructional groups easier in one setting than another.

The interdependence of one's own career and the careers of colleagues reflects the use of rankings in the vacancy competition operating in schools. A specific and limited number of places has to be filled, and there is a limited number of candidates for those places. Prediction of performance is important; opportunism is likely. Schools therefore like to rely on "objective" tests when making the most important assignments. Though these tests may have stronger metric properties than ordinality, they are inevitably used to produce percentiles, so that cut-off points can be established corresponding to the number of available places.

Strangely enough, few of these theoretical factors have been incorporated into research on the educational attainment process. The exten-

sive literature on school effects does not look at how schools evaluate and channel students into educational trajectories, but on how much variance global school characteristics add to individual-level attributes in explaining levels of academic achievement.

There is some research on the effect of tracking (Alexander and McDill, 1976), but it focuses on additive effects in models that do not reflect the interaction between educational trajectories and rankings in vacancy competition. Qualitative research (e.g., Rosenbaum, 1976) does suggest the usefulness of some of the ideas presented here.

A simple example can illustrate the metric implications of vacancy competition (Sørensen and Hallinan, 1982). In a study of the assignment of students to reading ability groups in 34 classrooms, one question addresssed was the effect of race. These classrooms varied consideraly in racial composition. Using as the dependent variable the probability of getting assigned to a high ability group, logit models were estimated. The analysis first fitted a "conventional" model, where the probability of being assigned to the high group was seen as determined by the reading achievement of the student (measured at the start of the school year) and the race of the student. The reading achievement variable was first measured in the usual metric for such tests (standardized scores, using national norms).

In the "conventional" model the results appear to be (1) a strong effect of reading achievements; (2) major race effect in favor of nonblacks; and (3) a strong interaction effect between race and achieve-ment. The interaction effect presumably means objective reading achieve-ments are used differently for blacks and nonblacks in the assignment to reading ability groups. Further analysis established strong, but dif-

ficult to interpret, effects of classroom characteristics, such as racial composition and grade level.

A change in metric produced dramatically different results. The vacancy competition concept implies that teachers use student rankings in particular classes when making assignments to reading groups. To capture this, within-classroom achievement distributions were obtained and the percentile ranks in these distributions were used as the metric for achievement. This produced a significant better fit of the model (for example, the chi-square for a model with only race and reading achievement in the conventional metric was 699.8; with the percentile metric it was 639.5; and the degrees of freedom were the same, 573). With the change in metric, the interaction between race and achievement disappeared; in fact, the effect of race on assignment disappeared altogether. The first results were an artifact created by using the wrong metric. The metric also eliminates the classroom effects that are difficult to interpret. Part of this results from the incorporation of another variable, inspired by the vacancy competition model, which measures the relative sizes of the high groups in the various classroom, or the number of empty places to be filled.

These results show the usefulness of elementary ideas inspired by the vacancy competiton concept of the allocation of students to places in instructional schools. The findings obviously need elaboration and extensions in future research.

Research on assignment processes and in schools and on educational careers are not the only areas where vacancy competition ideas may be useful. The interdependence of outcomes created by the allocation of a limited number of students to a predetermined number of places should

have consequences for the efforts of students. As already noted, the same set of outcomes can be produced in vacancy competition at high effort levels and at low effort levels. Schools may be less concerned than firms about overall performance, and are therefore not likely to invent elaborate incentive devices by complicated promotion systems. This poses performance problems to which solutions are proposed by turning schools into open-position market structures in voucher systems. Whether this is feasible remains to be seen. However, despite a considerable amount of research on peer group effects and the like, little is known, except for the possible existence of "frog pond" effects, about how the interdependence of allocational outcomes creates strategic behaviors of students and collective manipulations of effort levels in schools.

CONCLUSION

I would like to point to a few consequences of the discussion presented here for our understanding of common concepts in sociological attainment research. Opportunity, inequality of opportunity, and inequality are terms very frequently used in that research. The nature of the phenomena they denote and the interrelations among these phenomena depend on whether systems consist of open or of closed positions.

Opportunity as a well-defined meaning in closed-position systems. An opportunity is an empty space or a vacancy to be filled by someone. Upward mobility predominates in such systems and each vacancy represents a favorable occasion for someone. This seems to be the sense in which opportunity is usually understood. There is an interesting and important relation between the number of oportunities a system provides, in a period of time, and the degree of inequality of the system. This can be

seen from the specification of the vacancy competition model described above. An exponential distribution of positions by the attainment level they provide is assumed. The variance of this distribution, as defined before, is $(-1/\beta)^2$, where β is negative. Hence the closer β is to zero the more inequality there is in the system. But the number of opportunities provided by the system is characterized as $b = \beta/h$.[6] Hence, for given h, the more inequality there is, the more opportunities there are for growth in socioeconomic attainment.

More unequal systems provide more promotion opportunities, at least if they have the hierarchical structure assumed here. Promotion opportunities represent incentives. One may see the considerable amount of inequality in personal attainments found in labor markets (inequalities due to capital is another matter), created in large organization as deliberate devices to move employee performance from perfunctory to excellent. Ironically, extreme inequalities are often seen as products of the market. They instead reflect the impossibility of using market mechanisms in certain job structures, and the incentive problems thus created.

The relation between individual attributes and ultimate attainments reflects the opportunity structure. In specifying the vacancy competition model it was shown that the contribution of an individual attribute to the ultimate level of attainment is measured by $d_i = -c_i/b$. Here, c_i measures the weight or contribution to the qualifications of the individual of a single attribute used in the rankings performed in vacancy competition. The observed effect on ultimate attainment will also be dependent on b, measuring how many times the individual was ranked. The more opportunities provided by a system, the stronger will be the observed effects of individual attributes on ultimate attainment.

This has a methodological implication. Much of the sociological research on labor markets looks for "structural" effects that are added to individual-level effects, but if structural effects are produced by internal labor markets, the effects are not additive but interaction effects. The relationship between observed effects of individual attributes and the opportunity structure also has an important substantive implication. If any ascriptive characteristics influence the allocational process, the effect will be magnified the more opportunities there are. More inequality produces more opportunities for growth that may result in more observed inequality of opportunity.

Inequality of opportunity need not occur in vacancy competition, depending on how individual attributes are used in ranking candidates for new vacancies. But there is, as noted, a tendency toward inequality of opportunity in such systems created by the limited number of vacancies and of candidates for these vacancies at a given moment. Rankings reflect ascriptive characteristics, and if they do so in a consistent manner across promotions, there is no automatic mechanism that will eliminate inequality of opportunity in such systems. One can only observe the performance one has created by past allocation in a particular system.

The nature and interrelation of opportunity, inequality of opportunity, and inequality are very different in open-position markets. The concept of opportunity is not well specified in markets, and systematically created favorable occasions do not exist in perfect markets. This is the rationale for the argument by Hayek on the impossibility of competition in perfect markets, already noted. Opportunities are, when they do occur, market imperfections. But such imperfections are at least

thought to be transient. They have no long-term effects on the attainments of individuals; they merely create error terms in attainment models, and indeed the attainments of individuals are not influenced by their past attainment histories. Markets in equilibrium are static systems providing wage rates that measure the performance of individuals at the time at which they are observed. Inequalities are produced outside of the market, in the acquisition of human capital and in genetic endowments. The importance of individual attributes is not cumulative, and there is no need to establish incentive procedures. Wage rates are attached to individuals, so no one is paid more than markets say they contribute. It is difficult to imagine a relation between the number of market imperfections, supposed to be transient, and the degree of inequality in the attainment distribution. Such a relationship may exist between the opportunities for acquiring human capital in institutions outside of the market, in particular from the family, and inequality. This presents a major rationale for concern over the intergenerational transmission of socioeconomic resources. It is to be noted, however, that most of the opportunities for acquiring human capital are provided by closed-position school systems, where vacancy competition also governs outcomes.

It is well known that markets are supposed to eliminate inequality of opportunity. Employers who use attributes of individuals in the allocational process that do not reflect productivity will be punished by the market. There are automatic checks to eliminate discrimination. The number of opportunities in the system and the degree of inequiality of opportunity are unrelated. What appear to be inequalities of opportunity are produced outside of markets in ascriptive allocations of human capital and genetic endowments.

Closed-position systems, because of the interdependence of outcomes and ranking, idiosyncratic mobility regimes, and strong effects of past histories, are perhaps both more interesting and more frustrating than markets. Perfectly competitive markets are not very interesting; in them one has only oneself to blame for one's attainment.

NOTES

[1]I am indebted to John Myles for first pointing out to me the usefulness of Weber's distinction for the analysis of mobility processes. Our collaboration resulted in Myles and Sørensen (1975), which points out some of the implications of the distinction between closed and open postions for the analysis of intergenerational mobility.

[2]It is interesting to note that most of this work has been carried out in Europe, where the conceptualization of phenomena in terms of markets is less widespread.

[3]One solution to the problem is to argue that ability is not normally distributed, but is only observed in a metric producing a normal distribution. Mincer (1970) resolves the paradox using human capital theory, keeping the assumption of normally distributed abilities.

[4]There are strong assumptions involved in the derivation of the human capital earnings model employed by Mincer (1974) and many others. It is assumed that lifetime earnings are equal for everyone, regardless of educational attainment, as all current earnings differences compensate for training costs differences. Without this assumption the earnings equation is not identified and coefficients to education do not measure rates of return (Rosen, 1976).

[5]The sample used in Sørensen (1979) was obtained from the Public Use Sample of the 1970 U.S. Census. From the 1-in-100 PUS file, samples of white men, white women, black men, and black women were obtained. Sample sizes varied from 18,000 to 30,000.

[6]Recall that the smaller b is in absolute magnitude, the more opportunities there are.

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