EDUCATION AS A VALID BUT FALLIBLE SIGNAL OF WORKER QUALITY:

REORIENTING AN OLD DEBATE ABOUT THE FUNCTIONAL BASIS OF THE OCCUPATIONAL HIERARCHY

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I. INTRODUCTION: DEBATES ABOUT THE ROLE OF EDUCATION IN OCCUPATIONAL STRATIFICATION

A striking feature of all complex societies, now as well as throughout history, is that they are highly stratified; that is, there are large and enduring socioeconomic differences among members of those societies. At least in industrialized countries, these inequalities are intimately related to

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an occupational hierarchy in which some jobs are widely considered more attractive and rewarding than others. The nature, origins, and fairness of inequalities in life circumstances have been central issues in sociology and, because educational attainment is so important in determining who gets good jobs and who does not, these issues have formed the backdrop to much of the research in the sociology of education. The effectiveness and fairness with which schools prepare students for the workplace have long been of great concern to many people throughout our society, but arguments about *how* the educational system may be unfair have shifted over time.

I begin this chapter by examining these shifts in opinion because they mirror an increase in the apparent popularity within sociology of "non-meritocratic" over "meritocratic" theories of occupational stratification. The chapter describes some severe defects in current meritocratic theories, defects that help to explain why such theories are falling into disfavor in many quarters, but it also summarizes extensive evidence that the fundamental premise of meritocratic theories is sound: namely, there is a functional basis or value for the occupational hierarchy that accords with meritocratic principles. Most of the chapter is devoted to proposing a third approach—a "modified functional" theory—for understanding how occupational hierarchies develop and are maintained and what role education plays in those processes. The social problems that have stimulated shifts in public opinion about the value of education are quite real. It is argued here, however, that commonly-proposed solutions to these problems are unlikely to prove very effective because they are generally based on fundamental misconceptions about the value of education for preparing workers to actually perform the work it enables them to obtain.

A. Shifting Basis of Claims that Educational and Occupational Processes are Unfair

The Closed Competition

Prior to the 1960s, concern seems to have focused on opening the competition for education and jobs and on allowing talent to rise to the top unimpeded by artificial barriers. The adoption of statutes against discrimination on the basis of race, sex, and religion, the provision of free public elementary and secondary education, the establishment of relatively inexpensive state institutions of higher education, scholarships on the basis of merit, and an increasing emphasis on using universalistic standards (e.g., standardized test results) for selection in education and employment all reflect an effort to find and cultivate talent regardless of sex, ethnic group, race, and social class background.

The Unfair Competition

By the mid-1960s, persistent social class and race differences in educational and occupational attainment alerted many people to the possibility that the competition was organized to favor or handicap certain types of people. It was frequently argued that less advantaged youngsters entered school already behind in the competition as a result of earlier cultural deprivation. It was also argued that schools provide better education and more rewards to white and more affluent students, thus dooming disadvantaged youngsters to fall further and further behind their more advantaged peers as they advance in grade level. The educational and occupational aspirations of such youngsters are thereby also assumed to be severely dampened. Unequal distribution of financial and other school resources, ability tracking by classroom, racially segregated schools, differential teacher expectations, and biased testing were suggested as prevalent and important sources of bias in the schooling process. Remedial programs, open admissions, and scholarships based on need were widely adopted in order to reverse earlier adverse circumstances. However, research on the putatively biased school practices as well as on recently-implemented "remedies" showed that neither the negative nor positive attributes of schools has had substantial, if any, effects on inequalities in achievement and so has dashed hopes for an easy or quick reduction in the troubling differences in attainment (e.g., see Hurn, 1978).

Competition as Subterfuge

The results of the foregoing research and social experimentation have made it more difficult to argue convincingly that specific educational practices are biased in favor of or against any particular group, and those results have blunted the force of the more general argument that the competition is grossly unfair. As this has occurred, another basis of criticism has gained in popularity: the competition is a sham. For example, Berg (1970) is widely cited for his argument that education is not related to on-the-job performance. Bowles and Gintis (1976) have attracted a lot of interest with their claims that the actual function of schools is to select and create, not merit, but social class and personality attributes that allow the ruling class to perpetuate its own social and economic advantages. Although academic abilities may be a by-product of schooling, they claim that these abilities are not actually relevant to the work people perform on the job. They further claim that by stressing the importance of these abilities, dominant social classes create the illusion of fairness and so help to legitimate their own advantages and self-serving practices. This position denies that there is any functional basis for the occupational hierarchy and implies that the fairness of the process by which people find their way onto

the occupational hierarchy is irrelevant because the hierarchy itself is neither necessary nor fair. Educational performance and attainment thus become suspect as qualifications for work, and some theorists (e.g., Collins, 1979) have advocated banning the use of educational credentials in hiring. This position also leads to the conclusion that the hierarchy might be abolished or people assigned to it in much different ways (e.g., rotated through it) than they are now without adverse consequences (and perhaps with positive consequences) for productivity. Although they might not feel comfortable with the particular theories or social policies that have been developed in this vein, many people do feel that the relevance of differences in academic ability and achievement to the workplace has been overemphasized.

B. Current Stratification Theories and Their Defects

The various approaches to the study and explanation of social stratification generally fall into two categories that will be referred to here as revisionist theory and functional theory. The first includes theories that claim that stratification is not meritocratic, including approaches referred to as Marxist, radical, or conflict theories. Functional and meritocratic theories in sociology and human capital theories in economics constitute the other position. Neither of these two general theoretical approaches represents a fully developed, completely explicit, or single theory, nor is there probably even much consensus within either one about the various issues they address. But they do represent a set of consistently different assumptions about the nature of human talent and the nature of work. (See, for example, Rehberg and Rosenthal's, 1978, comparison of these two perspectives.)

Before discussing either of these general categories of theory, two issues concerning the aims of stratification theory must be clarified.

A Focus on Hierarchical Issues

Social stratification, by definition, refers to the ways in which society is organized *hierarchically*. When we study occupational stratification, we are concentrating on only one dimension of the division of labor. In addition, although income, occupational prestige, authority, education, and other indicators of social or economic advantage are not perfectly correlated, they do correlate so highly in fact and in common perception that it does make sense to talk about "the" occupational hierarchy and to give it a central place in theories of social stratification. My point here is not that the hierarchical aspects of social and occupational organization are all that matter, for indeed I would argue quite the contrary. The point is that

this chapter concentrates on that single dimension because it is central to all debates, both inside and outside of sociology, about the functions and fairness of schools in relation to work. It should also be noted that this chapter focuses on only one among the several highly correlated hierarchies that are of interest to stratification researchers—the hierarchy of occupational socioeconomic status (e.g., the Duncan Socioeconomic Index scale) that constitutes the dependent variable in much of current status attainment research in sociology.

Distinction between Person-Level and Occupational-Level Processes

Occupational stratification is best conceptualized as the product of two very different but empirically related processes: (1) the origins, form, maintenance, and consequences of the occupational hierarchy and (2) the attainment or mobility processes by which individual people find their way onto and across that hierarchy. I shall refer to these, respectively, as "structural" versus "allocation" processes. The long tradition of mobility research in sociology that looks at the fate of individuals or groups in society has examined the second process, but different data are required to study the emergence and functionality of the occupational hierarchy or any other aspect of the division of labor. Conclusions about the fairness of mobility processes are not always especially relevant to the structural issue, although it often appears to be assumed otherwise because researchers (e.g., Crouse, 1979:115) seem to have ignored the possibility that a functional hierarchy can exist despite considerable slippage, and even some systematic biases, in allocation processes. Although allocation processes supply the workers who sustain the hierarchy, and so are clearly important in any theory of stratification, aggregate data about occupations themselves are necessary for constructing any convincing theory of occupational stratification. This chapter reviews occupation-level data in order to describe structural processes; it then relates these structural processes to the processes of allocation that have been researched so widely in sociology.

One structural feature of occupational hierarchies is of particular concern in this chapter and will be defined to avoid confusion in later sections. *Differentiation* of occupations on a hierarchy refers to the shape or form of the hierarchy; it is the degree to which jobs within one occupation are separated from each other or spread out on the attribute underlying the hierarchy (say, intellectual requirements). Differentiation is not necessarily a stable attribute of hierarchies and, ultimately, any theory of stratification must also account for changes in differentiation over time. This includes not only the original emergence of the hierarchy but also its mutability in the face of various influences. Although many discussions of the changing skill demands in an economy focus on increases or decreases

in the *elevation* of entire hierarchies over time, differentiation is really the feature of most direct concern in occupational stratification because it refers to degrees or extent of inequality between different occupations.

Revisionist Challenges to Functional Theory

Functional or meritocratic theories of occupational stratification (e.g., Davis and Moore, 1945) assert that some occupations are more important to society than are others and that greater rewards are necessary for attracting the best educated and most talented individuals to the most important occupations. Status attainment research focuses only on the issue of allocation and essentially takes the hierarchy for granted, but it does provide some evidence that is inconsistent with the revisionist position. Despite revisionist claims that one's socioeconomic fate in adulthood depends primarily on one's social class background, status attainment research has consistently shown that one's ability and years of education have greater independent effects on occupational prestige and income than does the social class of one's parents (see the review by Campbell, 1983; see also Eckland's, 1980, book review of Jencks et al., *Who Gets Ahead?*, 1979). Furthermore, research has consistently shown that school achievement itself is more highly related to intelligence than to socioeconomic status (Follman, 1984). Similarly, revisionist claims for the importance of social class-related personality traits in schooling and work have not been substantiated (Olneck and Bills, 1980).

Although allocation processes seem more consistent with functional than with revisionist claims, functional theory has been quite vulnerable to attack in other respects. Revisionists directly challenge the functionalist premise that the occupational hierarchy does in fact have functional value for society, and the functional position has never provided evidence to support it. Furthermore, existing evidence about the functional value of education has been quite damning to the functional position. For example, differences in the educational level of workers are not consistently related to differences in their performance within different occupations; the rise over time in the educational requirements of jobs cannot be accounted for by increases in their skill demands; a high proportion of our population is "over-educated" for the types of work they do; employers are frequently mistaken about the benefits of employing better-educated workers; some employers pay more attention to personality and appearance than to cognitive traits in hiring workers; and the socioeconomic returns to education are not consistent across all types of workers and occupations (see Berg, 1970; Collins, 1979; a variety of chapters in Gordon, 1974; Wright and Perrone, 1977; among many others). While some of these criticisms are more damaging than others, they clearly indicate that functional theory as usually stated has some serious shortcomings.

One shortcoming is that the nature of work itself—what workers do on the job and the worker traits and competencies required to do that work well—has been almost totally ignored by stratification researchers. The tasks performed by workers do not even have a place in labor market segmentation research although that research is considered an advance over status attainment work because it focuses on a greater variety of characteristics of work and work-places than does the former (e.g., see Kalleberg and Sørensen, 1979).

A second shortcoming is that stratification research ignores the hiring process as well as the attendant uncertainties in job search and employee selection that lead employers to rely on valid but imperfect signals of worker competence. Employment practices are rarely mentioned, let alone investigated, in the large status attainment literature. This gap in the literature is in striking contrast to the great amount of attention that has been devoted to the links between family, ability, and schooling processes.

A third shortcoming is that the multidimensional nature of work, human competencies, and worker aspirations is not sufficiently appreciated. For example, a multidimensional view of the cognitive and non-cognitive demands of work tasks leads one to expect employers to look for and reward different worker traits; this in turn leads one to expect differences in "payoffs" to education, intelligence, and personality across different types of work, but status attainment researchers generally have interpreted such differences as evidence of unfair discrimination. Status attainment theory also seems to assume that people seek to maximize their occupational status, but this is not so. People's preferred "social selves" as revealed by their occupational aspirations differ along a number of dimensions, including prestige, and many of these differences develop in childhood long before youngsters become aware of constraints in the labor market (Gottfredson, 1981).

A fourth shortcoming has been particularly serious not only for functional theory but also for its real-world consequences. The value of education in the workplace has been badly miscontrued and it has been overestimated relative to that of differences in intelligence. Too much emphasis has been given to the power education to *produce*, as opposed to just *select*, people with the competencies that are most important in the occupational hierarchy. Demonstrations that education does not have its widely expected effects thus provide revisionists an easy but inappropriate way of dismissing the entire functional position.

C. Modified Functional Theory: A Reconceptualization of Occupational Stratification

The general objectives of this chapter are to provide evidence that the occupational hierarchy is based on functionally important differences

among workers and their jobs, and then to propose a view of occupational stratification that differs from both functional and revisionist theory. Because this reconceptualization is much more akin to functional than to revisionist theory, I refer to it as a "modified functional" theory. The objectives of the chapter are pursued by triangulating data and argument from several disciplines, including social stratification, human intelligence, personnel selection, job analysis, and signalling theory in economics.

The chapter develops the modified functional theory in the following four sections. The next section (Section II) organizes and reviews the various functions of schooling that have been proposed in the stratification literature. This helps to clarify the direction this chapter takes and how it differs from previous theory. Section III reviews evidence showing that there is a functional basis to the occupational hierarchy and that the hierarchy is rooted in the differences in intelligence among the members of a society. Specifically, empirical data are reviewed that support the following four propositions:

1. Occupations differ in the general intellectual difficulty of the tasks they require workers to perform on the job.
2. The occupational prestige hierarchy primarily reflects an ordering of occupations according to intellectual difficulty level.
3. Occupations that are higher in intellectual difficulty level tend to be more critical to the employing organization.
4. Large differences in intelligence in the population are evident by the early school years and this distribution is not substantially changed, at this time in history, by either later school or work environments.

Section IV examines how the occupational hierarchy itself arises and evolves "naturally" in response to large and enduring differences in intelligence in a population. Specifically, it presents arguments to support the following three additional propositions:

5. The occupational hierarchy has evolved and is sustained over time because enduring differences in intelligence within populations create pressure for segregating work tasks into different occupations by intellectual difficulty level.
6. The degree of differentiation (i.e., mean differences in intellectual difficulty among occupations) in a hierarchy is affected by the efficiency (i.e., validity) with which people are sorted by intelligence to occupations.
7. Only moderate levels of efficiency in sorting by intelligence are necessary to sustain a highly differentiated intelligence-based occupational hierarchy.

Section V returns to the role of education in stratification by first examining why employers use educational credentials as signals of worker quality (i.e., of worker competence on the job). It then discusses the often unrecognized consequences for stratification processes of employers making hiring and promotion decisions on the basis of valid but imperfect signals of worker competence. The major additional propositions presented in this section are that:

8. Education (primarily years of education) influences allocation processes (i.e., the status attainment of workers) to the extent that employers use education as a signal of worker quality.
9. However, employers will rely on educational credentials only to the extent that education actually is a useful signal of worker competence (useful meaning not only valid but also having a favorable cost-benefit ratio compared to other possible signals).
10. Educational level has been the most useful (but not the most valid) indicator of worker intelligence in recent history, but its value to employers can wax and wane as social policies and practices change its relative costs and benefits as a signal of worker quality.

The final section of the chapter (Section VI) discusses the implications of the modified functional theory for educational policy and for stratification research. It is argued that the widespread failure among both laymen and researchers to appreciate the limitations of schooling in preparing people to be productive workers leads to unrealistic educational reforms that themselves stimulate a new round of criticisms of the school system. It is also argued that the widespread failure in stratification research to distinguish between the value of education for getting a job versus performing it well has created enormous confusion in the field.

The modified functional theory reorients attention in the study of social stratification in three major ways. First, whereas current stratification research focuses on how people end up at different levels of the occupational hierarchy, the present theory focuses on the long neglected issue of the evolution, form, maintenance, and mutability of occupational hierarchies themselves. Second, current research conceptualizes occupations primarily in terms of their rewards to workers (e.g., income and prestige) and on resulting socioeconomic inequalities among workers; in contrast, the modified functional theory takes account of the goals, needs,

and constraints of employers in the hiring process and devotes considerable attention to the issue of worker performance on the job. Finally, current stratification research has adopted a mechanistic or chemical-reaction imagery of social processes, but this chapter argues that any convincing theory of social stratification must explicitly recognize and take account of the great amount of "slippage" and error in real-world social systems where workers and employers have to make decisions on the basis of limited and faulty information.

II. WIDELY HYPOTHESIZED FUNCTIONS OF SCHOOLING IN PROCESSES OF OCCUPATIONAL STRATIFICATION

A major goal of this chapter is to clarify what role schools actually play in maintaining the occupational hierarchy and in allocating workers to it. It helps to have in mind first what the widely hypothesized functions of schools relative to work are.

A. Ten Common Hypotheses and Their Relative Importance in the Debate between Revisionist and Functional Theories of Stratification

Table 1 lists ten ways schools are commonly hypothesized to affect the occupational attainment of students. As is apparent from this list, one major distinction in hypothesized functions is whether or not schools actually *change* students or whether they primarily *sort* and label them. Another distinction, of course, concerns what types of attributes schools select for or foster—for example, intelligence, non-cognitive traits, knowledge, and occupational aspirations.

The foregoing distinctions often form the lines of debate between functionalists and revisionists, although both positions would agree that one or more of these functions of schooling does play a central role in stratifying individuals in society. Neither theoretical position has been entirely clear about the relative importance they assume each of these ten functions to have, nor is it likely that there would even be consensus within either camp. Nevertheless, it is clear that functionalists give greatest weight to the sorting and fostering of cognitive aptitudes (functions 1 and 6) and to the development of specialized skills and knowledges (8), with perhaps some weight being given to the functions of either selecting for or fostering ambition (4, 10). They certainly give least weight to the possibility that schools function to channel youngsters to adult social positions strictly on the basis of their social class backgrounds (5). In contrast, the revisionist

Table 1. Ten Commonly-Hypothesized Functions of Schooling in Relation to Occupational Stratification

Sorting students according to their attributes (selecting, discriminating, classifying, labelling)

1. general cognitive aptitude (learning ability, intelligence, academic ability)
2. non-cognitive aptitudes (e.g., motor or interpersonal)
3. habits and attitudes (cooperativeness, deference to authority, conformity)
4. goals and aspirations (socioeconomic and field of work)
5. socioeconomic background

Changing the attributes of students (educating, training, socializing, remediating)

6. general cognitive aptitude (learning ability, judgment, intelligence, adaptability)
7. basic skills and knowledges ("tool" knowledges such as reading, writing, and arithmetic)
8. specialized skills and knowledges
   a. cognitive (recorded bodies of knowledge on a topic, analytical techniques)
   b. motor (athletics, dancing, typing, surgery, woodworking)
   c. interpersonal (techniques for motivating, leading, teaching, and counseling people)
9. habits and attitudes (good work habits, reliability, cooperativeness, deference to authority, conformity)
10. goals and aspirations (socioeconomic and field of work)

position maintains that schools are primarily a device to sort students by social background (5), often accomplishing this by fostering or selecting social-class related habits and attitudes (3 and 9). Although revisionists often refer to such traits as "non-cognitive," they do not consider them to be functional aptitudes or skills, so I have labelled them habits and attitudes (3, 9) to distinguish them from non-cognitive *aptitudes* (2, 8). To the extent that schools influence aspirations (10), the revisionist position maintains that it is only to blunt the potential aspirations of the lower classes and so resign them to their less favored circumstances. Intelligence is treated as a non-functional trait by the revisionists, but it is variously seen as simply a matter of cultural definition, a non-functional by-product of schooling, or a (non-functional) trait of the higher social classes that can be used as a criterion in superficially "fair" schooling processes to perpetuate the advantages of those social classes. Specialized skills and knowledges tend not be mentioned except to say that most job skills can be obtained on the job. In other words, prior training (in schools) is generally not necessary.

Most theorists from both positions would probably agree that education is important in allocation processes, that is, in determining the occupational fate or destination of individuals within society. In light of the high correlation between educational and occupational attainment (usually around .6), this would be hard to deny. Both positions also appear to give education a key role in maintaining the occupational hierarchy (which is a structural rather than an allocation issue). The argument between the two

positions is primarily about *why* education is important in maintaining the hierarchy, the revisionists claiming that schools simply legitimate non-functional inequalities and the functionalists often stressing that schools actually provide the skills and knowledge needed to perform many jobs.

B. A Modified Functional View of Schooling

I take for granted that education is important in allocation processes and concentrate on outlining which of the ten functions are most important in supplying workers to the hierarchy and maintaining its form over time. I argue that the two most important functions of schools in relation to occupational stratification are that schools sort by intelligence (function 1) and that they provide specialized job-related skills and knowledges (8). This is consistent with current functional theory except that I place greater emphasis than other functional theories appear to do on the sorting than the training function of schools in explaining the occupational hierarchy.

Schools do sort by intelligence, because school achievement is correlated from .5 to .9 with intelligence at various grade levels (Follman, 1984; Jensen, 1980, chap. 8) and because years of school completed is correlated about .6 with intelligence (Matarazzo, 1972, Chap. 12; Duncan, Featherman, and Duncan, 1972, chap. 5). I do not argue that schools do not or cannot change intelligence (6), but only that whatever effects schools or other social settings have on intelligence have not been large enough in the past to disrupt the overall stability of intelligence that has been observed in the population.

Providing specialized skills and knowledges (8) is less important than is sorting by intelligence (1) because the former largely overlaps and is dependent upon the latter. This conclusion follows from the fact that it is precisely their success at the learning of skills that sorts students by intelligence. Successively higher grades present not just different information to be learned, but they present *more difficult* information, and people who have trouble passing the earlier performance hurdles will find it increasingly difficult to pass later ones successfully in a timely manner, if at all. Not only do schools tend to screen out the less academically successful at higher grades, but the less successful also tend to screen themselves out as well, as is clearly suggested by the higher secondary school dropout and college attrition rates of less intelligent students (see reviews by Matarazzo, 1972:282-283; Super and Crites, 1962:86; Jensen, 1980:334). So while it is true that the higher level knowledges and skills provided by the formal educational system may be necessary on a job, even for the most intelligent of workers, these knowledges and skills will be acquired most successfully, on the average, by the most intelligent students. Furthermore, much of the knowledge that students gain in school does not seem to be relevant to the jobs in which they end up.

Several other functions of schools are relevant to the form of the occupational hierarchy only to the extent that they interfere with the foregoing two functions. For example, sorting by intelligence is depressed to the extent that students obtain more education because they can better afford it, net of intelligence (which amounts to explicit selection according to social class, function 5), or because they have higher aspirations net of intelligence (4, also often associated with higher social class). To the extent that reward systems in schools encourage able students to pursue higher levels of education than they might otherwise (10), schools increase their efficiency of sorting by intelligence. The fact that schools and students function in ways that decrease the efficiency of sorting by intelligence does not mean that the hierarchy is not functionally based; it means only that differentiation of occupations by intelligence on that hierarchy will be suppressed to some degree.

Identifying or fostering non-cognitive aptitudes (2, 8b, 8c) are explicit and primary objectives of relatively few schools (e.g., schools of art, dance, or music), but they are by-products of many. Extra-curricular activities provide settings in which personality and other "non-cognitive" traits (e.g., leadership or athletic ability) may be revealed or augmented. Coursework in different majors also provides a way for students to test their interests and potential success in different fields of work at similar occupational levels (e.g., nursing, social work, accounting, teaching, engineering). Although this function of schooling may have relatively little effect on years of schooling attained, it probably helps produce and sustain lateral differentiation of the division of labor (e.g., by situs or field of work).

The remaining schooling functions listed in Table 1—selecting or changing work habits and attitudes (3, 9) and providing basic skills (7)—are frequently discussed in the context of how schools can make less successful students employable. The concern here is not one of increasing the job level that these youngsters are able to attain as much as it is to increase their chances of even securing employment. What this amounts to is a concern with getting everyone at least onto the bottom end of the occupational hierarchy. Although where the low end of the occupational hierarchy terminates relative to the lower end of the distribution of human capabilities is an important issue, this issue and the potential role of schools in "extending the bottom end" of the occupational hierarchy (e.g., by decreasing the costs of hiring some types of people) will be disregarded here because of this chapter's focus on the form of the entire hierarchy.

It might be noted that some of the foregoing functions of schools are shared by other institutions. For example, families probably exert at least as strong an influence on occupational aspirations as do schools. At the

present time however, schools dominate all other institutions in the function of sorting by intelligence and in providing specialized knowledges and skills for many high level jobs. They almost certainly do not dominate in either sorting by or providing the non-cognitive (e.g., interpersonal and motor) aptitudes that are important for performance in some jobs at a variety of levels of the occupational hierarchy.

III. INTELLIGENCE AND THE FUNCTIONAL BASIS OF WORK DEMANDS

Research shows quite clearly that intelligence is a major determinant of educational attainment, which is in turn the major determinant of occupational level, and that intelligence influences occupational level attained primarily *indirectly* via its effect on educational attainment. The question of whether either intelligence or education are "functional" or necessary in the workplace is an entirely different matter, however, and the determinants of worker productivity cannot be assumed to be the same as the determinants of worker attainment. The previous section argued, in fact, that education is of functional value in the workplace primarily because it sorts prospective workers by intelligence level and only secondarily because it teaches them skills that are useful on the job. The advisability of distinguishing between the determinants of worker attainment and worker productivity is illustrated in the public arena by the suits that have been brought against some employers in recent years for their use of intelligence tests and educational credentials in hiring and by the resulting court decisions requiring employers to show that their selection procedures are in fact "job-related" (e.g., valid for predicting performance) when those procedures have adverse impact on the employment of blacks and other protected groups.

As the existence of such suits demonstrates, the question of whether worker attributes such as intelligence and education are functionally important cannot be answered by studying status attainment processes. The question can be answered only by determining what tasks jobs actually require workers to perform and the attributes of workers that contribute to good performance of those tasks, but stratification researchers have not yet collected or examined such data. On the other hand, a massive amount of relevant data has been collected in industrial psychology, but these data have not been interpreted in the context of stratification theory. The fields of job analysis and personnel selection within industrial psychology have produced especially useful data, and this section briefly describes some of the more important sets of data and the insights they provide into the structure of work from a sociological perspective.

A. Relevant Data from Industrial Psychology for Investigating the Structure of Work

Job analysis methods provide a standardized and detailed accounting of the work activities, ability requirements, and working conditions typical of different jobs with the aim of improving the effectiveness and fairness of hiring, promotion, compensation, and training practices within organizations (McCormick, 1979). The widely-used and respected Position Analysis Questionnaire (PAQ: McCormick, 1979), for example, enables a person familiar with a job to rate almost 200 elements of that job according to their importance, frequency, or extent of use. The six categories of items are information input (e.g., quantitative materials), mental processes (e.g., decision making), work output (e.g., use of precision tools), relationships with other persons (e.g., negotiation), job context (e.g., personal sacrifice), and other job characteristics (e.g., criticality of the position to the organization). Another valuable source of data, although it is of less well established reliability and validity, are the 47 ratings developed by the U.S. Employment Service (USES) to accompany its *Dictionary of Occupational Titles* (DOT: Miller, Treiman, Cain, and Roos, 1980). The rating scales include working conditions, physical demands, and the aptitudes, interests, temperaments, and training required. Together, the PAQ and DOT job analysis data provide a comprehensive view of the division of labor at the worker or occupational level. They provide ratings of a wide variety of job attributes, including some of a particular concern to stratification theorists, such as skill requirements, arduousness of training, criticality of work, and both the pleasant and unpleasant conditions of work. In addition, when the PAQ and DOT data are merged with 1970 census data on employment, they are shown to cover the jobs of 85% of the workforce.

Research in personnel selection has focused largely on documenting how valid different aptitude tests, work sample tests, and biographical inventories are for predicting actual performance in training or on the job (Dunnette, 1976). Hundreds if not thousands of such studies have been done over the years and recent advances in meta-analysis are now beginning to provide a systematic portrait of patterns of validity generalization, that is, of the degree to which the same aptitude(s) predict(s) performance in jobs differing in location and specific task requirements (e.g., Hunter and Hunter, 1984). The long-standing USES research program on the General Aptitude Test Battery (GATB) provides two other valuable sources of data. One set of USES data consists of parallel analyses of the importance of the nine aptitudes measured by the GATB for predicting performance in over 400 different occupations (U.S. Department of Labor, 1970). (These data will be referred to as the GATB "validity studies.") Together with the DOT ratings described above, these GATB

validity data in turn have been used by the USES to group about 11,000 titles in the DOT according to the types and levels of cognitive, perceptual, and motor aptitudes they require (U.S. Department of Labor, 1980).

B. Major Conclusions about the Functional Basis of Work Demands

The foregoing types of data provide a wealth of information relevant to the major debates in stratification theory. The remainder of this section provides a synopsis of an extended review (Gottfredson, 1984:21-77) of how such data support the fundamental proposition of functional theory, that is, that there is a functional basis or value to the occupational hierarchy that accords with meritocratic principles. The data support a modified functional theory, however, because they show that differences in intelligence are more critical in the workplace than has been assumed in previous functional theory. Although many of the conclusions summarized here concerning the nature and stability of intelligence and the determinants of job performance are taken directly from the published literature in industrial psychology and psychometrics, the discussion of the organization of the division of labor as a whole is derived from secondary analyses by the author of the various data sets described above. Space limitations here allow only a brief mention of some of the more illustrative findings; details and references supporting the following generalizations can be obtained from the aforementioned review.

Jobs differ in the aptitudes they require for good performance, and those demands stem from the nature of the work itself. The importance of aptitudes in the workplace seems not to be widely appreciated in sociology, but objectively measured aptitudes do in fact have a significant influence on performance in training and on the job. Furthermore, this is true whether performance is measured subjectively or objectively. Meta-analyses of hundreds of studies in the selection literature show that cognitive abilities, for example, are useful in predicting performance in all jobs. Although cognitive aptitudes are more strongly related to performance in some jobs than in others, the average (corrected) correlation between cognitive aptitudes and job performance is about .5. The specific cognitive, perceptual, or motor aptitudes that are most important and the lowest levels of them that are required for minimally acceptable job performance differ systematically by field and level of work, however. Meta-analyses of the GATB validity studies show that the higher the level of work, the higher are estimated minimum intelligence requirements and the more highly correlated worker intelligence is with job performance. In contrast, motor aptitudes (e.g., manual dexterity, motor coordination) are important in few high-level jobs (e.g., dentist), but they are the major predictors from among the nine GATB aptitudes of job performance in the lowest level jobs.

Among high-level jobs, either spatial aptitude or clerical aptitude also appears to be important for job performance, depending on the field of work. GATB spatial aptitude (the ability to visualize or manipulate objects in three-dimensional space) is important in the hard sciences, medicine, engineering, technical work, many crafts jobs, and some artistic ones (e.g., painting and sculpture), but clerical aptitude (the ability to perceive pertinent detail in verbal or tabular material) is important in jobs dealing with social and economic relations and in the more verbal arts. Furthermore, the foregoing differences in aptitude profiles are related to differences in DOT ratings of the functions workers perform on the job. For example, intelligence requirements increase with the complexity of dealings with data; spatial aptitude is important when complexity of dealings with things is high *relative to* complexity of dealings with people; and clerical aptitude is important when the reverse of the latter is true, that is, when complexity of dealings with people is high *relative to* complexity of dealings with things.

The foregoing data are based primarily on studies of the predictors of actual job performance. Analyses of job ratings data provide evidence that is consistent with the foregoing conclusions but that shows more persuasively that aptitude demands are rooted in the types of tasks performed. When PAQ and DOT ratings are factor analyzed together, PAQ ratings of demands for decision making, planning, negotiating, reasoning, using many sources of information, analyzing data, and a variety of other intellectual tasks are correlated highly with the same "Intellectual Difficulty" factor as are DOT ratings of general intelligence, verbal aptitude, numerical aptitude, and lack of job structure. To take another example, PAQ ratings of the use of patterns and pictorial materials and DOT ratings of spatial aptitude, motor (eye-hand) coordination, and complexity of dealings with things all load highly on a separate "Work With Complex Things" factor.

Most debate about the functional basis of work has focused on the vertical dimension of work, but the foregoing data indicate that the case for the functional basis of work demands is more general, and thus more convincing, because the particular patterns of aptitudes required for good job performance are systematically and rationally related not only to the vertical but also to the lateral aspects of occupational differentiation.

Intelligence is the most important human aptitude in the division of labor and differences in the general intellectual difficulty level of jobs largely coincide with the occupational prestige hierarchy. Not only is intelligence an important predictor of job performance, but differences in intelligence can also be characterized as the *most* important distinction among workers in the division of labor. Cognitive tests (i.e., tests highly correlated with intelligence) are valid predictors of performance in all kinds of work, as was noted above, but this is not true of other selection criteria such as motor

aptitude tests, personality tests, or education. Cognitive aptitudes are not the most important predictor of performance in all jobs, but secondary analyses of the USES occupational aptitude patterns data indicate that intelligence is one of the most important predictors of performance in more types of work than is the case for any other GATB aptitude, cognitive or not.

In addition, the more critical intelligence is for job performance (i.e., the more highly intelligence is correlated with performance), the higher both the minimum and mean levels of intelligence of *workers* are in those jobs. This is not surprising, of course, but this positive correlation between importance of differences in an aptitude on the job and the average aptitude level actually possessed by workers holding the job is not found for GATB aptitudes that are not highly correlated with intelligence. Moreover, average level of motor coordination among workers is *negatively* correlated with the importance of motor coordination on the job, but is positively correlated with the importance of *intelligence*. Because motor and cognitive aptitudes are weakly to moderately positively correlated in the human population, the foregoing findings suggest that workers with high levels of motor aptitude tend to be siphoned away from jobs demanding motor skills because their higher-than-average *intellectual* skills are more highly valued elsewhere. The fact that jobs requiring high intelligence have the power to draw workers with the high motor abilities that would be more critical to performance in other jobs provides another sort of evidence that differences in intelligence among workers are critical in stratification processes. Positive correlations between the importance of an aptitude and the mean level of the aptitude among workers in an occupation occur only for the highly cognitive GATB aptitudes (e.g., verbal, numerical) and the correlation is highest for general intelligence. This suggests that intelligence is the major aptitude gradient by which workers have been selected into jobs. There is considerable overlap in the intelligence of workers from one occupation to the next, but the mean differences are striking and are related to the impact of differences in intelligence on performance in those jobs. The foregoing selection gradient supports the hypothesis that the occupational hierarchy *arises* from differences in intelligence in the population because it is precisely such a gradient that can *lead* to, and which is necessary in a functional system of *sustaining*, differences across occupations in the mean intelligence levels of workers—differences we now observe but which by themselves do not constitute direct evidence for the functional importance of intelligence.

The job clusters where minimum GATB intelligence requirements are highest are also widely perceived to be the most prestigious in society. In addition, the mean intelligence level of workers in an occupation is highly correlated with the prestige of that occupation. These data suggest that intelligence requirements are highly correlated with occupational prestige, but more direct evidence for this link between functionally-based intelligence requirements and the occupational hierarchy is provided by the job analysis data. When job attribute ratings are factor analyzed, the first factor can be characterized as a general intellectual difficulty factor because a wide variety of intellectual tasks (e.g., analyzing, decision making), cognitive aptitude requirements (e.g., verbal aptitude, numerical aptitude), lengthy education and training demands, and demands for continual learning on the job (e.g., continual updating of job knowledge) are all highly correlated with the factor. In addition, this factor is highly correlated with but was *not* derived from related requirements for intelligence and General Educational Development (GED) Level. This intellectual difficulty dimension is much the same as the occupational hierarchy of concern to stratification researchers because it is highly correlated (.82) with occupational prestige. Consistent with functional theory, intellectually difficult and prestigious jobs are also more important to the organization and require more arduous training. Specifically, general intellectual difficulty is correlated .76 with degree of general responsibility and .71 with criticality of good performance for the welfare of the organization; intellectual difficulty is also highly correlated with requirements for level of formal educational curriculum, length of specific job training, amount of relevant job experience, and importance of continual updating of knowledge. Finally, average educational levels of both men and women actually employed in those occupations, which can be taken as de facto indicators of the educational levels employers have and have not required in the past, are correlated .83 and .77, respectively, with average intellectual difficulty of work.

I do not mean to imply that intelligence is the only important predictor of job performance or that either the less-cognitive aptitudes or that the lateral aspects of occupational differentiation are unimportant. Indeed, they are essential for explaining the unexpectedly low or high mean levels of education or income of workers in some jobs (e.g., see Gottfredson, 1984:36-50, 66-77). The point here is that the prestige hierarchy, which is a particularly important but not the only dimension of the division of labor, reflects an ordering of jobs according to their intellectual difficulty level as measured both by the tasks they require workers to perform and the aptitudes they require for good performance of those tasks. Another point is that the hierarchy itself probably *arises* from and is shaped by the variance in intelligence among workers in a society.

C. The Nature and Distribution of Differences in Intelligence in the Population

There is a widespread belief in sociology, as in many of the social sciences, that differences in intelligence are not functionally important except in the school setting. Both functionalists (e.g., Davis and Moore, 1945:244) and revisionists (e.g., Collins, 1979:54) have grossly underestimated the importance of intelligence in the workplace and thus in social stratification. This error may be due in part to misconceptions about the nature of intelligence. Intelligence is not a specific skill nor is it valuable only in academic pursuits; it is a general capacity that enhances performance to some extent in most if not all tasks in life. The concept of intelligence is most usefully operationalized as *g*, where *g* is the first principal factor obtained from factor analyses of a heterogeneous set of cognitive tests. It is important to understand that this first principal factor represents what is *common* to the ability to perform well on tests which often *differ* considerably in their specific content, some of these tests being clearly related to what children learn or do in school (e.g., arithmetic tests) but others not (e.g., block design tests).

The error of underestimating the importance of intelligence may also be due in part to the common failure to appreciate how large and enduring differences in intelligence are in the population. Small changes in individual intelligence often occur from one year to the next, but large changes are rare and are usually associated with unusual circumstances such as severe emotional problems. A large body of evidence exists showing that intelligence test performance is quite stable from the early elementary years through advanced old age. Also, there is no reason to believe that the *variance* in intelligence in the U.S. white population has changed since at least the first Stanford-Binet intelligence test in 1916. The claim here is not that intelligence *cannot* be changed, but only that under present conditions differences are fairly fixed by the time important educational and employment decisions are made and that the variance in intelligence facing employers in our society probably is stable for periods of at least decades. Moreover, the variance in intelligence is large in practical terms. This fact can be illustrated by the minimum intelligence requirements for different jobs that have been established in the GATB validity studies. For example, the following proportions of the population meet or exceed the *minimum* level of intelligence required in the following occupations: general practitioner—11%, general duty nurse—50%, radiologic technologist—60%, licensed practical nurse—77%, and nurse aid—84%.

Finally, underestimation of the importance of intelligence may stem in part from the failure to appreciate the following facts about job performance. First, performance is not an all-or-nothing thing; it varies from very poor to very good with better workers often outproducing poorer workers by a factor of at least two or three. Second, the relation of intelligence to job performance is linear, meaning that each additional increment in intelligence contributes to better job performance. And third, differences in job performance have enormous economic consequences for the employer and for society as a whole. For example, computer programmers at the 85th percentile in performance level have been shown to be worth $10,871 a year more to their employers than programmers at the 50th percentile and $20,826 a year more than those at the 15th percentile.

The relevance of large and enduring differences in intelligence and their relation to job performance is that the division of labor has to absorb and be structured to make use of a workforce whose members differ enormously in their capacity to perform different work tasks. As is argued in the next section of this chapter, the distribution of intelligence constitutes a major constraint on the form the division of labor will take.

IV. THE ROLE OF INTELLIGENCE IN THE DEVELOPMENT OF NATURALLY-OCCURRING OCCUPATIONAL HIERARCHIES

This section outlines how work tasks probably are reorganized over time by general intellectual difficulty level and how such reorganization leads to differences in aptitude requirements and the emergence of an intelligence-based occupational hierarchy. Revisionists speak of the occupational hierarchy and its associated allocation processes as if they were the conscious creations of the dominant social classes. Another objective of the following pages is thus to show how "naturally-occurring" processes can account for the order that we presently observe.

Occupational Difficulty Levels

Jobs can be conceived of as fairly stable configurations of *tasks*. In turn, jobs can be grouped according to their similarities into categories which we refer to as *occupations*. That there is a considerable variety of jobs within any occupation is evident from glancing at the U.S. Census Bureau's *Classified Index of Industries and Occupations* (1971). There may also be considerable variety in tasks among jobs with the same title. Nevertheless, we generally feel certain enough about the overall similarities and differences in the configuration of tasks constituting jobs that we are able to classify jobs fairly reliably into widely-understood occupational groups.

The segregation of tasks into fairly homogeneous sets occurs for diverse reasons, including technological constraints and the efficiencies to be

gained through specialization. Occupations of quite diverse content areas exist at similar prestige levels, but what is of concern in stratification research is in essence why tasks become segregated according to general intellectual difficulty level. No job is likely to consist entirely of easy or difficult tasks, but mean task difficulty levels apparently differ across occupations.

There is some precedent for characterizing a job's overall difficulty according to the average difficulty level of tasks performed in that job within a given period of time (Christal, 1974). That research also supports the claim that rated job difficulty level reflects intellectual difficulty level. When reviewing the Air Force's large occupational research program, Christal (1974:14) described how, after considering many alternative definitions of difficulty level, they settled on "the amount of time it takes individuals to learn to perform a task adequately," and ratings generated according to this criterion were highly correlated with independent ratings of estimated aptitude requirement levels. The difficulty level of jobs appeared to be most clearly dependent on the average difficulty level of the tasks comprising that job, but the number of different tasks (i.e., probably the variety of tasks) also increased rated difficulty level.

Changes over Time in Difficulty Levels of Individual Jobs

One key to understanding changes in occupational demands over time is that individual jobs are generally molded to some extent to conform to the traits of incumbents. As noted above, the tasks comprising a job are somewhat heterogeneous in difficulty level. Likewise, the jobs that are recognized as belonging to the same occupational group are also somewhat heterogeneous in average task difficulty level. Some of this heterogeneity is a response to the range of capabilities of the workers with which occupations are manned, because workers and their supervisors will tend to target the job to the capabilities of the individual—capable people drawing the more difficult assignments and less capable people tending to end up, by choice or not, with somewhat easier tasks on the average. In short, jobs are somewhat flexible and allow the "matching" of people to jobs to continue to some extent after people are hired for jobs.

It may help to illustrate how this adaptation of job to person can occur in several ways. First, number and difficulty level of tasks within a job probably increase in the early stages of employment as the worker becomes oriented to the job. Christal's (1974) data on the regular increase in job difficulty levels between the 5th and 36th months of service in the Air Force is consistent with this hypothesis. Presumably, as workers learn to master some tasks they are given others to perform. We might further assume that in most employment settings workers are often assigned new tasks as they are judged capable of performing them, which will generally be sooner for

more intelligent workers if the tasks are intellectually demanding. We might further assume that more intellectually demanding tasks are more likely to be *permanently* assigned to the more capable workers because they are more likely to perform them successfully, all else equal.

The average difficulty level of a particular worker's job can also change later in employment if employers delegate tasks to those employees. Higher level workers often delegate tasks to lower-level workers that are actually the responsibility of the higher-level worker. "Delegating a task" is generally understood to be the temporary or ad hoc assignment of a task of one job to another. The tasks delegated tend to be of lower than average difficulty for the job from which they are delegated but are of higher than average difficulty for the job to which they are temporarily sent. If the worker who receives the task assignment performs it well, that worker is likely to receive more such tasks. Furthermore, if the worker is highly capable, tasks of above average difficulty may be permanently delegated to that worker; in effect, the presence of an above average worker in a job can change the average difficulty level of the tasks permanently assigned to that job.

The segregation of tasks by difficulty level into different jobs can also be observed on an on-going basis in our society in the case of craftsmen and other entrepreneurs who build businesses from the ground up. If the concern becomes a growing one, the entrepreneur successively delegates and then permanently assigns the simpler tasks (e.g., production, maintenance, clerical, sales, low-level supervision) to other personnel in order to concentrate on the more difficult and critical ones for the survival of the business (e.g., planning, obtaining financing, hiring). It is apparent, of course, that this process also depends to some extent on the capacities of the entrepreneur, because the concern will not grow much unless the entrepreneur is successful at performing the most difficult tasks.

Changes in Difficulty Level of Occupations (i.e., of Collections of Jobs)

Occupations are collections of jobs and their change over time is contingent upon the types of changes that occur among their constituent jobs. The most likely source of change is when a sustained change in the flow of workers into an occupation raises or lowers the average intellectual ability level of workers in that occupation. For example, if the case of the hypothetical employer who permanently delegated more difficult tasks to the highly capable (i.e., above average) lower-level worker were repeated frequently throughout the system, a new job title might be spawned to characterize this new stable configuration of tasks, or the occupation as a whole would be perceived as having been upgraded. So, too, might the jobs *from* which the tasks were delegated be elevated in difficulty level because

those lost tasks were probably among those jobs' less difficult tasks. We might also expect that the more homogeneous (that is, the less variable) the aptitude levels of workers regularly flowing into an occupation, the more homogeneous the task configurations become in difficulty level for different jobs in that occupation—a process which would decrease that occupation's overlap with at least some other occupations.

Employer responses to difficulties in filling their job openings demonstrate that employers do indeed restructure jobs if they cannot find workers with the skills they seek. A study of the employment practices of 309 establishments (Gordon and Thal-Larsen, 1969:244-247) suggests that employers probably first step up their recruiting efforts when faced by shortages of specific types of workers, particularly for high-level jobs, but that employers also resort to reorganizing the work itself to make it simpler. Relaxation of selection standards and "dilution of job content" were reported more often by employers for lower level jobs than for higher level ones (e.g., 32% for semiskilled jobs vs. 14% for professional and managerial), and such changes were reported much more often than changes in wages or fringe benefits for the low-level jobs.

System-Wide Changes in Relative Difficulty Levels

If such changes affect only a small proportion of workers, then they may constitute only "local" changes in occupational requirements along the occupational hierarchy. The problem is that in a system where worker intelligence levels differ widely but are fairly stable, the allocation of talent is somewhat of a zero-sum game and increases in talent in one segment of the hierarchy decrease the availability of talent elsewhere along the hierarchy. To the extent that intellectual talent is reliably siphoned off to the top of the occupational hierarchy, high-level occupations may be upgraded or increasingly difficult occupations may be created at the top of the hierarchy, but lower-level jobs lose some of their more capable people. As occupations lose their regular supply of higher than average performers, average performance levels may fall and tasks become reorganized on an easier level.

An illustration of this process is provided by the Armed Forces when the draft was abolished and greater proportions of their enlistees were drawn from the lower levels of intelligence. Christal (1974) outlined three types of contingency plans drawn up by the Air Force to deal with the possibility that incoming enlistees would not as a group allow the Air Force to fulfill its mission satisfactorily. Two of the three contingency plans involved changing the organization of work itself rather than only how enlistees are trained or assigned to jobs. (See also Sticht, 1975, for research stimulated by an analogous concern in the Army.) One contingency plan involved "shredding" the easier jobs from existing job ladders to create new specialty

areas consistent with the capabilities of the less intelligent men. Another alternative was to remove the easiest tasks from existing jobs and reorganize them into new and easy jobs. Because of their centralized authority, the Armed Forces represent a much more rationalized and systematic approach to job design than exists in the economy as a whole, but they do illustrate processes that have probably occurred in a less systematic way throughout this society over a long period of time.

Enhancers and Suppressors of Vertical Differentiation

There has been some debate in the literature about whether occupational skill demands have risen or fallen over time (e.g., Rumberger, 1981). The foregoing argument suggests that the overall *average* of skill demands may have remained fairly stable, but that there has been a growing *dispersion* or differentiation in skill levels across occupations. It is this dispersion that constitutes the occupational hierarchy.

From this point of view, various social phenomena can be examined for their effects on the form of the occupational hierarchy: they can enhance differentiation, they can suppress it, or they can elevate or lower the entire hierarchy. If we could somehow raise everyone's IQ by, say, 10 points we might expect the entire occupational hierarchy to slowly shift upwards, but for its degree of differentiation to remain much the same unless there is a ceiling of some sort on occupational difficulty levels. Most social forces that have affected the form of the occupational hierarchy, at least those forces in recent history, have probably done so by enhancing or suppressing differentiation rather than by affecting elevation. Social practices that sort people more efficiently to jobs according to intelligence would enhance differentiation. This has probably been one result of the growth of the public educational system. To take another example, as labor force participation rates rise for women and as women become more serious competitors for the high-level jobs which many women were capable of previously but did not pursue, we might expect greater differentiation among jobs to result. Not only might we expect an upgrading of some of the highest level jobs, but also we might expect a downgrading of lower-level jobs that women have frequently held in the past. These trends may account in part for the increasing problems companies appear to be having in finding adequate clerical workers (e.g., Price, 1984).

Other social forces can be seen as differentiation suppressors. Productivity and equality in an economy have been conceived of as somewhat inconsistent social goals (Okun, 1975), and social policies designed to produce greater equality of occupational rewards (e.g., through progressive taxation) can be expected to suppress differentiation in task and ability requirements because they probably depress the supply of talented workers available for the more difficult jobs. Differentiation can also be suppressed

by policies that increase reliance in hiring and promotion on personal characteristics that are less correlated with intelligence than are the criteria they replace. Whether these policies are instituted to promote greater social justice (e.g., group parity) or whether they reflect unfair biases against certain social groups (e.g., unfair discrimination on the basis of ethnic group, race, sex, or religion), they can have the same effect of suppressing differentiation by decreasing the efficiency by which people are attracted or sorted to jobs by intelligence. Finally, the multidimensional nature of the demands of work itself can be expected to suppress hierarchical differentiation to some extent. If a non-cognitive aptitude is particularly critical in an occupation, employee selection will occur to some extent on the basis of a worker trait that may be independent of intelligence. Even if the job also requires high levels of intelligence, the probability of finding workers high on two *independent* traits is much lower than finding a worker high on either one alone. This could be expected to result in less than optimal selection for each of the individual traits.

The progress of differentiation need not be steady because the competing social goals of productivity and equality can oscillate in importance. Recent social history is probably testimony to this phenomenon. Nor are equilibria likely to be maintained in systems where technology is constantly evolving because technology is essentially a means for increasing output for the same input of worker mental or physical capacities.

Existence of Multiple Similar Intelligence-Based Hierarchies

It is sometimes suggested that definitions of intelligence are determined by definitions of success in the world of work (e.g., Duncan et al., 1972:78-79). To the extent that occupational hierarchies differ from one society to another, definitions of intelligence would also differ. For example, Duncan et al. suggest that in hunting cultures concepts of general intelligence might "involve visual acuity and running speed rather than vocabulary and symbol manipulation." While this may have indeed been the case in some nontechnological societies (but see Jensen, 1980:248, who cited a study of Kalahari Bushmen of Africa that found that their concept of "practical intelligence" does not differ from ours), it is more relevant to note that few hunting or gathering societies survive in the world. Furthermore, research on occupational prestige, in conjunction with the data presented above, suggests that most recent occupational hierarchies throughout the world may be based on the same human substrate—individual differences in intelligence within a society.

There is much evidence that occupations are ranked in essentially the same order by people from diverse social groups and from very different economic and political systems and that U.S. rankings have varied little since they were first obtained in the 1920s (e.g., see Treiman, 1977, for a review and an *international* prestige scale). Although Treiman speculates that the prestige hierarchy is based on some unspecified type of "power," it seems likely that occupational power ultimately derives from the advantages of superior intelligence. As noted earlier, the U.S. population is characterized by a wide *dispersion* in intelligence levels that has probably remained fairly stable throughout this century; furthermore, the intelligence levels of most *individuals* are largely stable over the greater part of their lifetimes. There is every reason to believe that these two features of the intelligence distribution in the U.S. are mirrored in almost all societies in today's world, and certainly in the industrialized ones where severe malnutrition among children is rare. Among potential bases of the distribution of power, degree of intelligence dispersion is undoubtedly one of the more stable over time and one of the more comparable across different societies (e.g., compared to economic and political bases of power); it can therefore be expected to best account for the maintenance, if not the emergence, of quite similar occupational hierarchies throughout the world.

In a study of agents in a federal regulatory agency, Blau (1955:105-116) found that an agent's standing among the other agents in the group depended on his competence, where competence in turn meant both not having to ask other agents for advice and information as well as being able to give it if asked. Blau's study illustrates how in day-to-day dealings with other people, superior skills and knowledge create at least respect, if not power itself, for the person possessing that superior knowledge. It may be largely these day-to-day encounters in which co-workers, customers, supervisors, and acquaintances in different occupations reveal their competencies and incompetencies to each other that create and sustain differences in occupational prestige over the long run. High income levels may affect occupational prestige, but perhaps primarily indirectly by their power to draw more competent workers into an occupation.

V. EDUCATION AS A SIGNAL OF WORKER QUALITY

The role of education in occupational stratification can now be better understood. It is one of the most important, if not the most important, means by which people are sorted by intelligence; it therefore may be the one social institution today with the greatest effect on occupational differentiation. That education may have been instrumental in enhancing and maintaining occupational differentiation in the past does not imply that it will continue to have this function in the future. Education is to a large extent only a signal of worker quality. Its signalling value can change over time, and worker quality can be signalled in other ways.

Research has clearly shown that differences in education are more important than differences in intelligence in determining the occupational status and income of individuals (Duncan et al., 1972; among many others). The correlations with adult occupational prestige, for example, are generally in the order of .6 for education versus .4 for intelligence. Does this not flatly contradict the argument that the occupational hierarchy is rooted in differences in intelligence and *not* in education? The following pages argue that this apparent contradiction results from the inherent uncertainties in hiring and promotion processes and from attempts by employers and workers alike to develop dependable signals of worker quality.

A. The Problem of Identifying Good Workers

Employers want workers who at least meet some minimum standard of job performance, because the employer's own fate (e.g., income and reputation) depends upon the ability of workers to provide products or services within a reasonable period of time, without wasting resources, and without making costly mistakes. Whatever their other biases or preferences for different types of workers, fair or otherwise, employers are pragmatists in that they try to select and retain workers with the capacity to satisfactorily perform the work they need done. Productivity is not the only concern of employers, but it is an important one, even if it surfaces only when productivity slips below some acceptable level or when competitors obtain a higher level.

Employers cannot know, however, how well any particular job applicant will perform a job before the applicant actually enters it, but good predictions of performance are important because poor hiring decisions are costly, sometimes extremely so. If nothing else, investments in hiring and training are lost when workers have to be replaced. Less able workers require more training time and supervision. And not only may a worker's own typically low productivity level constitute a net loss for the employer, but gross errors by a worker can wreak havoc in an organization by reducing the productivity of other workers and injuring the reputation of the organization.

Although employers generally would like to be able to predict who will perform well and who will not, employers often have only limited information for doing so. One major problem is that the employer may not actually know just what kind of person (e.g., what kinds of aptitudes) are most appropriate for the job. This problem is illustrated by the very existence of the large field of personnel selection research whose primary purpose is to help develop precisely such information. Another major problem facing employers is that even if they have a clear idea of the traits they are looking for or trying to avoid, they may have no good way of

determining which applicants possess those traits. For example, they may wish to screen out individuals whose intellegence is too low for the jobs in question, but validating a selection test is often impossible (because of the small number of jobs in that category within the organization) or prohibitively expensive, especially given today's legal standards. And even if an employer knows of an existing test that would be appropriate and legally defensible, routine administration of such tests to all job applicants may not be feasible because of either time or financial constraints. In short, the employer faces a trade-off between the costs of making mistakes in hiring and the costs of determining who is likely to be the most successful hire. Therefore, employers cannot be expected to always select employees by the most valid means even if they want to and even if they know what those means are (which they often do not).

In small communities employers may already be familiar with or have ready access to extensive information about the entire pool of eligibles and so may have a good idea which applicants would be the better workers (Gouldner, 1954: 40-41, 64). Indeed, such employers may simply solicit the desired worker. Promotion from within a company may be so common (Gordon and Thal-Larsen, 1969: 321) partly because of a similar familiarity with eligibles. Most employers today, however, face the need to hire employees about whom they have little or no prior knowledge. This is certainly the case for entry-level jobs. What employers seek, then, are inexpensive but valid *signals* of worker quality (Spence, 1974). This need for dependable signals becomes especially apparent when existing personnel selection practices are disrupted or become overburdened. For example, employer interest in personnel selection research was stimulated early in this century by high accident rates in some industries and phenomenal turnover rates by today's standards in many others (Hale, 1983). Both world wars led to the development of large personnel research programs not only within the military because it suddenly had to train and place millions of men but also within some large firms (e.g., Sears) because they suddenly had to replace much of their workforce (Hale, 1983).

B. Why Schooling is Frequently Used as a Signal of Worker Quality

Employers use a wide variety of signals, ranging all the way from sophisticated and validated assessment devices to vague impressions of how well they would get along with different applicants. At the same time, some reliance on educational credentials runs through most approaches to hiring. For example, Noland and Bakke (1949: 180-181) found in a study of 240 businesses that education was considered of "outstanding importance" by 62% to 88% of firms hiring administrative and executive assistants (i.e., middle management workers) and by 84% to 91% of those

hiring routine clerical workers. Education was less important in hiring for service, maintenance, and lower level jobs. Those occupations in which education was considered most important as a hiring criterion had the highest level educational requirements (pp. 194-195).

The widespread use of education in hiring is easy to understand. Information about educational credentials is inexpensive, public, and verifiable. Compared to other sorts of information about applicants (e.g., job experience or references), the meaning of different educational credentials is fairly standard throughout this country and variations at the local level (e.g., in high school "quality") are probably recognized by many local employers who draw frequently from those sources. Also, the use of educational credentials is generally accepted as a fair and rational practice by both employers and workers. Finally, education does in fact "work" because better educated workers on the average are more intelligent and so perform better.

C. The Various Signalling Functions of Schooling

The major function of education in the hiring process is probably that it provides employers an inexpensive and efficient way of creating acceptable applicant pools. By advertising for workers with a given minimum level of education (e.g., a high school diploma), they are in effect drawing applicants predominantly from a restricted range of the IQ distribution. To support this hypothesis, it can be observed that IQs are increasingly higher among students who complete more years of education. In a summary of diverse types of evidence, Matarazzo (1972: 178) estimated that the median IQ of all persons completing high school was about 105 at that time, median IQ was 115 for four–year college graduates, and it was 125 for persons receiving Ph. D. and M.D. degrees.

It should be noted that the most highly educated people within an applicant pool (often designated as over-qualified) may not be the most preferred by the employer. Although it may be costly to hire a poor worker, it can also be costly to hire someone who is especially interested in a better job and liable to quit soon or be recruited away. In short, many employers may prefer applicant pools where educational credentials are neither too low nor too high unless they are interested in hiring "promotable" workers. For example, Noland and Bakke (1949:194-195) found that although employers preferred workers with somewhat higher educational levels than they actually required, they often did not want the most highly educated.

Many employers have little concern with educational credentials. In the Noland and Bakke study (1949: 180-181) only 43% to 55% of the employers considered education of outstanding importance. However, this is not inconsistent with the claim that education is widely used to sort job

applicants by intelligence, because it is primarily the employers for lower-level, less intellectually-demanding jobs that do not consider education to be important. This does not mean that differences in intelligence are unimportant in such jobs, but only that lower level educational credentials (e.g., a high school diploma today) have little discriminatory power at this end of the IQ distribution because almost everyone possesses them.

After having assembled an applicant pool that is fairly homogeneous in terms of educational level compared to the general population, employers will rely on additional types of information for making their final selections. A lot of additional information is likely to be sought for the highest-level jobs because hiring mistakes are most costly for such jobs for a variety of reasons. Educational credentials may continue to function in various signalling capacities at this stage of the hiring process, depending upon the nature of the job in question. The employer may seek information about student performance or the quality of the school program in which the applicant was enrolled because both types of information may enable the employer to distinguish applicants more finely by general ability level. Employers seem not to be particularly interested in such information, however, perhaps because reliable information about grades is difficult or impossible to obtain. Furthermore, grading practices vary so widely across schools that grades may be of little value in improving selection by intelligence compared to the cost of gathering and verifying such information. Letters of recommendation may be sought from school personnel, particularly for high-level, entry-level jobs (e.g., college teaching), but these share many of the same ambiguities as do grades.

For some jobs, especially professional ones, particular types of degrees (e.g., MD, LLD) are extremely important to employers because of the types of specialized training and knowledge they signify. As argued earlier, however, it is doubtful that the specialized skills required for most jobs are acquired in the formal education system of high schools and colleges, so employer insistence on high levels of education is in effect often primarily an insistence on high intelligence. In terms of the functions of schooling that were listed in Table 1 earlier, then, the most pervasive effect that education has as a signal is its sorting of people by intelligence as operationalized by years of education (rather than by grades or other measures of academic performance); provision of occupationally useful skills and knowledge beyond the basic skills level is only a secondary function.

Other signals provided by schooling are still important to some employers, but these signals are related more to lateral than to hierarchical differentiation among occupations. As noted earlier, schools provide settings in which people can manifest various non-cognitive interests, values, and aptitudes that are relevant to performance in certain types of work. To illustrate, employers prefer to recruit managers from college

graduates who have majored in engineering or business rather than in the natural sciences or humanities, not only for the skills they may have learned, but also because the former are more likely to have "a commitment to the business community" (Gordon and Thal-Larsen, 1969: 277). To take another example, employers for managerial jobs may also look for leadership shown in various extra-curricular activities (Endicott, 1944). Turning to a somewhat different signalling function overall gradepoint average may be of little interest to employers, but some employers may be particularly interested in *patterns* of grades across different subjects (e.g., physical science and math versus humanities or social science) because these patterns reflect *profiles* of abilities and interests relevant to some jobs.

In summary, a person's educational history can serve many signalling functions, only some of which may be of interest to any one employer depending on the type of job being filled, but most employers will pay some attention to years of schooling as a rough indicator of overall worker quality.

D. Important Attributes of Signals such as Education and How They Affect Stratification Processes

While it may seem obvious that education is used as a signal of worker quality, what may not be so well appreciated are the implications of the attributes of this signal. I shall describe a few such attributes and show how they help to explain some phenomena that often have been mistakenly assumed to be inconsistent with a functional view of occupational stratification.

1. Effect, not Explanation of it, is What Matters

The fact that employers frequently use education as a signal does not mean that they know why it works or what it is about educated people that makes them more valuable. Some employers may not be able to explain why they use it; others are surely quite mistaken in their beliefs about education and educated workers (e.g., see Berg, 1970). All that is required for employers to continue to use education as a signal is that their expectations that better-educated workers are more valuable workers be borne out (Spence, 1974). These expectations need not be fulfilled in all cases, but only on the average. Furthermore, the effect need only be a gross one. For example, many employers are probably less interested in or aware of differences in the performance levels of individual workers than they are in differences in the aggregate output of groups of workers (e.g., whole workforces) that have higher or lower levels of education.

2. Individual Workers are Selected According to the Signal, not According to the Underlying Trait Being Imperfectly Signalled.

Years of education is a useful signal of worker quality because of its high correlation with intelligence; it "works" on the average. Nevertheless, there is considerable error in the signal. If employers rely heavily on education in selecting employees, a substantial fraction of workers will end up in jobs that are either too easy or too hard for them. The point here is not to criticize employers for using a fallible signal, because years of education may contain less error than other signals they realistically can be expected to use. The point is to show how, in a society whose occupational hierarchy is rooted in differences in intelligence, the fate of individual workers can depend more on their level of education than on their level of intelligence. This formulation explains how correlations with occupational status can be only .4 for intelligence versus .6 for education in a system where the hierarchy is ultimately created and maintained by intelligence rather than educational differences. We would expect intelligence to become more important than education in allocation processes only if employers replaced education with a less fallible indicator of intelligence, say mental tests.

As I have already argued, the specific knowledges and skills provided by schools are essential for *some* jobs—particularly for high-level professional jobs. But this does not mean that the occupational hierarchy is any less intelligence-based or that a higher education can compensate for low intelligence; it means that poorly educated or poorly motivated individuals of high intelligence are not likely to be found in high-level jobs. Research has long shown that there are many highly intelligent individuals in low-level jobs but few individuals of low intelligence in high-level ones (Matarazzo, 1972, chap. 7).

3. Worker Performance Depends not on the Signals Workers Send but on the Traits They Actually Possess

If education were important primarily because it *provided* the traits that enhance job performance, years of education would not be as fallible an indicator of worker quality as it now is and there might be no significant distinction between the signal and the trait being signalled. This identity of signal and underlying trait appears to be the assumption behind expectations that differences in education should be related to significant differences in performance *within* specific occupations (e.g., Berg, 1970). This is an unrealistic expectation for several reasons. One is that if employers use education to select employees into an occupation, then there may not be much variation in the educational levels of workers within that occupation. Greater variance in intelligence might be expected, however,

because workers were not directly selected for intelligence. (It might be noted that this variation in intelligence within occupations has been misconstrued as evidence that intelligence is not really very important.) As was described earlier in this chapter, a considerable amount of research shows that intelligence is related to performance within all occupations, and especially so in higher levels ones. If indeed years of schooling is used to screen applicants for jobs, performance *within* occupations would be expected to be better predicted by differences in intelligence than by differences in educational level. Consistent with this hypothesis, Hunter and Hunter (1984, Table 9), in their meta-analysis of job performance studies, found that correlations with performance averaged only .10 for educational level versus .53 for an ability composite for entry-level jobs. Results were similar for other samples of jobs as well.

4. As Workers Accumulate Work Experience, Performance in That Work May, but often Does Not, Compete with Education as a Signal of That Worker's Quality

To the extent that *performance* in jobs is observable and attended to, there will be a certain amount of "corrective" mobility (Berg, 1970) after people get on the job. As noted earlier, because intelligence is far from perfectly correlated with education, many people will end up in jobs that are either too easy or too hard for them if employers rely on education in making their hiring decisions. Highly capable individuals may be more motivated and able to move into higher-level jobs regardless of their education, and poor performers are more likely to quit or be fired than are other workers. One study reviewed by Super and Crites (1962: 90) found that the first workers to be let go from a variety of occupations in the Great Depression were less intelligent that those who were released later. These authors (p. 97) also reviewed an early study of clerical workers showing that over a two and a half year period the more intelligent tended to leave the low grade jobs, often for advancement in the company, and the least able tended to leave the higher grade jobs. Employers also report that demonstrated ability is by far the most important criterion for promotion in non-unionized jobs and it is at least comparable in importance to seniority in unionized ones (Gordon and Thal-Larsen, 1969: 325-331). Corrective mobility can occur not only because employers respond to variations in performance, but also because workers themselves feel more comfortable in jobs that are suited to their capacities. Consistent with this, several studies reviewed by Super and Crites (1962: 99-100) indicated that job satisfaction is related to having a job that is *neither* too hard nor too easy.

Over the lifetime of individuals, then, we should expect to see some fraction of the less intelligent drifting down in the occupational structure (or not rising as would be typical for their line of work) and some fraction of the more intelligent rising up—regardless of their educational levels. If enough of this corrective mobility were to occur, we might expect to find mean differences in intelligence between more and less educated members of the occupation to be smaller among the more experienced workers than among the less experienced because of this selective in- and out-migration. This phenomenon would also decrease the likelihood of finding a correlation between education and performance in a representative sample of members within an occupation.

But if intelligence really does affect performance independently of education, why does there seem to be relatively little corrective mobility? The personal preferences and life circumstances of individuals are no doubt important in this regard. And as already implied, structural "rigidities" such as promotion by seniority (which helps to reduce costly turnover) often prevent or restrict promotion according to demonstrated ability (Gordon and Thal-larsen, 1969: 325-331). However, corrective mobility based on job performance will be severely limited if for no other reason than that the performance of individual workers is often difficult or impossible to measure or observe, at least under current conditions. Sometimes only group or team performance is readily observable, as on an assembly line, but to some extent accurate performance appraisal is difficult in all jobs. Despite their decades of research on the topic, it still constitutes the "most vexing" problem facing industrial-organizational psychologists (Landy and Farr, 1983: 3). And as the current debate over merit pay for teachers illustrates, there is often considerable disagreement about even the *possibility* of ever fairly evaluating some types of workers. The very success of education as a rough signal of worker quality, together with the frequent difficulty of judging the quality even of experienced workers (especially job applicants from outside the firm), may encourage employers to insist rigidly on certain credentials even when it would be in their own best interests to ignore them in some cases.

5. Workers Are very Concerned about Sending Favorable Signals to Potential Employers

Signals are by definition modifiable characteristics (as opposed to unmodifiable "indices" such as race or sex, Spence, 1974) and many workers are motivated to place themselves in a favorable position in the competition for good jobs by seeking a higher education. As long as the educational opportunities are available, and in this society they are relatively plentiful, people are likely to avail themselves of them in ever greater proportions. The result is the rising levels of educational attainment we find for successive cohorts in the population—education inflation as it is sometimes called. This rise in educational levels represents an upward shift within the educational system of the entire intelligence distribution because the most

intelligent will still get the most education. Furthermore, this secular rise in educational levels would be observed whether education improved the quality of the average worker or not. Employers face increasingly less select applicant pools as a greater proportion of the population passes through successive levels of the educational system, and they are forced to raise their educational requirements just to maintain the same average intelligence level of their applicant pools.

A 1930 follow-up of students tested in 1917 (Proctor, 1935) illustrates the necessity of raising educational requirements when there is education inflation. Proctor found that people who had gone no further than the ninth grade had an average IQ in 1917 of 105; those who graduated from high school had a mean IQ of 111; and those who went to college averaged 116. The average IQ of 105 in 1917 for people who later went no further than the ninth grade is equal to the average IQ for high school graduates, *including* those who went on to college, in the 1960s (Matarazzo, 1972: 178). Changes over time in the ratio of high school graduates to the number of persons aged 17 (a lower-bound estimate of high school graduation rates) explain this decrease in the quality of the average high school graduate over time: .17, .29, .51, .59, .65, and .76, respectively, for the years 1920, 1930, 1940, 1950, 1960, and 1970 (Grant and Lind, 1979: 63). Moreover, many of the skills a high school education is supposed to reflect today (Panel on Secondary School Education for the Changing Workplace, 1984) are precisely those that four decades earlier Noland and Bakke (1949: 34) found employers assuming to be the function of only an eighth grade education.

Critics of the functional position (e.g., Collins, 1979) often point to the fact that rising educational levels cannot be accounted for by changes over time in the actual skill demands of jobs (e.g., through technological change), but it is not necessary to postulate such changes in skill demands to explain rising educational requirements from a functionalist perspective. Neither should it come as a surprise that employers complain that fewer and fewer high school graduates possess the skills employers require (e.g., Price, 1984) or that students feel increasingly compelled to pursue a higher education in order to distinguish themselves from the progressively less select pool of high school graduates.

6. Signals Are Used as Long as They Serve a Purpose, and They Wax and Wane in Use According to Their Value Relative to Other Criteria for Selecting Workers

It is not necessarily the case that ever increasing levels of education have value for society as a whole even though they may benefit particular individuals. Concerns about over-education in our society are justified and

may portend a stabilization or reversal of education inflation. It can be expected that at some point the increasing costs of ever higher educational levels relative to their value will encourage the search for alternative means for selecting and training workers. Tucker (1983) notes, for example, that some high technology firms are now providing their own training at far lower costs to both themselves and their employees.

Secular increases in educational levels increase the *costs* of education as a signal of worker quality, but one can also envisage changes in the *benefits* of education as a signal. In particular, if education were to function more efficiently (or less efficiently) as a device for sorting students by intelligence, we might expect employers eventually to observe changes in the quality of applicants with different credentials and so increase (or decrease) their reliance on those credentials in future hiring decisions. This in turn would lead to education becoming more (or less) useful in predicting differences in status attainment (cf. Herrnstein, 1973: 213).

7. Fallible Signals of Intelligence Can Create and Maintain an Occupational Hierarchy Based Primarily on Intelligence

Only a moderately strong or valid signal of intelligence is required to support an occupational hierarchy based primarily on differences in intelligence requirements. To maintain the relative positions of occupations in the hierarchy, processes for the selection and promotion of workers only need to reproduce the existing *average* intelligence differences among occupations. There can be considerable variation in intelligence and performance levels within an occupation, but as long as the typical level of performance is maintained by members of an occupation, the organization of tasks and rewards will be stable, all else equal (e.g., technology). Assume for the sake of illustration that the typical or equilibrium level of performance by the incumbents of an occupation, in the aggregate, is represented by 80% of the members correctly performing 70% of all the specific tasks they carry out during some specific period of time—a rate that may seem dismally low at first but which is probably realistic (e.g., see Sticht, 1975, chap. 3, for a use of this rate in determining the reading requirements of jobs). This assumption suggests that wide variation in performance probably is tolerated before the occupation as a whole is devalued or restructured. In addition, the more able members of an occupation can both bolster the performance of the less able members and protect them from downward corrective mobility. For example, Blau's (1955: 105-116) study of regulatory agents showed that consultation with more competent co-workers in the same job not only helped less able agents to carry out their work but also enabled them to avoid revealing their lower competence to supervisors.

8. Increases in the Intelligence-Sorting Validity of Hiring and Promotion Signals Lead in Time to a Steeper Occupational Hierarchy Because They Lead to Greater Differentiation of Intelligence Requirements Among Occupations, All Else Equal

It is important to make clear again that greater differentiation of occupations along the intelligence hierarchy means that the intelligence ***requirements***, not just the mean intelligence levels of incumbents, become increasingly different over time. Changes in intelligence requirements reflect changes in the overall intellectual difficulty level of *tasks* assigned to a job. An earlier section of this chapter illustrated how job difficulty levels can change in response to the aptitude levels of workers assigned to those jobs. If a signal such as schooling level were to sort workers more efficiently over time according to intelligence, high-level jobs would receive workers of reliably higher intelligence and low-level jobs would receive workers of reliably lower intelligence (even if employers did not increase their reliance on educational credentials although they might be expected to do so). Job difficulty levels could then be expected to edge up in the higher-level jobs; they would simultaneously edge down in low-level jobs as the newer less able workers were unable to sustain previous performance standards.

Comparing early simple societies with modern large industrial nations, it is obvious that the occupational hierarchy has become increasingly differentiated over time, if only because many new occupations are found on that hierarchy. There are undoubtedly many reasons for this evolution, changes in technology being an important one. It is also likely that workers are being sorted more validly by intelligence now than they were in centuries past, partly because of the growth of large public school systems with many different levels. As public school systems cover larger and larger proportions of the population and as they make more use of standardized tests that are highly correlated with intelligence, schools increase the likelihood that highly intelligent people from all segments of society will be identified and build the critical mass of eligibles that allows the development of new types of intellectually demanding jobs. In fact, schooling may constitute the only fairly standardized and rationalized system that has ever existed for identifying intellectual talent throughout all sectors of society. It is not the only possible system, and it might be superseded in its current worker-sorting role by the widespread adoption of even more valid sorting processes for hiring and promotion. If employers were to use more valid means of selecting and promoting workers, allocation processes would become more meritocratic and improve productivity, but this would *increase* rather than decrease socioeconomic inequalities because it would allow and perhaps stimulate greater occupational differentiation. This paradox of greater equity leading to greater inequality has also been predicted in other contexts (Herrnstein, 1973, chap. 5).

VI. IMPLICATIONS OF THE MODIFIED FUNCTIONAL THEORY FOR EDUCATIONAL POLICY AND STRATIFICATION RESEARCH

A. Schools and the Social Goals of Equality and Productivity

This chapter began by describing the recent evolution of concern about how education influences occupational attainment and whether those processes are fair or not. This chapter's odyssey through issues of intelligence, the organization of work, and the ways employers try to find suitable workers illuminates some of these common concerns. It illuminates these debates by questioning the assumptions upon which so much educational criticism and reform have been based. For example, as long as differences in intelligence in student populations remain unchanged, schools will probably always be criticized for failing to meet sufficiently one or both of the two conflicting social goals—socioeconomic equality and economic productivity. Moreover, the pursuit of occupational equality through changing schooling processes is self-limiting if it is not accompanied by acceptable and effective techniques for equalizing student intelligence levels, something that still eludes educators.

There is a widespread hope that schools can decrease inequality in society by more equally preparing students for the workplace. This hope takes several forms. One is the assumption that schools can reduce differences in intelligence—most often by raising the intelligence of less intelligent youth. Indeed, colleges have often claimed that they teach people how to think, learn, and be adaptable, and there are certainly many efforts in the earlier grades to teach youngsters how to think (Beyer, 1984). To the extent that schools succeed in reducing the variance in cognitive aptitude, we might expect to see some eventual compression of the occupational hierarchy and thus probably greater socioeconomic equality as well. Unfortunately, efforts to teach people how to think have been notably unsuccessful (Beyer, 1984), as have been programs designed explicitly to change intelligence levels (Hurn, 1978). Although the variance in schooling has decreased during this century (Crouse, 1979), there is no evidence that variance in intelligence has decreased.

Many people appear to believe that occupational outcomes can be equalized by equalizing educational achievement rather than intelligence itself. Crouse (1979: 115) has suggested, for example, that instruction might be altered so that youngsters of low intelligence can learn as much as youngsters of higher intelligence, thus equalizing their occupational chances as adults. However, equalizing the prior *knowledge* of workers does not make them equally valuable to employers, because intellectual *aptitude* continues to be important for job performance.

Many researchers and laymen have argued that one way to improve occupational outcomes for disadvantaged groups is for them to complete more years of education. They base this recommendation on the fact that educational level and occupational level are highly correlated. However, if education is important in occupational attainment primarily because it signals intelligence, the pursuit of higher levels of education will produce the desired elevation in occupational level only under certain circumstances. If only a small proportion of people follow this recommendation, highly-educated people of low intelligence do indeed increase their chances of getting higher level jobs. However, if less intelligent people were disproportionately and in large numbers to increase their educational levels relative to the rest of the population, there would be a noticeable decline in the efficiency with which schooling sorts by overall quality (i.e., intelligence) and employers would turn away from schooling as a signal of worker quality. Under these circumstances, the benefits to less intelligent people would be short-lived. In reality, more intelligent individuals also will increase their educational levels in order to remain competitive for high-level jobs and will thereby maintain the high correlation between intelligence and educational level. The net result will not be a decrease in occupational inequalities, but education inflation.

Turning to the role of schools in fulfilling the social goal of productivity, there is a widespread assumption that schools have the power to provide students the skills they will need in the workplace and that will thus make them more productive workers. Concern is growing that the educational system is doing a poorer job of producing high school graduates of the quality our economy will need to remain competitive in the world. The recent National Academy of Sciences Panel on Secondary School Education for the Changing Workplace (1984) identified a set of core competencies that, from the employer's point of view, students should obtain in high school. Those competencies ranged from basic skills such as reading and writing to interpersonal competencies and good habits and attitudes. If schools were to be more successful in imparting such competencies, the value of high school graduates would no doubt improve, perhaps quite considerably, from the employer's perspective, and would benefit individual workers and society alike.

Prominent in the panel's list of core competencies to be taught, however, was the capacity to reason and solve problems, a capacity the panel (p. 20) considered to be "the central indication of an educated person." Moreover, the first of the panel's three major findings (p. xi.) was that "the major asset required by employers of high school graduates seeking upwardly mobile careers is the ability to learn and to adapt to changes in the workplace." What the panel correctly identified is that intelligence is important on the job, particularly for people with high aspirations. Given the current state of instructional technology, it is unrealistic to expect schools to do more than

make marginal improvements in the underlying intellectual capacities that contribute to worker productivity. Small gains can make big differences nationwide, so this is not an unimportant achievement. However, educational reforms that overestimate the power that educators currently have for changing the distribution of cognitive capacities (e.g., bringing most high school graduates up to some minimum standard) are bound to be disappointing—particularly as high schools retain larger proportions of their less-able students until graduation.

As I tried to show in this chapter, schools are more the handmaiden of stratification processes than their creator. Schools play an important role in matching individual talent with occupational demands, but they are less powerful than generally assumed in creating differences in those talents and in maintaining the occupational hierarchy itself.

B. The Failure to Distinguish between Explanations of Social Practices and Explanations of Their Effects on Individuals: A Major Source of Confusion in Stratification Research and Theory

The title of a recent major book on social stratification captures well the goal of most social stratification research in the last few decades—*Who Gets Ahead*? (Jencks et al., 1979). In his review of this book, Mare (1980) argued that the last two decades of refinements and elaborations of status attainment research have been unable to "adjudicate among alternative explanations" for the relations among family background, ability, education, occupation, and income that the research has documented so well. Stratification research has not explained *why* education is important in getting higher-level jobs and so has failed to answer important questions such as: "What are firms doing when they reward persons with more schooling? . . . What would happen if formal educational qualifications were equalized or if employers were prohibited from discriminating on the basis of educational status?" (Mare, 1980:709). As noted earlier, some revisionist theorists have in fact advocated banning the use of educational credentials in hiring.

One obvious explanation for the failure to answer these questions is that past stratification research has not investigated the social practices that link education and occupation. "Social practices" refers here to the conventional or customary ways in which people attempt to meet their own recurring needs or those of other individuals or groups in society; these procedures are often learned or adopted and consciously performed by people in the course of fulfilling their particular social roles (e.g., as parent, employer, teacher). Some practices that influence *educational* attainment, such as curriculum tracking and parental encouragement, have been studied. But supply side practices that "translate" education into oc-

cupation (e.g., the job search behaviors of individuals), although clearly important, have been studied by only a few people. And demand side practices that mediate education and occupation—in particular employer recruitment, selection, and promotion practices—have been ignored by stratification researchers almost totally.

Thus, the allocation of research attention accounts in part for the failure to answer the types of questions raised by Mare. But there are even more fundamental problems behind that failure. These problems relate less to the content of research than to its strategy and its assumptions about the social order. Mare's questions deal with why certain social practices exist (e.g., why employers generally prefer to hire more highly educated workers) and what might happen if those practices were intentionally changed. Unfortunately, the status attainment field has sought answers to these questions by working backwards from data on the socioeconomic outcomes of individuals who presumably have been subject to these practices—a strategy fraught with many pitfalls.

In order to explain why social practices that create large socioeconomic inequalities persist, we must also examine the other effects those practices have on society. Employer practices clearly affect not only the phenomenon of most direct interest to stratification researchers—socioeconomic inequalities—but also productivity; yet worker performance and economic productivity essentially have been ignored in the stratification literature. Nevertheless, whether one is ultimately most interested in social inequality or in productivity, *both* outcomes must be taken into account to explain the persistence and nature of the employer practices that create them. And both need to be taken into account when designing social policies to *alter* either productivity or inequality by changing employer practices. Having ignored the issue of productivity, it is but an easy step to claim that employment practices are structured *in order* to create socioeconomic distinctions in society and that it is the primary *intention* of employers to create such disparities. Revisionist theory takes this step when it claims that socioeconomic inequalities are perpetuated because the people who profit from them structure the system for that purpose.

One reason that productivity has been ignored, even by functionalists, may be the common failure to appreciate the fact that employer practices are *only* social practices. Employers do not have any greater power than the rest of us to fulfill their needs and goals. Often employer practices are procedures employers consciously follow in an effort to accomplish their own work without realizing that these procedures may be less than optimal. To illustrate concretely the adverse consequences of ignoring the reality behind employer practices, I shall refer again to the relative importance of intelligence and education for occupational attainment.

Years of education has a substantially greater effect than does intelligence on an individual's level of occupational attainment. This is largely because it is the *practice* of employers to screen workers by education but not directly by intelligence. A common but mistaken inference from the fact that education has a bigger impact than intelligence on the ability of workers to obtain high-level jobs is that education therefore also must be more important than intelligence, and to the same degree, for *employers* to achieve their goal of hiring competent workers. Specifically, researchers apparently assume that education has a substantially greater effect than intelligence on *job performance* just as is the case for the occupational levels workers attain. But there is no reason to expect the effects on worker job performance and worker job level to be parallel. Although employers may wish to select workers according to the criteria that best predict the value of workers to the employer, this cannot be expected of them in the real world. Realistically, employers typically discover better selection criteria through trial and error over long periods of time. Eventually, these criteria come to constitute a common wisdom that is accepted routinely by new employers. When an employer selects a highly educated person, what the employer generally gets is a person who is likely to perform well primarily because of having above average intelligence. Note that the employer need not realize this to profit from it, and as long as the employer benefits from the practice no less than competitors benefit from theirs, the employer will most likely continue to select workers in much the same way in the future despite the procedure's less than optimal results.

It may be helpful to think of employer practices as social rituals, not to demean employers or to question their rationality, but only to point out that many social practices (e.g., dietary practices) that clearly benefit individuals and societies have an overlay of myth as to why they are beneficial. Moreover, these practices may not serve their intended purposes as well as their practitioners would wish. More effective practices evolve gradually as employers observe the effects of past practices and experiment with new ones. With perfect knowledge of the effects of their actions, the hiring policies of employers might eventually come to mirror their functional needs precisely. Then it would be safe to assume that if education is more important than intelligence for getting a job, it is also more important than intelligence for performing it well. Clearly, this is not the case now, where in the absence of perfect knowledge employers must grope toward better ways of doing things.

An expectation of parallelism between the worker traits employers select for and the traits they benefit from constitutes the starting point for most scientific and lay theories of the value of schooling for employment. In particular, much discussion about the value of schooling seems to rest on

the following mistaken line of reasoning: (a) intelligence is less important than education for getting a high-level job (which is true), therefore intelligence is less important than education for performing it (false), and (b) education does not explain differences in job performance (which is largely true), therefore intelligence cannot explain differences in job performance (false). These tacit assumptions remain hidden by people's neglect of the performance issue, but their widespread acceptance may account in part for the continued underestimation in sociology of the powerful role that intelligence plays in creating and maintaining a stratified society. This chapter has not examined the issue of the maintenance of differences in earnings and wealth over time, which is a central concern of stratification research, but it has argued that a highly related feature of social stratification—the occupational hierarchy—is created and maintained ultimately by the great and enduring dispersion in intelligence levels in our society. The current allocation of people to jobs may be unfair to particular individuals, it may be unfair to certain groups in society, and it may not be optimal for economic productivity. But these defects are best understood as the slippage and impediments surrounding the driving forces that create the occupational hierarchy. The employment processes that create socioeconomic inequalities originate in large part from the differential ability of the members of a society to perform the more difficult and critical tasks that individuals and societies rely on for their well-being. The irony, of course, is that non-meritocratic employer practices do not create the occupational hierarchy as revisionists have maintained; non-meritocratic practices put a brake on the power of intelligence to do so.

Although the evidence is not yet available to test these claims adequately, that evidence will not come from further individual-level studies of status attainment, as useful as these studies are for some purposes. Nor will the evidence come from studies that ignore differences in the actual, as distinct from the presumed, productive contributions of individuals to their societies. Instead, the needed evidence will come from studies that examine the talents of people available for employment, the ways in which work is structured, the ways in which jobs and workers influence each other, and the ways in which employers try to fulfill their roles as producers of goods and services. Many of the processes that create and change occupational hierarchies can be observed daily in the workplace as jobs are adapted to new workers, as employers face shortages or surpluses of qualified job applicants, and as the composition of the work force changes. This constant flux in the minutiae of the system opens a window on the processes that, over time, have shaped the form of the entire structure.

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