CONCEPTUAL INTEGRATION AND EMPIRICAL TEST OF JOB DESIGN AND COMPENSATION RELATIONSHIPS

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A conceptual integration of job design and compensation draws on interdisciplinary job design, job evaluation, and labor economic theory. It is argued that job design influences the number and level of skills required and the degree to which jobs are physically aversive or hazardous. External labor markets also respond to skill and physical requirements. Job evaluation links job design and market forces by analyzing jobs' compensable factors that reflect these requirements, and then relating them to the market through wage surveys across firms. An empirical examination presents relationships between job design and pay or job evaluation measures. Strongly supportive results replicate in two separate samples (total n = 213 jobs) which differ in industries, job types, skill levels, job design measures, job evaluation measures, and labor markets. Motivational job design had higher job evaluation measures reflecting higher skill requirements, and mechanistic and perceptual/motor design had lower evaluation measures reflecting lower skill requirements. Biological design had lower evaluation measures reflecting physical requirements.

Job design and compensation are two major parameters of the human resource system. Both may be viewed (in part) as rewards offered by the organization to induce individuals to join and remain, to perform effectively, and to be satisfied with these important aspects of their jobs (e.g., Hackman & Oldham, 1980; Opsahl & Dunnette, 1966). Both activities also require substantial investment of the organization's financial resources and commitment of managerial effort (Milkovich & Newman, 1990).

While they are important to both the individual and the organization, little attention has been directed towards understanding how these two

major activities interrelate. The goal of this study is to identify, explain, and test the relationships between job design attributes (e.g., content, skill requirements, methods, and environments) and how jobs are compensated (in terms of both the external labor market and internal job evaluation practices). Establishing these relationships is important in order to understand the compensation implications of designing jobs in new organizations, or redesigning jobs due to technological innovation, growth or retrenchment, reorganization, quality of work life programs, or product market demand.

The study is organized as follows. First, salient research in job design and compensation is briefly reviewed. The focus is on both internal (i.e., job design choices, job evaluation processes) and external (i.e., labor supply and demand) factors. Next, conceptual relationships between job design and compensation are identified by comparing similarity of content, objectives, and methods. Finally, the empirical relationships between job design and compensation are examined in two distinctly different samples.

Job Design

This study adopts the interdisciplinary perspective on job design (Campion, 1988, 1989; Campion & McClelland, in press; Campion & Thayer, 1985, 1987). This perspective considers a variety of alternative approaches to job design from diverse disciplines (e.g., psychology, engineering). This research has delineated a taxonomy of four job design approaches, and it has demonstrated that each approach is oriented toward the optimization of a different category of outcomes.

The first job design approach is the *motivational* which comes from organizational psychology (Cherns, 1976; Hackman & Oldham, 1980; Herzberg, 1966; Steers & Mowday, 1977). It focuses on those features of jobs that enhance psychological meaning and motivational potential, such as skill variety, autonomy, and task significance. This model predicts that increases in complexity (operationalized through these job features) will increase satisfaction, intrinsic motivation, involvement, performance, attendance, and mental skill requirements.

While proponents of the motivational approach vary to some degree, they share two common themes—well designed jobs increase both the *number* and *level* of skills required. (Note that the term "skills" is used here to refer to knowledge, skills, and abilities as used in the personnel psychology literature.) For example, Hackman and Oldham (1980) stress increasing skill variety, thereby utilizing a greater number of skills, as does Herzberg's (1966) notion of job enlargement. Sociotechnical approaches (e.g., Cherns, 1976) would also increase the number of skills

by expanding the boundaries of the work process for which the group is responsible. Likewise, skill level increases in all three models because each emphasizes that jobs include more responsibility for decision making. This concept is clearly central to Herzberg's job enrichment, and it may also be seen in Hackman and Oldham's core dimension of autonomy, which is defined as freedom to make work decisions. Similarly, sociotechnical theory suggests reducing the number of hierarchical levels in the organization, thus pushing decision making responsibility down to the work group.

The second job design approach is the *mechanistic*, which comes from classic industrial engineering (Barnes, 1980; Gilbreth, 1911; Niebel, 1988; F. Taylor, 1911). It predicts that decreased complexity will increase human resource efficiency and flexibility outcomes such as staffing ease and low training times, and will decrease skill requirements.

The mechanistic approach is nearly opposite of the motivational approach in decreasing both the number and level of skills required. The key mechanistic concepts of specialization and simplification are the opposites of job enlargement and enrichment, respectively. Efficiency is attained because specializing reduces the number of skills required, and simplification reduces the level of skills required. The mechanistic approach suggests decreasing the amount of responsibility or autonomy of the worker, which also decreases skill requirements. These points are emphasized here because, as will be argued below, compensation also reflects both number and level of skills, albeit for different reasons.

The third job design approach is the *biological*, which comes primarily from ergonomics (Astrand & Rodahl, 1977; Grandjean, 1980; Tichauer, 1978). It focuses on minimizing physical strain on the worker by reducing strength and endurance requirements and aversive climate and noise conditions. It results in less discomfort, fatigue, and illness for employees, and the jobs have decreased physical ability requirements as well. As described below, the external labor market recognizes physical hazards, while job evaluation plans consider physical effort and working conditions.

The fourth job design approach is the *perceptual/motor*, which comes primarily from human factors (Fogel, 1967; Salvendy, 1987; Sanders & McCormick, 1987; Welford, 1976). It is oriented toward human mental capabilities and limitations, primarily by striving to reduce the attention and concentration requirements of jobs.

The perceptual/motor approach seeks to improve reliability, safety, and user reactions by limiting the sensory and information processing requirements of the job. In so doing, the job is designed not to exceed the abilities of the least capable potential worker. This has the effect of decreasing the cognitive demands and skill requirements in general,

even though that is not the primary goal as in the mechanistic approach. Therefore, as discussed below, the link with compensation is both in terms of skill requirements and in terms of physical hazards from potential accidents.

This interdisciplinary perspective on job design has two advantages for studying relationships with compensation. First, it considers both skill and physical aspects of jobs. Both of these aspects are also reflected in the labor market and in job evaluation plans. Second, it highlights the central conflict among the job design approaches. That is, jobs can be simultaneously high on the mechanistic and perceptual/motor approaches because both generally recommend design features that minimize skill requirements, but the motivational approach gives nearly opposite advice by encouraging design features that enhance skill requirements. Thus, interdisciplinary job design might suggest how jobs can be changed to either lower or raise compensation requirements.

Compensation

Compensation is determined by two major processes: external labor markets, and internal managerial decisions most frequently in the form of job evaluation (e.g., Milkovich & Newman, 1990). Note that in the present study the unit of analysis is the job, rather than the individual. Therefore, the discussion below does not consider variation in pay due to individual attributes such as performance or seniority.

Labor Markets

External labor markets act to set average occupational compensation and determine the magnitude of average compensation differentials across occupations (e.g., Ehrenberg & R. Smith, 1988). Given competitive market conditions, both the number of individuals employed and their average compensation are determined by the interaction of the supply and demand for labor. All else equal, the higher the pay, the greater the number of individuals willing to work in that occupation. The demand for labor, on the other hand, decreases as wages or salaries increase. Compensation within an occupation is determined by supply and demand reaching a relatively stable or "equilibrium" wage or salary. Differences in average compensation across multiple occupations exist, again reflecting the relative supply and demand in each occupation. Supply and demand in turn are determined (in part) by differences in number and level of skills required by the occupation and by physically aversive or dangerous working conditions.

Demand for labor. The demand for labor is affected by the demand for the product. As product demand increases, more product is sold or it is sold at a higher price. The organization will be willing to pay higher wages in order to attract the necessary labor to increase production and revenues. Thus there will be a corresponding increase in demand for labor with the relevant skills, which will in turn drive up compensation. The demand for labor also depends on the degree to which capital can be substituted for labor, usually in the form of advanced technology.

Supply of labor. Two primary determinants of labor supply behavior provide linkages between job design and compensation: the individual's investment in education or "human capital" (Becker, 1975), and physically hazardous or aversive working conditions.

Higher wages or salaries in an occupation will encourage individuals to enter that occupation. The higher pay may be the result of higher skills required by the occupation, or from high product demand creating a shortage of skills as described above. Either way, these skills are usually attained in the form of education or training. Human capital theory predicts that an individual will incur the costs of education (e.g., tuition, fees, books), plus opportunity costs of forgone earnings while attending school, if the discounted present value of expected future earnings is greater than the costs (Becker, 1975; Mincer, 1974). The theory has been successfully applied to many specific occupations (e.g., engineers; Freeman, 1976), as well as education in general (e.g., Catsiapis, 1987; Fuller, Manski, & Wise, 1982; Lindsay, 1971), and the findings have been consistently supportive (e.g., Becker, 1975; Blaug, 1976).

A second determinant of labor supply is the degree to which an occupation is physically aversive or involves a substantial risk of injury or death. From their earliest literature (A. Smith, 1776/1937), labor economists have argued that there would be fewer people willing to work in hazardous, dirty, or unpleasant environments, and consequently there would be a "compensating wage differential" or higher pay to reflect these undesirable conditions. Reviews of empirical research (Ehrenberg & R. Smith, 1988; R. Smith, 1979) indicate that there is a measurable positive differential for occupations that involve risk of death, and to a lesser degree nonfatal injuries. Differentials for physically aversive conditions, however, appear to be difficult to isolate from survey data (Ehrenberg & R. Smith, 1988), even though they are generally recognized in internal job evaluation plans (e.g., Hills, 1987).

In summary, two characteristics of labor markets—generally higher compensation for higher skill levels, and compensating differentials for dangerous or aversive jobs—have clear implications for job design-compensation relationships.

Job Evaluation

Although there is substantial variance across individuals, organizations, and occupations, average salaries or wages are established as a result of aggregate supply and demand interactions in the external labor market (Rynes & Milkovich, 1986). These market forces are translated into the firm either informally, through having to match the market to attract employees, or more formally, through the process of job evaluation. The latter is the more common method in larger firms (e.g., 86% of those surveyed in Bates & Vail, 1984). Job evaluation can be defined as a systematic procedure to formalize and measure pay hierarchies or pay differentials across jobs within an organization (Milkovich & Newman, 1990). These pay hierarchies are intended to accurately reflect both external labor market factors and the organization's specific compensation objectives. There are several major methods of job evaluation (e.g., factor comparison, classification, point method), but they have two important commonalities for the purpose of the present discussion.

First, job evaluation links organizational pay rates to the external labor market through "key" or "benchmark" jobs. To the degree that a job is more common across organizations, it will be more strongly affected by market forces and will provide a stronger link between the market and the organization's pay rates (Schwab, 1980). In both the process of constructing the job hierarchy, and in pricing the hierarchy (i.e., setting wages and salaries) via market wage surveys, the organization sets compensation for key jobs at, above, or below the market depending on its compensation objectives, and then fits the non-key (i.e., relatively unique) jobs into the pay hierarchy. Following human capital theory, key jobs will reflect market determined premiums for scarcity of specific skills, as well as higher levels of skills in general. The external market also reflects higher wages for hazardous or aversive jobs.

Second, the basis of comparison used to construct the hierarchy of jobs are "compensable factors." These are the job attributes for which the organization wants to pay. While there are many different specific compensable factors in various job evaluation plans, commonly used categories include responsibility (e.g., for people, money, equipment), skill requirements (e.g., knowledge, technical skills, social skills), effort (e.g., physical effort, mental fatigue), and working conditions (e.g., hazards, aversive conditions like temperature extremes and noise) (Equal Pay Act of 1963; Hay, 1958; Hills, 1987; Midwest Industrial Management Association, 1974). Note that job evaluation methods differentially weight these compensable factors to reflect importance to the organization or to match the external market.

Integration of Job Design and Compensation

Job design and compensation can be integrated both by conceptual arguments and by drawing empirical evidence from previous research. The conceptual arguments identify similarities of content, underlying objectives, and method.

In terms of content, there are clear commonalities between recommendations in job design and compensable factors in job evaluation. The motivational approach argues to increase core task characteristics, and in so doing increases skill, responsibility, and mental effort which are factors in most job evaluation plans. The mechanistic approach suggests that jobs be simplified, and therefore decreases skill, responsibility, and mental effort. One would also expect compensation to be positively related to the motivational approach and negatively related to the mechanistic approach based on labor market considerations in that average compensation increases with the number and level of skills.

The biological approach reduces physical requirements of jobs, and so decreases physical effort and aversive working conditions which are factors in most job evaluation plans. Additionally, the biological approach should relate negatively to average compensation in the market as aversive working conditions and risk of injury or death are reduced. Finally, the perceptual/motor approach attempts to reduce information processing demands and, like the mechanistic approach, decreases skill, responsibility, and mental effort. It also attempts to decrease likelihoods of accidents. Therefore, the perceptual/motor approach should relate negatively to compensation because it decreases both skills and occupational hazards.

The underlying objectives of some job design approaches include a consideration of compensation implications. The goal of mechanistic designers is the minimization of immediate costs, especially payroll costs. This is true both historically (Davis, Canter, & Hoffman, 1955) and currently (J. Taylor, 1979). The motivational approach, in contrast, either considers pay to be a less important outcome (Gordon, 1969) or gives pay little overt consideration. Nevertheless, in the job design literature some authors have suggested that jobs high on motivational attributes may increase compensation requirements (e.g., Campion, 1989; Dunham, 1977; Taber, Beehr, & Walsh, 1985). Similarly, the job evaluation literature has sometimes recognized that more mechanistic designs can decrease compensation requirements (e.g., Kerr & Fisher, 1950; Schwab, 1980).

There are also important methodological reasons why job design and job evaluation may be related. Both job design and job evaluation include forms of job analysis, albeit with different purposes. Conducting a traditional job analysis (e.g., determining tasks and requirements) and the writing of job descriptions are recommended prior steps to conducting a job evaluation (Milkovich & Newman, 1990). Some experts even suggest the possibility of job design measurement instruments as a method of analysis to be included in preparing for a job evaluation (Milkovich & Newman, 1990; Schwab, 1980). Finally, most job design measures (e.g., Job Diagnostic Survey by Hackman & Oldham, 1975; Job Characteristics Inventory by Sims, Szilagyi, & Keller, 1976; and Multimethod Job Design Questionnaire by Campion, 1988), and the most common form of job evaluation (i.e., point method) involve quantitative ratings on dimensionalized scales.

Empirically, several studies provide evidence on the relationship between motivational job design and job evaluation. Dunham (1977) examined correlations with job evaluation estimates based on the Position Analysis Questionnaire (McCormick, Jeanneret, & Mecham, 1972), and Taber et al. (1985) found correlations with job evaluation estimates from the National Electrical Manufacturing Association plan. Other empirical studies provide indirect evidence by examining correlations with skill requirements of jobs (Gerhart, 1988; Rousseau, 1982; Schneider, Reichers, & Mitchell, 1982). In all cases, positive correlations were observed between motivational features of jobs and their compensation or skill requirements. No negative correlations were observed with skill requirements and no relationships were observed with physical requirements. Using an interdisciplinary perspective, Campion (1989) replicated these findings and then demonstrated that other approaches to job design (i.e., mechanistic and perceptual/motor) related negatively to skill requirements and another approach (i.e., biological) related negatively to physical requirements.

Prior empirical evidence also helps identify similarities of internal structures within job design and job evaluation. In both areas, measures have been studied to determine the smallest number of independent dimensions. In job evaluation, a very early common finding was that most sets of compensable factors tended to reduce to a large skill component (e.g., skill requirements, responsibility, complexity) and one or more very small physical components (e.g., physical effort, working conditions) (e.g., Grant, 1951; Howard & Schutz, 1952; Lawshe, Dudek, & Wilson, 1948; Lawshe & Maleski, 1946; Lawshe & Satter, 1944; Lawshe & Wilson, 1946; Rogers, 1946). In job design, studies exclusively within the motivational approach have frequently discovered that job design recommendations reduce to only a large complexity or skill component

(Aldag, Barr, & Brief, 1981; Hogan & Martell, 1987). However, interdisciplinary job design research (Campion, 1988, 1989; Campion & Thayer, 1985) and other research that evaluated perspectives broader than the motivational approach (Stone & Gueutal, 1985; Taber et al., 1985) found an analogous result as in the job evaluation area—a large skill component and one or more small physical components. It is recognized, of course, that the dimensionality of either job design or job evaluation measures is influenced by the range of jobs studied (e.g., the physical dimension may account for a larger proportion of variance within a set of factory jobs than across the entire range of jobs in an organization).

Given these conceptual similarities and prior empirical evidence, the following hypotheses are tested in the present study. Each hypothesis is advanced assuming that all other variables are held constant.

Hypothesis 1. The motivational approach will relate positively to overall pay, and it will relate positively to those job evaluation dimensions (i.e., compensable factors) that reflect higher numbers and levels of skills.

Hypothesis 2. The mechanistic approach will relate negatively to overall pay, and it will relate negatively to those job evaluation dimensions that reflect higher numbers and levels of skills.

Hypothesis 3. The biological approach will relate negatively to overall pay, and it will relate negatively to job evaluation dimensions that reflect more physical effort and aversive working conditions.

Hypothesis 4. The perceptual/motor approach will relate negatively to overall pay, it will relate negatively to those job evaluation dimensions that reflect higher numbers and levels of skills, and it will relate negatively to job evaluation dimensions that reflect more physical effort and aversive working conditions.

Method

Overview

Research paradigm. The conceptual integration proposed in this study is intended to describe the relationships between how jobs are designed and the resulting impact on compensation. However, the research paradigm testing these relationships differs in three ways. First, it examines covariation between job design and compensation, rather than how changes in job design affect changes in compensation. Thus, it provides only a cross-sectional examination of what is actually a longitudinal phenomenon, and so it weakens the ability to draw causal inferences. Second, the present study does not examine job design as a set of actions

the organizations took. Instead, it examines static jobs in terms of ratings on dimensions that reflect job design theories. Whether the jobs were actually designed according to these theories can only be inferred. Third, the conceptual integration applies both within- and between-jobs, but perhaps more strongly to the former. That is, differences in the design of a particular job are related to differences in compensation for that job. However, the test is conducted between-jobs; job design differences between jobs are related to compensation differences between jobs. This is a somewhat weaker test of the ideas, and thus weaker results should be expected.

Nature of data. The job design data came from two samples studied previously. The compensation data were collected specifically for this study and have not been elsewhere reported. The samples allow a replication, and they differ in four ways which enhance generalizability. First, sample 1 (Campion & Thayer, 1985) includes blue collar manufacturing jobs from a low technology industry, while sample 2 (Campion, 1988) includes both blue and white collar manufacturing and development jobs from a high technology industry. The jobs in sample 1 are all nonexempt (i.e., require overtime pay according to the Fair Labor Standards Act of 1938), but sample 2 includes both nonexempt and exempt jobs (e.g., managerial, professional). Second, the jobs differ in average expected ability requirements, with sample 1 higher on physical requirements and sample 2 higher on skill requirements (Campion, 1989). Third, job design measurement differs, with an analyst-completed measure in sample 1 and a self-report measure in sample 2. Fourth, both compensation measurement and labor markets differ, with sample 1 using actual pay in a unionized company in a rural setting, and sample 2 using job evaluation indices in a nonunion company in an urban setting.

Sample 1

Sample description. Job design data were collected by observation of 121 jobs from five operations of a large forest products company: plywood plant (40 jobs), sawmill (33 jobs), fiberwood plant (25 jobs), wood treatment (e.g., landscape timber) facility (14 jobs), and merchandiser (i.e., log sorting/grading) facility (9 jobs). Statistical power to detect a .30 correlation between job design and job evaluation measures is estimated at 96% ($p < .05$, one-tailed test; Cohen, 1977). The sample is a census of hourly production jobs in these plants, with 23 skilled/craft, 63 semi-skilled/operative, 34 unskilled/labor, and 1 clerical job. Employees average 6.1 years of company tenure, 2.5 years of job tenure, and 11.3 years of education.

Job design measurement. Job design was measured using the analyst-completed Multimethod Job Design Questionnaire (MJDQ; Campion, 1985; Campion & Thayer, 1985). It was developed by rewriting specific job design recommendations into principles that could be used to make objective and quantifiable judgments about jobs. The MJDQ has four sections, one corresponding to each of the four job design approaches: motivational (15 items), mechanistic (13 items), biological (18 items), and perceptual/motor (23 items). Note that the pay adequacy item was removed from the motivational scale for this study to avoid any definitional dependency among measures. Each item has a five-point rating scale (with five highest), with detailed anchors to enhance interrater reliability. Total scores, calculated as averages of applicable items (Pierce & Dunham, 1976), indicate the degree to which jobs are well designed based on the recommendations of each approach. Internal consistency reliabilities range from .82 to .89, and interrater reliability ranges from .89 ($p < .05$ here and below) to .93, across the four total scores. The MJDQ was completed by an analyst on the job site based on a 15 to 30 minute observation period with occasional informal questioning of the worker about less observable or infrequent tasks. Further development and reliability information is contained in Campion and Thayer (1985), and the instrument is contained in Campion (1985).

Compensation measurement. Union negotiated hourly pay levels were obtained for each job. Four of the five plants were in the same geographic area, and pay levels were negotiated by the same union at the same time. The fifth plant was geographically separated, but in the same state. It did not have a union, but pay levels were set by management to correspond to the prevailing union rates. Average wage rates and ranges were generally comparable across plants, with rates at the geographically separate plant slightly higher due to proximity to large cities.

Given that there was no formal job evaluation in these plants, there may be an issue as to how well the external market was related to pay rates. But as Friedman (1953) argues, if an organization does not respond to the market in terms of wages and prices, at least within a broad range, it eventually would be forced out of business. This firm was well established and successful, and thus its wages were likely to have some correspondence to the local labor market in terms of global wage levels and differentials even without a formal job evaluation. The lack of a formal job evaluation system would work against detecting the results predicted in the hypotheses.

Another potential issue is whether the presence of a union would alter compensation rates. There is evidence that unions increase wages (Lewis, 1986), employee benefits (Freeman, 1981), restrictive work rules

(Freeman & Medoff, 1984), and narrow job descriptions (Berger, Olson, & Boudreau, 1983). Unions also tend to flatten pay structures (Freeman & Medoff, 1984) by increasing pay of lower level (relatively unskilled) jobs. While union "monopoly power" can alter market forces (Freeman & Medoff, 1984), it is unlikely that it could totally negate them. Therefore, it is expected that the same basic job design-compensation relationships will be observed in this union sample.

A final concern is that global compensation measures like pay provide a less precise assessment of relationships than would analyses at the level of compensable factors (e.g., responsibility, working conditions). Therefore, the data in sample 1 provide only a limited opportunity to examine empirical relationships. Sample 2 contains detailed compensable factor data, however.

Sample 2

Sample description. Job design data were collected from 1,024 employees on 92 diverse jobs in a manufacturing and development facility of a large nonunion electronics company. Statistical power to detect a correlation of .30 is estimated at 90% ($p < .05$, one-tailed test; Cohen, 1977). Using variance estimates from the data, employee population statistics, and standard sampling formulas (Warwick & Lininger, 1975), the 10.7 ($SD = 2.65$) respondents per job yield averaged 95% confidence intervals around job design estimates of 3.2% of the scale range. The 92 jobs are a 79.3% representative sample of the most populated jobs in this setting. Job types are 17.4% managerial, 27.2% professional, 19.6% technical, 21.7% manufacturing, and 14.1% administrative. Most respondents have at least one year company tenure (99.8%), six months job tenure (91.4%), and two years of college (60.5%).

Job design measurement. Job design was measured using the self-report MJDQ (Campion, 1988). A self-report version allows the examination of many managerial and professional jobs that could not be analyzed via observation (e.g., long task cycles, difficult to observe tasks, confidentiality of some job content, etc.). Like the analyst-completed MJDQ, scores are provided on each approach: motivational (17 items), mechanistic (8 items), biological (10 items), and perceptual/motor (12 items). Note that the pay adequacy item was again removed from the motivational scale for this study to avoid any definitional dependency among measures. Incumbents indicate the extent to which each statement is descriptive of their job using a common five-point scale ranging from *strongly agree* (5) to *strongly disagree* (1). Total scores are again calculated as averages of applicable items and reflect the degree to which jobs are well designed based on each approach. Estimates of various

types of reliabilities calculated at the job level are generally acceptable across the four total scores: internal consistency (range .82 to .91), interrater among analysts (range .78 to .95), interrater among incumbents (range .55 to .86), and interrater between analysts and incumbents (range .66 to .89). Subsequent research on the self-report MJDQ has provided evidence of convergent validity between the motivational scale and the Job Diagnostic Survey (JDS; Hackman & Oldham, 1975), discriminant validity between the other three scales of the MJDQ and the JDS, and convergence of MJDQ responses between incumbents and supervisors (Campion, Kosiak, & Langford, 1988). Individual incumbent data were aggregated to the job level for analysis by averaging all incumbents in each job ($M = 10.13$ per job, $SD = 2.65$). Employees in each job were randomly sampled from alphabetical listings, and questionnaires were sent through company mail. Job titles were precoded on the questionnaires to ensure consistency and accuracy, and employees could indicate if their titles had changed. The 1,024 respondents represent a 69.6% return rate. Further development and reliability information, as well as the instrument itself, is contained in Campion (1988).

Compensation measurement. The organization has an extensive point-method job evaluation plan, which is the most common evaluation system used (Milkovich & Newman, 1990). The plan has been in place for nearly 30 years. While it does not cover very high level executives or commission sales, it does cover all the jobs in the present sample including nonexempt and exempt (which also contains managerial). As usual with such plans, it was developed based on detailed job analyses, careful selection of compensable factors, establishment of scale anchors for each factor degree, and the derivation of factor weights (as reflected in the points assigned to each degree) using a combination of judgmental and statistical methods (Milkovich & Newman, 1990). Extensive input was provided by line management and by consultants certified by the American Compensation Association. The plan has been updated through eight revisions since the original development. A large corporate staff monitors and updates the plan, while separate compensation departments located in each major geographic site implement and provide updating information to the plan.

Separate nine-factor systems exist for nonexempt and exempt jobs. For nonexempt jobs, the compensable factor titles, brief descriptions, number of degrees, and point ranges are:

1. Education—level of knowledge obtained through formal education or training (5 degrees from 10 to 40 points).

2. Experience—amount of related work experience or on-the-job training (8 degrees from 5 to 60 points).

3. Complexity—difficulty of job assignments, including length of work cycle, number of different tasks, depth of analysis, ingenuity required, and so forth (7 degrees from 5 to 55 points).

4. Direction received—extent of latitude or degree to which incumbent performs job without extensive verbal or written instruction (5 degrees from 3 to 15 points).

5. Physical effort—amount of physical strain or fatigue resulting from physical effort including such factors as strength, energy expended, and continuity (5 degrees from 3 to 15 points).

6. Accountability—likelihood and financial impact of errors (5 degrees from 5 to 25 points).

7. Relationships with others—importance of contacts with other employees, or with customers and others outside the company, in terms of frequency, difficulty, and level of contact (5 degrees from 5 to 25 points).

8. Instruction and coordination to others—amount of assisting or guiding of less experienced members of the department (4 degrees from 0 to 15 points).

9. Position conditions—extent of undesirable working conditions not compensated for under physical effort such as environment, travel, and on-call (5 degrees from 5 to 25 points).

For the exempt plan, the factors are:

1. Education—same as in nonexempt plan, except points differ (7 degrees from 10 to 100 points).

2. Experience—same as in nonexempt plan, except points differ (12 degrees from 5 to 60 points).

3. Decision making—importance of decision making in terms of effect on organization, and independence and extent of action without guidance or approval (15 degrees from 10 to 150 points).

4. Creative and analytical—amount of imagination and inventiveness required, and the need to identify and interpret data to derive conclusions (9 degrees from 10 to 100 points).

5. Inside relationships—importance of contacts with other employees, excluding subordinates, in terms of frequency, difficulty, and level of contact (13 degrees from 2 to 40 points).

6. Outside relationships—importance of contacts, in terms of frequency, difficulty, and level, with others outside the company where contacts could affect business relationships (14 degrees from 4 to 140 points).

7. Managerial responsibility—degree of active management of organizations or facilities in terms of scope and policy formulation and interpretation (14 degrees from 0 to 110 points).

8. Financial responsibility—level of financial or profit responsibility in terms of budgets, costs, revenues, and asset utilization and protection (14 degrees from 0 to 90 points).

9. Position conditions—extent of all undesirable working conditions such as physical effort, environment, travel, and on-call (5 degrees from 0 to 30 points).

Most factors in both systems reflect skill requirements. Physical requirements are reflected in physical effort and position conditions for nonexempt jobs and position conditions for exempt jobs.

Given the single point estimates for each job on each different compensable factor, there is no means of estimating the reliability of the ratings. However, several reasons suggest that the data are reliable. First, the organization places great emphasis on the job evaluation system and its accuracy. Second, multiple evaluators are involved in the rating process including compensation analysts and multiple levels of line and staff management. The rating process is one of consensus seeking, where differences of opinion are resolved by rational arguments and collection of additional information, thus increasing reliability. Finally, unreliability attenuates criterion-related validity both in terms of product moment correlations (Nunnally, 1978) and multiple regression coefficients (Arvey, Maxwell, & Abraham, 1985; Johnston, 1985). Thus any lack of reliability will underestimate relationships and represents a conservative error in this study.

Note that a confidentiality agreement with the organization precludes further description of the compensation plan. However, it is fair to state that the organization is regarded as a leader, both within its industry and across industries, in terms of the quality and extent of its compensation planning.

Results

Descriptive statistics and correlations are presented separately for sample 1 (Table 1), sample 2 nonexempt jobs (Table 2), and sample 2 exempt jobs (Table 3). Means and standard deviations indicate no apparent range restriction or ceiling effects for any measure or sample, with two exceptions (i.e., instruction and coordination evaluation measure in sample 2 nonexempt jobs, and position conditions evaluation measure in sample 2 exempt jobs). Where the same or similar measures are used in sample 2, logical differences are observed between the nonexempt and exempt jobs (e.g., nonexempt jobs are lower on motivational and biological design, higher on mechanistic and perceptual/motor design, lower on education evaluation measure, and higher on position conditions evaluation measure than exempt jobs).

TABLE 1

Means, Standard Deviations, and Correlations
Among the Measures in Sample 1

	M	SD	1	2	3	4
Job design measures						
1. Motivational	3.1	.5				
2. Mechanistic	3.6	.5	-69*			
3. Biological	3.2	.5	31*	-07		
4. Perceptual/Motor	3.4	.4	-30*	21*	47*	
Compensation measure						
5. Pay	6.2	1.0	64*	-41*	43*	-15*

Note: n = 121 jobs. Decimals omitted from correlations.
* p< .05 (one-tailed test).

Intercorrelations among the job design measures are generally comparable in sign across samples, even though they differ somewhat in magnitude. The mechanistic and perceptual/motor approaches are positively correlated with each other, but usually negatively correlated with the motivational approach. The biological approach shows positive correlations with the other approaches in sample 1, but is not significantly related to the others in sample 2.

Most of the job evaluation measures in sample 2 have large positive intercorrelations in both sets of jobs, as might be expected based on the large skill component underlying evaluation systems. As expected with the small physical component also underlying many evaluation systems, the physical effort and position conditions measures have negative correlations with the others in the nonexempt jobs, and the position conditions measure shows only low correlations with the others in the exempt jobs. However, in the exempt jobs the managerial responsibility measure has no correlation with the education and creative and analytical measures, suggesting a multidimensionality among the skill requirements.

The correlations between job design and compensation measures are largely as hypothesized for all measures and samples. The job evaluation measures that reflect skill requirements, and pay in sample 1 because it primarily reflects skill requirements, tend to correlate positively with the motivational approach, and negatively with the mechanistic and perceptual/motor approaches. The largest correlations are with the motivational and mechanistic approaches. Also as hypothesized, the job evaluation measures that reflect physical requirements, such as physical effort and position conditions in the sample 2 nonexempt jobs, show large negative correlations with the biological approach. Also, the physical effort measure in the sample 2 nonexempt jobs shows a negative correlation with the perceptual/motor approach. Contrary to predictions,

TABLE 2

Means, Standard Deviations, and Correlations Among the Measures in Sample 2 (Nonexempt Jobs)

	M	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Job design measures																
1. Motivational	3.6	.3														
2. Mechanistic	3.0	.3	-32													
3. Biological	3.3	.4	09	02												
4. Perceptual/Motor	3.0	.3	-37	75	08											
Compensation measures																
5. Education	23.3	6.6	45	-65	09	-73										
6. Experience	33.8	12.3	46	-72	30	-58	67									
7. Complexity	32.2	12.3	45	-71	26	-63	84	88								
8. Direction received	11.4	2.4	46	-66	18	-49	62	86	80							
9. Physical effort	6.5	2.4	-05	31	-65	-35	-38	-42	-42	-34						
10. Accountability	18.5	4.0	49	-62	15	-55	64	82	80	85	-23					
11. Relationships with others	10.8	3.9	28	-66	39	-55	63	67	64	69	-70	61				
12. Instruction & coordination	1.7	2.9	20	-32	26	-14	20	46	38	53	-49	38	53			
13. Position conditions	9.6	3.0	07	14	-71	06	-11	-23	-17	-20	77	-09	-49	-27		
Compensation scales																
14. Complexity	131.6	39.0	49	-76	28	-66	83	95	96	89	-48	86	77	50	-24	
15. Physical	16.1	5.1	02	23	-73	20	-25	-34	-30	-28	93	-16	-62	-39	95	-37

Note: n = 51 jobs. Decimals omitted from correlations. Critical r = .23 (p< .05) for one-tailed test.

TABLE 3
Means, Standard Deviations, and Correlations Among the Measures in Sample 2 (Exempt Jobs)

	M	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Job design measures																
1. Motivational	3.8	.2														
2. Mechanistic	2.5	.2	-36													
3. Biological	3.9	.2	12	-12												
4. Perceptual/Motor	2.8	.1	-03	29	09											
Compensation measures																
5. Education	62.4	12.6	29	-41	37	-19										
6. Experience	31.0	12.2	49	-73	13	-20	54									
7. Decision making	65.1	27.6	52	-72	10	-16	47	95								
8. Creative & analytical	42.6	21.6	26	-40	23	-14	71	70	61							
9. Inside relationships	11.4	5.6	38	-65	01	-20	41	85	89	39						
10. Outside relationships	13.8	6.6	29	-70	09	-33	45	69	63	36	68					
11. Managerial responsibility	21.3	19.5	46	-57	-13	-16	-07	63	70	01	71	37				
12. Financial responsibility	24.4	12.9	51	-75	00	-14	21	88	89	40	80	63	86			
13. Position conditions	0.6	1.7	-03	-40	-13	-08	11	28	34	03	51	33	23	25		
Compensation scales																
14. Managerial	167.7	76.8	52	-76	03	-17	34	94	96	46	91	68	84	96	35	
15. Technical	105.0	31.8	29	-43	30	-17	88	69	60	96	42	42	-03	35	06	45

Note: n = 41 jobs. Decimals omitted from correlations. Critical r = .26 (p< .05) for one-tailed test.

however, the biological approach correlates positively with compensation measures that reflect skill requirements.

Composites of job evaluation measures in sample 2 were formed to simplify the results. Factor analyses were conducted using principal components analysis with varimax rotation to provide the simplest representation of the measures (Ford, MacCallum, & Tait, 1986). The ratio of jobs to measures of 5 to 1 in the nonexempt jobs and 4 to 1 in the exempt jobs is the minimum required by some authors (e.g., Gorsuch, 1974) but below that of others (e.g., Nunnally, 1978), so results must be interpreted cautiously. Two factors emerged with eigenvalues greater than 1.0 in each set of jobs, with 66.1% of the total variance explained in the nonexempt jobs and 87.9% explained in the exempt jobs. Scales were formed by summing the measures that loaded highest on each factor.

In the nonexempt jobs, the seven skill oriented measures were formed into a scale labeled complexity (internal consistency reliability = .87), while the physical effort and position conditions measures were formed into a scale labeled physical (reliability = .77). In the exempt jobs, the experience, decision making, inside and outside relationships, managerial and financial responsibility, and position conditions measures were formed into a scale labeled managerial (reliability = .86), while the education and creative and analytic measures were formed into a scale labeled technical (reliability = .77). The interpretation for the exempt jobs was suggested by the organization's dual managerial-technical career paths. Correlations between the scales and the individual measures are presented in Tables 2 and 3.

The scales were also correlated with the job design measures in Tables 2 and 3. The complexity scale in the nonexempt jobs and both the managerial and technical scales in the exempt jobs show the same skill requirements pattern. The physical scale in the nonexempt jobs shows the physical requirements pattern.

In order to assess the independent effects of the different job design approaches on compensation, pay in sample 1 and each of the job evaluation scales in sample 2 were simultaneously regressed on the four job design measures. These multivariate analyses control for covariation between the job design measures, thus providing the opportunity to isolate the various effects from each other (e.g., examine physical requirements effects while holding skill effects constant). The results of these five regressions are presented in Table 4.

All five equations are statistically significant. Coefficients of determination (R^2) indicate that the job design approaches taken together account for a very large proportion of the total variance in the compensation measures, with 47% for pay in sample 1, and typically from 62% to 70% with the job evaluation scales in sample 2. The individual regression

TABLE 4

Regression of Compensation on Four Job Design Measures

| Job evaluation measures | Job design measures | | | | | | |
	Motivational	Mechanistic	Biological	Perceptual/ motor	n	R^2	F
Sample 1							
Pay	.85*	−.08	.72*	−.52*	121	.47	27.61*
	(.44)	(−.04)	(.38)	(−.19)			
Sample 2							
Nonexempt							
Complexity	28.87*	−66.66*	26.27*	20.92	51	.70	30.46*
Scale	(.22)	(−.56)	(.28)	(−.17)			
Physical	3.75*	1.84	−9.29*	4.07	51	.62	21.12*
Scale	(.22)	(.12)	(−.77)	(.26)			
Exempt							
Managerial	115.88*	−222.64*	−32.94	22.60	41	.62	17.11*
Scale	(.29)	(−.68)	(−.09)	(.04)			
Technical	23.38	−44.03*	37.27	−21.50	41	.19	3.40*
Scale	(.14)	(−.32)	(.25)	(−.10)			

Note: Regression coefficients are in original scale units. Standardized coefficients appear in parentheses. R^2s are shrunken (Cohen & Cohen, 1975, p. 106).

*$p<.05$

coefficients are largely consistent with the hypotheses. The coefficients for the motivational approach are positive and significant in four of the five equations. Coefficients for the mechanistic approach are negative and significant in three of the five equations. Thus the more complex the job design (i.e., following the motivational approach), the higher the compensation measure. Conversely, the simpler the job design (i.e., following the mechanistic approach), the lower the compensation measure. Note that while to some degree the mechanistic and motivational approaches are conceptual opposites, and that empirically these measures have negative covariation in both samples in this study, they both have independent effects in two of the equations.

The biological approach addresses physical requirements almost exclusively. The most direct test of the biological hypothesis is with the physical scale in the sample 2 nonexempt jobs. In that case, the coefficient is negative and significant as predicted. Note too that when comparing standardized regression coefficients, the biological affect is approximately three times as large as the motivational. Thus in this equation, the less dangerous and physically aversive the conditions, the lower the compensation measure. Contrary to our hypothesis however, the biological coefficient is positive and significant in both the sample 1 pay equation and in the sample 2 complexity scale equation for nonexempt

jobs. Possible reasons for reversals with these skill oriented compensation measures are discussed below.

The perceptual/motor approach was expected to be negatively related to both skill and physically oriented compensation measures. But in these multivariate analyses, which control for the effects of the other approaches, the independent effect of the perceptual/motor coefficient is negative and significant only in the pay equation in sample 1. Reduced attention and concentration requirements are related to lower pay here, possibly due to fewer safety hazards in the frequently dangerous machine operator jobs in the forest products mills in this sample.

The regression analyses were rerun with only the significant predictors. The results were identical in terms of sign and significance for 10 of the 11 regression coefficients, and the magnitudes were also very similar (e.g., differing only by a few hundredths of a point on the standardized coefficients). This indicates that the estimated effects in our five equations are relatively stable within the set of variables examined.

Discussion

The central thesis of this research is that job design and compensation are related by means of the number and level of skills jobs require and by the degree of physically aversive or hazardous working conditions present on the jobs. Factors such as technology, organizational structure, and management philosophy determine how jobs are designed. Variation in job design alters the skill and physical requirements of jobs. At the labor market level, the higher the level and number of skills, or the more dangerous or aversive the work, the fewer the number of individuals qualified, or willing, to work in these jobs. Given adequate demand for their product, employers respond to shorter supply by increasing compensation. At the organizational and job levels, job evaluation is a formal process of linking job design and compensation by measuring the skill and physical requirements of jobs through compensable factors, and relating them to market wages through wage surveys on key jobs.

The results of this study are very robust with job design typically accounting for half to two-thirds of the variance in methodologically separate compensation measures (cf. Glick, Jenkins, & Gupta, 1986). The findings were also consistent with the specific predictions. Jobs scoring well on the motivational approach had higher pay and job evaluation measures reflecting higher skill requirements, and jobs scoring well on the mechanistic and perceptual/motor approaches had lower pay and evaluation measures reflecting lower skill requirements. Jobs

scoring well on the biological approach, and to some extent the perceptual/motor approach, had lower job evaluation measures reflecting lower physical requirements.

Contrary to predictions, in a couple of instances jobs scoring well on the biological approach had higher evaluation measures reflecting higher skill requirements, and they had higher pay which also primarily reflects higher skill requirements. It is possible that this is a consequence of hierarchical levels in organizations. It has been previously observed that jobs higher in hierarchical level are better paid and tend to have fewer physical requirements (Campion, 1988, 1989; Campion & Thayer, 1985). It is likely that organizations or higher level employees tend to push some of the more physically demanding or dangerous tasks lower in the hierarchy. For example, in sample 1 many of the jobs are in three-step hierarchies with laborer or unskilled jobs at the lowest level, operator or semi-skilled jobs at the middle level, and skilled or crew chief jobs at the top level. Such hierarchies reflect both union-based lines of promotion and lines of authority in terms of work direction. Such arrangements would allow the delegation of unpleasant tasks from higher level to lower level employees. Also, it is possible that the union in sample 1 may have negotiated both pay and job assignment on the basis of seniority, with more senior employees getting more pay and fewer physical requirements. Thus the results may be reflecting the movement of tasks down organizational hierarchies over time, rather than a true causal relationship between biological job design and compensation.

Limitations

One potential criticism of this study is that it merely showed convergence between two forms of job analysis. This is not viewed as troublesome for many reasons. First, pay was used in sample 1 rather than job evaluation measures. Second, the job design and job evaluation measures in sample 2 differed in instrumentation, sources of information, and time, thus there was no "common method bias" in the usual sense. Third, the relationships observed are very large for the simple operation of similar methods. Fourth, this concern is somewhat indigenous to much of the research in this area in that many other components of the human resource system are also based on an analysis of the job (e.g., selection, training, performance appraisal). Fifth, part of the conceptual contribution of this study was to point out the many similarities between job design and compensation, including the methodological similarities. Finally, and most importantly, the shared concern with the identification of skill and physical requirements of jobs creates similarity in the need to collect job information. Thus the similarity in the use of job analysis

methodology is a consequence of the purposes of job design and compensation, rather than a methodological artifact.

Another potential criticism of this study is that the relationships between job design and compensation are the spurious result of organizational level. That is, higher level jobs are better paid and they have certain job design features such as better motivational design (Berger & Cummings, 1979). However, compensation level is often used to define organizational level, and job design features characterize the essence of organizational level (e.g., autonomy, task significance, decision making). Thus, it could be argued that compensation and job design explain organizational level, rather than the reverse. Either way, the argument is somewhat circular. The direct relationships between compensation and job design suggested in this paper are justified based on an extensive analysis of specific linkages in terms of skill and physical requirements, as well as our preference to use the most parsimonious model at early stages of research in this area.

This study has several other limitations. For one, the dependent variable of pay in sample 1 may have obscured some relationships. Pay is such a global measure that the skill versus physical components of compensation could not be empirically separated. Thus it may have hidden the relationship between biological design and compensation for physical requirements. Moreover, pay in this sample was influenced by union negotiations which may have depressed job design-compensation relationships because unions flatten the pay structure by decreasing differentials across jobs (Freeman & Medoff, 1984; Johnson & Youmans, 1971; Lewis, 1986). It is also possible that negotiations reflected factors specific to these particular plants and their unions, and there were no measures to control for such potential effects in this sample.

A second limitation is that there were not identical compensation or job design measures across the samples in the study. This precludes combining samples into a single analysis which would have greater statistical power, and which would allow the assessment of the magnitude of differences in the job design-compensation relationships across the three distinct employee groups.

A final and perhaps most severe limitation is that the empirical work is underspecified. The causal sequence in our argument flows from job design to skill and physical requirements. These requirements and other forces are reflected in labor supply and demand. Job evaluation links job design with the labor market to partly determine compensation. Our model is underspecified in that these skill and physical requirements are not directly measured, nor are supply and demand in the labor market. In addition, other exogenous forces such as unions (e.g., Lewis, 1986) and government regulation (e.g., Occupational Safety and Health Act

of 1970) also affect compensation. Other forces like social information (Salancik & Pfeffer, 1978), organizational structure, and technology also affect job design, but are not included in the analysis. These unmeasured variables suggest a far more complex model than we were able to estimate. Thus the regression equations constitute reduced form models (James, Muliak, & Brett, 1982; Johnston, 1985; Theil, 1971). Primary threats to valid statistical inferences here include both bias due to omitted variables (James, 1980) and loss of power due to the independent and dependent variables being so far removed in the causal sequence. Both of these problems can create substantial bias in the estimated regression coefficients. Power loss decreases the probability of observing true effects when they exist. Omitting relevant explanatory variables biases estimated regression coefficients in direct proportion to their covariation with included explanatory variables. But we believe the overall pattern of results is robust enough to warrant tentative support for the model. Recall, for example, that the coefficients changed very little when the equations were re-estimated with only the significant explanatory variables, suggesting stability across alternative specifications within this set of variables. However, caution is suggested. Replication and expansion of this study are needed where all relevant variables are measured.

Implications and Future Research

Should future research support the proposed model, important practical implications may be derived. One implication is that there may be requirements for higher compensation as a result of job enrichment or enlargement projects (Campion & McClelland, in press). That is, reevaluation of enriched jobs may find higher levels of compensable factors, thus increasing pay for those aspects of jobs that are actually rewarding to employees. There might even be instances where such costs are not recognized or linked to the enrichment project because the benefits of such interventions (e.g., enhanced employee satisfaction) may occur relatively soon after the job design changes, while the requests for higher compensation may be lagged in time, occurring only after the rewarding novelty of the changes wear off and the employee realizes that the job is now more demanding. It can be speculated that sometimes these costs may be difficult to identify because the units that often promote such projects (e.g., organizational development departments) are not the same units responsible for compensation administration. In fact, in many large organizations the first line manager is not directly responsible for controlling the compensation budget, thus may not always recognize or be motivated to avoid such costs.

A larger implication is the potential for controlling compensation costs through the programmatic application of job design principles. The common orientation when conducting job evaluation in an existing organization is to accept the job as a given, and attempts to influence compensation costs are often limited to decisions regarding which factors to reward, how they should be weighted, which jobs and companies to include in the wage survey, and decisions about desired correspondence with the external labor market. This study highlights the potential strategy of influencing compensation costs through changes in job design. An advantage of the interdisciplinary perspective is that it indicates how job design can be changed to decrease compensation costs (e.g., through the application of the mechanistic or perceptual/motor approaches) or increase costs (e.g., through the motivational approach). Of course, current incumbents may find an expanded job with increased pay to be acceptable, but a simplified job for decreased pay to be quite unacceptable. Thus the optimal times to influence compensation through job design may be when the job is originally developed (e.g., during start-up or expansion) or between successive incumbents.

The interdisciplinary perspective has previously highlighted the potential costs and trade-offs from job design decisions (Campion, 1988; Campion & Thayer, 1985). Jobs high on the motivational approach have costs such as higher staffing and training requirements, greater error-likelihood, and more mental overload and stress. Jobs high on the mechanistic and perceptual/motor approaches have costs such as less satisfied and motivated employees and higher absenteeism. The present study extends our understanding of this basic trade-off between organizational and individual costs to a consideration of compensation consequences of job design.

Future research could proceed in at least three directions. First, organizations have some choice about how to design jobs. Future research could compare the trade-offs between having more employees at lower wages and less employees at higher wages. It may be possible to design jobs that require greater salaries, but compensation costs decline because fewer jobs and employees are needed. More generally, future research could compare the advantages and disadvantages of work and reward systems for high complexity/high compensation jobs with low complexity/low compensation jobs in terms of productivity, employment levels, employment costs, and flexibility, as well as the more traditional comparisons on incumbent satisfaction, performance, and turnover. In fact, such cost/benefit differences between approaches to organizing work might well be examined within broad based utility models (e.g., Boudreau & Berger, 1985).

Second, future research could try to determine if there are components of motivational job design that can act as rewards themselves without having an effect on compensation (e.g., feedback, social interaction). This would allow job design to function as an independent reward, thus complementing the reward value of compensation without requiring an increase in compensation costs.

Third, future research could continue to integrate components of the human resource system. The link between job design and compensation through the ability requirements of jobs suggests that other components of the human resource system that are also influenced by ability requirements (e.g., staffing, training, equal employment opportunity, performance appraisal) can also be similarly integrated.

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