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Interdisciplinary Examination of the Costs and Benefits of Enlarged Jobs: A Job Design Quasi-Experiment

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Costs and benefits of job enlargement were examined in an interdisciplinary framework (Campion, 1988, 1989; Campion & Thayer, 1985). A quasi experiment was conducted with multiple comparison groups, dependent variables, and replications in a financial services organization. Enlargement involved combining jobs and adding ancillary duties to jobs. Data on 11 clerical jobs were collected from incumbents (n = 377), managers (n = 80), and analysts (n = 90). Enlarged jobs had better motivational design and worse mechanistic (i.e., engineering) design. They had the benefits of more employee satisfaction, less mental underload, greater chances of catching errors, and better customer service, but they also had the costs of higher training requirements, higher basic skills, and higher compensable factors. Biological (i.e., physical) aspects were unaffected. All potential costs of enlarged jobs were not always observed, suggesting that it may be possible to gain benefits through redesign without incurring every cost.

The purpose of the present study was to evaluate one of the most popular job redesign interventions in the organizational behavior literature—*job enlargement.* This intervention is inspired by the psychology-based motivational models of job design (e.g., Hackman & Oldham, 1980; Herzberg, 1966). These models focus on such job attributes as variety, autonomy, and task significance. Evaluations of these interventions are usually concerned only with beneficial outcomes of such models (e.g., job satisfaction).

In this study, we examined the costs and benefits of job enlargement by using an interdisciplinary perspective. Different disciplines have produced several approaches to job design, and although each approach has a set of intended benefits, each also has associated costs. The interdisciplinary perspective has been described in detail previously (Campion, 1988, 1989; Campion & Berger, 1990; Campion & Thayer, 1985, 1987). In essence, there are at least four major approaches to job design. First, a *motivational* approach comes from organizational psychology and has the intended benefits of satisfaction and motivation. Second, a *mechanistic* approach comes from classic industrial engineering and has the intended benefits of human resource efficiencies, such as easier staffing and training (e.g., Barnes, 1980; Taylor, 1911). Third, a *biological* approach comes from ergonomics and related disciplines (e.g., work physiology and biomechanics) and has the intended benefits of physical comfort and health (e.g., Astrand & Rodahl, 1977; Grandjean, 1980; Tichauer, 1978). Fourth, a *perceptual-motor* approach comes from human factors research and experimental psychology and has the intended benefits of reliability and usability (Fogel, 1967; McCormick, 1976; Welford, 1976).

This interdisciplinary perspective was developed because only intended benefits tend to be examined when single disciplines are used in isolation. Costs exist because there is divergence and conflict among the various approaches to job design. Most notably, the motivational approach with its individual orientation (e.g., higher satisfaction) conflicts with the mechanistic approach, which has an organizational orientation (e.g., lower training costs). Thus, job enlargement, an intervention based on the motivational approach, can be expected to have costs that reflect the foregone benefits of the mechanistic approach. Consideration of other approaches beyond the motivational approach leads to an evaluation of costs as well as benefits and may expand the range of outcomes that can be influenced by motivational job design.

The motivational approach grew out of the humanistic movement of the 1940s as a reaction against the mechanistic or "scientific management" approach (Davis & Taylor, 1979). A continuing challenge for both psychologists and industrial engineers (Salvendy, 1978) is to determine if trade-offs between the two approaches are absolute or if alternative job configurations can enhance the outcomes of both approaches simultaneously. Interdisciplinary research involving job change is needed to examine this issue.

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Previous Job Redesign Studies

More than 20 field studies of job redesign interventions have been reported in the organizational behavior literature. They have been of two sorts, those that attempted to enhance motivational design and those that had other purposes. In all cases, evaluation was focused mainly on motivational features and associated benefits (e.g., job satisfaction).

In most interventions guided by motivational approaches, the results were positive. Clerical jobs were examined in many studies, for example, telephone service representatives, keypunchers, clerks, and operators (Ford, 1969), insurance keypunchers (Hackman, Oldham, Janson, & Purdy, 1975), government clerks (Graen, Scandura, & Graen, 1986; Orpen, 1979), and university receptionists (Griffeth, 1985). Results with clerical jobs have not been uniformly positive, however (see, e.g., Frank & Hackman, 1975; Griffin, 1989; Lawler, Hackman, & Kaufman, 1973; Locke, Sirota, & Wolfson, 1976).

In several other studies, nonclerical jobs were examined. Positive results have been found for garment manufacturing jobs (Coch & French, 1948), telephone installers, connectors, and engineers (Ford, 1969), product inspectors (Maher & Overbagh, 1971), technicians, salespersons, engineers, and supervisors (Paul, Robertson, & Herzberg, 1969), machine shop jobs (Griffin, 1983), and blue-collar petrochemical jobs (Ondrack & Evans, 1986). Again, results have not been uniformly positive (e.g., Bishop & Hill, 1971; Luthans, Kemmerer, Paul, & Taylor, 1987).

Changes that were not guided by the motivational approach have been examined in numerous studies. In those studies, redesign was the result of changes in equipment or operating procedures, which appeared to be the result of the mechanistic approach. The consequences for motivational features and outcomes were generally negative or neutral. Changes included a move from batch to mass production (Billings, Klimoski, & Breaugh, 1977), installation of office automation (Hackman, Pearce, & Wolfe, 1978), a move to a more efficient work-space arrangement (Oldham & Brass, 1979), and a move from manual to automated assembly (Wall, Clegg, Davies, Kemp, & Mueller, 1987). In other studies, changes not guided by any job-design approach were evaluated. Hall, Goodale, Rabinowitz, and Morgan (1978) studied the restructuring of an organization, and Latack and Foster (1985) studied the initiation of a compressed work schedule.

In summary, in most previous studies, job redesign was evaluated only in terms of the motivational approach and its expected benefits. Most interventions guided by this approach produced the desired effects. Job redesign that was apparently guided by the mechanistic approach tended not to improve motivational designs and outcomes.

Present Study

The present study differs from previous work in four ways. First, unlike the latter studies cited, it was guided by the motivational approach. Changes were intentionally made to increase the motivation and satisfaction value of jobs.

Second, it was not clear in most previous studies how much change took place. Changes *appeared* to improve the jobs, but there was no way to assess the changes separately. In this study, the intervention was based on combining jobs. Thus, the changes can be more fully understood because the combined jobs can be compared directly with the separate jobs and because alternative combinations can also be compared. (The terms *combined jobs* and *enlarged jobs* are used interchangeably in this article.) In addition, jobs that were not redesigned were included, thus providing a comparison among all the jobs in terms of designs and outcomes.

Third, in most previous studies, the samples were small (e.g., 50 to 100), and data were collected from incumbents only and from only one site. Sampling may partly account for the inconsistent results. We used a large sample of incumbents, included data from managers and analysts, and replicated the study at five separate sites.

Fourth, as noted, the interdisciplinary perspective allowed us to examine job enlargement in terms of other approaches to job design and in terms of costs and additional benefits.

Setting

The organization was a large financial services company. The unit of interest processed paper work in support of other units that sold the company's products. Jobs were mechanistically designed in that separate employees prepared, sorted, coded, computer keyed, and performed other specific functions on the paper work. Guided by the motivational approach, management wanted to redesign jobs by combining them into larger jobs in which incumbents performed a number of functions. The project had three goals. First, larger jobs might enhance the motivation and satisfaction of employees. Second, larger jobs might enhance feelings of ownership, thus increasing customer service. Third, in recognition of potential costs of enlarged jobs, every attempt was made to maintain (i.e., avoid decreased) productivity and quality.

Hypotheses

Enlarging jobs was expected to increase motivational job design, but previous research has indicated that the motivational approach is negatively related to the mechanistic and perceptual-motor approaches and unrelated to the biological approach. Therefore, we hypothesized that compared with separate jobs, combined jobs will be higher on the motivational, lower on the mechanistic and perceptual-motor, and no different on the biological approaches (Hypothesis 1).

In addition, we hypothesized that the outcomes of job redesign would follow a corresponding pattern. That is, compared with separate jobs, combined (enlarged) jobs would have the benefits of the motivational approach (Hypothesis 2); have the costs of the foregone benefits of the mechanistic and perceptual-motor approaches (Hypothesis 3); and not differ on the biological outcomes (Hypothesis 4).

A secondary purpose of the study was to replicate in a service industry the interdisciplinary job-design–outcome relations discovered in previous research in low-technology (Campion & Thayer, 1985) and high-technology manufacturing industries (Campion, 1988). The additional outcome of customer service was included because of its special interest to the financial services industry (Schneider, Parkington, & Buxton, 1980). Furthermore, individual differences in preferences or tolerances for types of work and demographics were again explored as moderators (cf. Campion, 1988).

Method

Research Strategy

The study took place in five work sites (at which the same type of work was performed). Each site was experimenting with similar combinations of jobs. These combinations were evaluated in a posttest-only quasi-experimental design (Cook & Campbell, 1979). Data were collected for the separate and combined jobs only after incumbents started performing the combined jobs. This research design alone cannot rule out many threats to internal validity, but it was strengthened by several factors. First, multiple nonequivalent comparison groups were used. Combined jobs were compared with separate jobs and with unchanged jobs. Second, multiple nonequivalent dependent variables were used. There were differential predictions for different variables (e.g., positive influences or benefits, and negative influences or costs). Such strong theoretical contexts strengthen causal interpretation when added to quasi-experimental designs (Cook & Campbell, 1979). Third, there were multiple replications in several areas (e.g., many combinations of jobs, five units that varied in location and size, and samples of incumbents, managers, and analysts).

The main weakness of the design in this context was selection (Cook & Campbell, 1979). Employees in the enlarged jobs did not constitute a random sample and may have differed in ways (e.g., tenure, education, performance rating) that could have influenced the findings. This threat to internal validity is explored in the Results section.

Jobs Studied

At most of the work sites, there were 11 jobs; there were slightly fewer jobs at smaller sites. All jobs were included in the study. Titles and brief descriptions follow. Corresponding codes from the *Dictionary of Occupational Titles* (DOT; U.S. Department of Labor, 1977) are provided so that additional descriptive information can be obtained and so that jobs can be compared across organizations. All of the jobs fell into the clerical occupational category. Multiple codes are provided to completely cover the content of the jobs or to identify similar jobs.

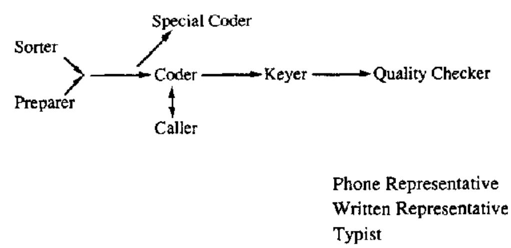
1. *Sorters* (n = 20) categorized correction forms for existing files—DOT sorter (209.687-010) or mail clerk (209.587-026).
2. *Preparers* (n = 36) organized and numbered files for new business—DOT office clerk (209.567-022) or general clerk (209.562-010).
3. *Coders* (n = 46) assigned codes to files by applying rules to information in the files—DOT policy rater (214.482-022), policy-change clerk (219.362-042), coding clerk (209.387-010), or underwriting clerk (219.367-038).
4. *Callers* (n = 21) phoned other company locations to obtain information missing from files—DOT reviewer (209.687-018).
5. *Keyers* (n = 49) entered information from files into the computer—DOT data-coder operator (203.582-026) or terminal operator (203.582-054).
6. *Quality checkers* (n = 18) verified information entered by the keyers by comparing files to computer data—DOT checker (209.687-010).
7. *Special coders* (n = 39) coded files that were not entered into the computer because of their complexity—DOT codes under 3, plus policy-value calculator (216.382-050), premium-note interest-calculator (216.482-022), or cancellation clerk (203.382-014).
8. *Phone representatives* (n = 45) answered phone inquiries and performed some file processing—DOT policyholder-information clerk or customer-service clerk (249.262-010).
9. *Written representatives* (n = 19) answered written inquiries and performed some file processing—DOT codes under 8.
10. *Typists* (n = 28) typed letters and performed other clerical duties to prepare correspondence—DOT typist (203.582-066) or word-processing-machine operator (203.362-022).
11. *Processors* (n = 56) performed the duties of both coders and keyers (this was the enlarged job). No comparable DOT title could be found.

Work flow relations among the jobs are shown in Figure 1. The main comparison was between the processor job and its components and the coder and keyer jobs. This is an example of enlargement through the combination of later and earlier work stages (Ford, 1969, p. 157). A coder's output was a keyer's input. These jobs were central to the primary function of these work sites, were held by a great number of employees, and were chosen by management as the most important to study.

Some employees performed other jobs as ancillary duties. The duties of a supporting job were absorbed. Although not the main interest of the study, this provided opportunities to explore other combinations. Jobs enlarged through the absorption of ancillary duties and their comparison groups also are shown in Figure 1.

Samples

Sampling was driven by four goals: (a) accurate estimates of measures for all jobs, (b) high power for the detection of differences across jobs, (c) minimally adequate power within sites, and (d) data for all jobs from all samples. On the basis of these goals and previous research (Campion, 1988), the lesser of either 10 randomly sampled incumbents or all incumbents was selected for each job at each site. This procedure yielded 377 incumbents. Calculations of sampling accuracy based on variance estimates from the data, employee population statistics, and standard sampling formulas (Warwick & Lininger, 1975) indicated an



Job combinations studied:	Comparison groups:
*Processor (i.e., Coder and Keyer combined)	*Coder and Keyer separately
*Coder with Caller added as ancillary duty	*Coder alone
*Keyer with Quality Checker added as ancillary duty	*Keyer alone
*Processor with Caller added as ancillary duty	*Processor alone
*Processor with Quality Checker added as ancillary duty	*Processor alone
*Processor with Caller and Quality Checker added as ancillary duties	*Processor alone

Figure 1. Schematic representation of work flow and job combinations studied.

average 95% confidence interval per job of .13 (range .07 to .22) for job design and .22 (range .12 to .37) for outcome measures. That is, estimated accuracy per job averaged ±3.2% of the 1 to 5 scale range for job design and averaged ±5.5% for outcome measures. At the site level, accuracy per job averaged ±5.5% for job design and ±9.7% for outcome measures. Statistical power to detect differences across the 11 jobs was 96% in the total sample and averaged 39% at the site level, assuming a medium effect size (.50 *SD* mean difference, $p < .10$; Cohen, 1977). Power for hypotheses tests between the processor job and the coder and keyer jobs was 96% in the total sample and averaged 52% at the site level. Power for hypotheses tests with ancillary duties averaged 70%. Therefore, accuracy and power were judged acceptable for the total sample and marginal for the subsamples of incumbents.

All but 6 incumbents were female, and 66.1% were less than 33 years old. Company tenure was bimodal; 61.4% had been with the company less than 5 years, and 23.9% had been with the company from 9 to 15 years. Job tenure was usually more than 1 year (61.8%), and only 18.1% of the incumbents had been in their job less than 6 months. Fifty-five percent of the incumbents had only a high school education, and 41.8% had some college or technical-school education.

The lesser of either two managers or all managers was selected for each job at each site. This procedure yielded 80 managers. Each manager provided data on only one job. Sampling accuracy was high because 61.8% to 100% of all managers were included across sites. But statistical power was marginal at only 37% across the 11 jobs (.50 *SD*, $p < .10$; Cohen, 1977) and only 50% for tests of hypotheses.

Of the managers, 41.6% were female, 81.8% were between 20 and 29 years old, and 78.0% had 1 or 2 years company tenure (all in management). Nearly all had 4 or more years of college (98.7%).

Finally, two analysts evaluated most jobs at each site. Eight analysts participated, but 90 job measurements were obtained because each analyst provided data on more than one job. Sampling accuracy could not be estimated because the population of analysts could not be specified. Most jobs were evaluated by most analysts. Statistical power was marginal at only 40% to detect a medium effect size across the 11 jobs (.50 *SD*, $p < .10$; Cohen, 1977) and only 52% for the tests of hypotheses.

Analysts were from human resources, information systems, and line management. Most had knowledge and experience with the jobs they evaluated.

Job-Design Measures

We used the self-report Multimethod Job Design Questionnaire (MJDQ; Campion, 1988). The MJDQ has favorable psychometric qualities (Campion, 1988) and convergent and discriminant validity (Campion, Kosiak, & Langford, 1988) with the popular Job Diagnostic Survey (Hackman & Oldham, 1980). Several modifications were made for this study. First, items were reworded in the first-person singular to make them similar to opinion surveys familiar to employees. Second, minor wording changes were made to clarify concepts and incorporate company terminology. Third, the biological scale was made more appropriate for office jobs (e.g., the endurance item was eliminated and two items on physical *in*activity were added). A 5-point scale ranging from *strongly agree* (5) to *strongly disagree* (1) was used for responses. Larger scores indicated better job design. Scores were calculated as averages of applicable items: motivational (21 items), mechanistic (10 items), biological (12 items), and perceptual-motor (12 items). (All measurement instruments and item statistics are available on request.)

Outcome Measures

Overall. Twelve outcomes, developed to capture the range of benefits and costs of enlarged jobs, came from three sources. First, the basic interdisciplinary research (Campion, 1988; Campion & Thayer, 1985) revealed that each approach to job design is oriented toward a particular category of outcomes—the motivational approach toward attitudinal satisfaction (e.g., satisfaction and involvement), the mechanistic approach toward human resource efficiency (e.g., training and staffing ease), the biological approach toward physical comfort (e.g., physical effort and fatigue), and the perceptual-motor approach toward system reliability and user reactions (e.g., errors, mental fatigue, and user friendly equipment). Although the measures of these approaches do not share common items, they do have some relations with each other's outcomes. For example, some approaches share benefits and costs (the mechanistic and perceptual-motor approaches), and the benefits of some approaches are costs of others (motivational versus mechanistic and perceptual-motor approaches).

Second, some outcomes were drawn from subsequent interdisciplinary research in which it was discovered that mental and physical ability requirements (Campion, 1989) and compensation requirements are related to job design (Campion & Berger, 1990). Third, other outcomes were drawn from special interests of the company (e.g., customer service, quality, efficiency). The outcomes studied are described in the following paragraphs in terms of benefits or costs from the company's perspective. Except where indicated, the prediction was that enlarging jobs would produce more of the outcome.

Predicted benefits. The studies described earlier give references that support the outcome measures used.

The *satisfaction* measure contained 10 items; 2 items each were concerned with job satisfaction, intrinsic work motivation, and job involvement, and 4 job-related items were taken from the company's opinion survey (e.g., "Do you like the work?"; "Are you satisfied with the job?"). Job enlargement was expected to increase satisfaction, a benefit of the motivational approach.

The *mental underload* measure consisted of two items concerned with inadequate variety and boredom. Job enlargement was expected to reduce underload (a benefit of the motivational approach).

The *catching errors* measure contained one item. Although increased errors were a potential cost of enlarging the job, we also expected that enhanced feedback from more motivational work would increase the likelihood of catching errors.

The *customer service* measure contained three items assessing the extent to which priorities and objectives, methods and procedures, and the overall job enhanced customer service. (The term *customer* refers to both fellow employees and customers.) Job enlargement was expected to improve customer service by enhancing employees' feelings of work ownership.

Predicted costs. The *mental overload* measure contained three items assessing speed stress (e.g., too much to do), load stress (e.g., tasks are too difficult), and mental fatigue. Job enlargement was expected to eliminate the benefit of reduced stress associated with the perceptual-motor approach.

The *training requirements* measure consisted of three items; two items asked for estimates of the percentage of people who could perform the job with and without training, and one item assessed experience requirements. Job enlargement was expected to eliminate the benefit of reduced training needs associated with the mechanistic approach.

The *basic skills* measure contained four items, one each on required reading, writing, math, and problem-solving skills. Job enlargement was expected to eliminate the benefit of reduced skill needs associated with the mechanistic approach.

The *making errors* measure consisted of one item, which asked for an estimate of the chances of making errors. Job enlargement was expected to increase the likelihood of errors, a cost from the perspective of the perceptual-motor approach.

The *job efficiency* measure contained three items and was similar to the customer service measure. Job enlargement was expected to reduce efficiency, a cost from the perspective of the mechanistic approach.

The *compensable factors* measure assessed four factors most often used in job evaluations—responsibility, skill, effort, and working conditions. Job enlargement was expected to increase compensation needs, a cost from the perspective of the mechanistic approach.

The *work space* measure contained five items concerned with work space layout, availability of supplies and equipment, convenience of equipment, reliability of equipment, and attitudes toward work space and equipment. Job enlargement was expected to decrease the desirability of the work space, a cost from the perspective of the perceptual-motor approach.

No effect predicted. The *physical comfort* measure assessed outcomes drawn from the biological approach. There were six items, one on effort, three on aches and pains (e.g., posture and eye strain), one on fatigue, and one on working conditions.

Scoring. Five-point scales were used for all items, but the agree–disagree format of job-design items was not used for most. Scales were developed, when appropriate, to be objective (e.g., counts, percentage estimates), to use anchor points that aid discriminability, to be tailored to item content, and to reflect expected ranges of attributes. Scores were calculated by averaging items. Large values indicate greater amounts of the outcomes in question.

Other Measures

Preferences and tolerances. We also used scales to tap individual preferences or tolerances for types of work (Campion, 1988). Six items were written from the motivational approach (e.g., "I prefer highly challenging work that taxes my skills and abilities."), four were written from the mechanistic approach (e.g., "I have a high tolerance for repetitive work."), four were from the biological approach (e.g., "I do not mind work that requires some physical exertion."), and four were taken from the perceptual-motor approach (e.g., "I have a high tolerance for work where there are frequently too many things to do at one time."). Five-point agree–disagree response scales were used, and scores were calculated by averaging items.

Demographics. Data on six demographic variables were collected from personnel files: age (years), company tenure (years), education (coded from 1 year of high school [1] to 6 years of college [6]), current and previous performance appraisal ratings (coded from exceeds expected level [1] to needs improvement [4]), and pay (converted to a 1–100 range). Data on three additional demographic variables were collected with the questionnaire: job tenure (coded from less than 6 months [1] to more than 5 years [5]), overtime (coded from 0 to 2 hr average per week [1] to 9 hr or more per week [5]), and absenteeism (coded from 0 days per month on the average for reasons other than vacation [1] to 4 or more days per month [5]).

Procedures

A team of four analysts visited each site. Participating managers and incumbents were told that the study's purpose was to gather ideas and information on the redesigned jobs. Participants were assured of confidentiality. All employees selected agreed to participate, although a few substitutions had to be made because of scheduling conflicts.

Random sampling of incumbents involved systematic selection (i.e., every *n*th person) from alphabetized listings. Incumbents completed questionnaires in group sessions. They evaluated their entire job after indicating any ancillary duties on a checklist.

Managers were randomly assigned jobs to evaluate through simple alternation (e.g., every other manager). Managers completed questionnaires individually, evaluating only the assigned job without considering any possible ancillary duties. In the outcomes portion of the questionnaire, they were instructed to indicate their views of the incumbents' reactions to the jobs.

Analysts were randomly assigned jobs to evaluate, also through simple alternation. Analyst training consisted of a review of instrumentation, advice on making observation-based ratings, and practice. All reference to target jobs was avoided during training to prevent contamination. Analysts were instructed to evaluate the assigned job without considering any ancillary duties, to make independent judgments, and to use the entire scale range. They completed only the job-design items because outcomes could not be evaluated easily on the basis of observation. Analysts visited job sites together, observing and discussing each job with incumbents for 15 min.

In summary, every effort was made to gain an objective evaluation. All participants were randomly selected, rather than being solicited or chosen by management. Questions had neutral wording and addressed both benefits and costs. Bias was minimized by using a structured questionnaire and scripts for instructions. Finally, comments made to participants by project team members did not suggest a predetermined viewpoint on job enlargement.

Results

Reliability and Agreement

Internal consistency reliabilities, interrater reliabilities for the means of rater groups, and correlations between samples were generally large (see Table 1) for all measures and samples. However, several nonsignificant indices were observed for the making errors and catching errors outcome scales (possibly because they contained only one item) and the physical comfort outcome scale (possibly because of the physically undemanding nature of the jobs evaluated). Interrater reliability on the job efficiency outcome scale was nonsignificant for managers. Finally, reliability estimates at the aggregate job level do not ensure reliability among individual respondents (James, 1982), but the job level is the proper level of analysis in the present context because it is the level of treatment in job redesign projects.

Because reliability only assesses covariation and not absolute differences, and because differences highlight alternative perspectives, we also examined agreement among the three samples. Significant multivariate analyses of variance (MANOVAs) were observed between samples on both the job-design and outcome scales ($p < .05$). Individual analyses of variance (ANOVAs) identified several differences (e.g., analysts rated the jobs worse on the motivational and better on the mechanistic approaches than did incumbents or managers, and managers rated jobs better on the biological approach and lower on basic skills than did incumbents), but most comparisons were nonsignificant.

In summary, reliability and agreement were generally quite high. However, results for less reliable scales should be interpreted with caution, and enough differences existed among samples that we tested the hypotheses separately in each sample.

Differences Across the Set of Jobs

Significant MANOVAs ($p < .05$) were observed across the set of 11 jobs for both job-design and outcome scales and for all three samples. The means and post hoc comparisons for in-

Table 1
Reliability Analyses on All Measures and Samples

Measure	No. of items	Internal consistency I	Internal consistency M	Internal consistency A	Interrater reliability I	Interrater reliability M	Interrater reliability A	Correlations between samples I–M	Correlations between samples I–A	Correlations between samples M–A
Job design										
Motivational	21	.88	.83	.94	.75**	.87**	.81**	.73**	.78**	.76**
Mechanistic	10	.75	.83	.89	.94**	.83**	.85**	.82**	.84**	.95**
Biological	12	.79	.72	.88	.75**	.58**	.46*	.13	.33	−.08
Perceptual-motor	12	.88	.85	.93	.90**	.53**	.89**	.74**	.64**	.96**
Outcome										
Satisfaction	10	.92	.89	—	.81**	.78**	—	.57*	—	—
Mental underload	2	.71	.77	—	.84**	.71**	—	.84**	—	—
Catching errors	1	—	—	—	.56**	.56**	—	.17	—	—
Customer service	3	.97	.88	—	.85**	.64**	—	.84**	—	—
Mental overload	3	.63	.78	—	.73**	.56**	—	.85**	—	—
Training requirements	3	.72	.68	—	.96**	.88**	—	.87**	—	—
Basic skills	4	.68	.58	—	.95**	.85**	—	.89**	—	—
Making errors	1	—	—	—	.90**	.09	—	.39	—	—
Job efficiency	3	.95	.95	—	.47**	−.46	—	.54*	—	—
Compensable factors	4	.80	.72	—	.93**	.86**	—	.80**	—	—
Work space	5	.78	.76	—	.67**	−.29	—	.34	—	—
Physical comfort	6	.74	.83	—	.42*	−.18	—	.52*	—	—

Note. Analysts did not complete outcome measures. I = incumbents (n = 377), M = managers (n = 80), and A = analysts (n = 90). Correlations between samples are based on 11 jobs.
* $p < .10$. ** $p < .05$.

cumbents are shown in Tables 2 and 3. (Results for managers and analysts were essentially identical to those for incumbents and are available on request.) For incumbents, managers, and analysts, more complex jobs (e.g., phone representative, written representative, and processor) generally had better motivational design and associated outcomes, whereas the less complex jobs (e.g., sorter, preparer, caller, and quality checker) had better mechanistic and perceptual-motor design and associated outcomes. The worse biologically designed jobs (e.g., sorter, keyer, phone representative, and processor) tended to require physical restraint at a work station, keyboard, or telephone, whereas better jobs (e.g., preparer, quality checker, and written representative) tended to require a variety of physical activities. Thus, job-design and outcome scales seemed to array the jobs in a logical manner.

Tests of Hypotheses

Coder and keyer jobs did not differ significantly on any job-design scale or on most outcome scales (see Tables 2 and 3). We therefore compared the processor job with the total group of coder and keyer jobs to maximize statistical power for the hypotheses tests.

Hypothesis 1. MANOVAs comparing processor with coder and keyer jobs on the job-design scales were significant for incumbents and managers ($p < .05$). As predicted, the processor job had better motivational and worse mechanistic design than the coder and keyer jobs. There was no difference in terms of the biological design (see Table 4). Contrary to predictions, no differences were observed in incumbents' and managers' ratings of perceptual-motor design features or for analysts' ratings of any design features.

Four of five MANOVAs comparing jobs with and without ancillary duties were significant at $p < .05$. As predicted, three of the five jobs with ancillary duties tended to have better motivational and worse mechanistic designs (see Table 5). Contrary to predictions, one job with ancillary duties had better biological design and two such jobs had better perceptual-motor designs.

Hypothesis 2. MANOVAs comparing the processor job with the coder and keyer jobs on the entire set of outcome scales were significant for incumbents ($p < .05$) but just above conventional significance levels for managers ($p = .13$). The processor job had all four of the predicted benefits: more satisfaction, less mental underload, greater chances of catching errors, and better customer service (see Table 4). It also had the unpredicted benefit of requiring lower basic skills (according to managers).

Of the five MANOVAs comparing jobs with and without ancillary duties, one was significant at $p < .05$ and three at $p < .10$. Each of the four predicted benefits was observed in at least two comparisons (see Table 5). Scattered unpredicted benefits were observed, for example, lower training requirements, lower basic skills requirements, smaller chances of making errors, higher job efficiency, and more physical comfort.

Hypothesis 3. Compared with the coder and keyer jobs, the processor job had the predicted costs of higher training requirements and worse work space (according to incumbents) and higher compensable factors (according to managers; see Table 4). Contrary to predictions, neither incumbents nor managers reported more mental overload, greater chances of making errors, or lower job efficiency.

Jobs with ancillary duties tended to have the predicted costs of higher training and basic skills requirements and, less consistently, more mental overload and higher compensable factors

Table 2
Means and Analyses of Variance of Incumbents' Responses to the Job-Design Measures

Job	n	Motivational	Mechanistic	Biological	Perceptual-motor
Sorter	20	3.75_{ab}	3.39_{cd}	3.38_{abc}	3.27_{e}
Preparer	36	3.52_{a}	3.74_{e}	3.69_{de}	3.29_{e}
Coder	46	3.64_{a}	3.01_{ab}	3.49_{abcd}	2.67_{ab}
Caller	21	3.72_{ab}	3.40_{cd}	3.59_{bcde}	3.16_{de}
Keyer	49	3.71_{ab}	3.01_{ab}	3.29_{a}	2.75_{abc}
Quality checker	18	3.58_{a}	3.61_{de}	3.77_{e}	2.91_{bcd}
Special coder	39	3.67_{ab}	2.84_{a}	3.48_{abcd}	2.60_{a}
Phone representative	45	3.94_{bc}	2.91_{a}	3.35_{ab}	2.69_{abc}
Written representative	19	4.09_{c}	2.76_{a}	3.68_{de}	2.56_{a}
Typist	28	3.80_{ab}	3.19_{bc}	3.64_{cde}	2.95_{cd}
Processor	56	3.92_{bc}	2.86_{a}	3.35_{ab}	2.63_{a}
M		3.76	3.10	3.48	2.81
SD		0.48	0.54	0.48	0.54
F		3.98*	16.34*	3.99*	9.77*

Note. $N = 377$. Larger values indicate better design. Means in the same column with the same subscript are not significantly different (Duncan's test, $p < .05$).
* $p < .05$.

(see Table 5). Contrary to predictions, costs were not observed in terms of greater chances of making errors, lower job efficiency, or worse work space.

Hypothesis 4. As predicted, ratings of physical comfort did not differ for the processor, coder, and keyer jobs (see Table 4) nor in four of the five comparisons involving ancillary duties (see Table 5).

Site level analyses. Patterns of job differences were very similar across the five sites, and tests of hypotheses generally replicated ($p < .10$). In three or more of the five sites, the processor job was rated better in terms of motivational design and was rated as more satisfying, less boring (less mental underload), and resulting in better customer service. It was also rated as requiring more training than the coder and keyer jobs.

Effect sizes. Effect sizes for the hypotheses tests were fairly large, averaging around 0.5 standard deviations.

Job-Design–Outcome Relations

Intercorrelations among job-design scales were as expected from theory and previous research (Campion, 1988; Campion & Thayer, 1985). (Results reported are for incumbents. Results for managers and analysts were essentially identical and are available on request.) Mechanistic and perceptual-motor scales correlated negatively with the motivational scale but positively with each other, and the biological scale was fairly independent (see Table 6).

Intercorrelations among outcome scales (see Table 7) can be understood in terms of either the underlying influence of mental demands or logic. For example, mental demands were reflected in the relations among satisfaction, mental underload, mental overload, training requirements, basic skills, and compensable factors. Logically, customer service was associated with catching errors and satisfaction. Efficiency was associated with less mental underload, greater chances of catching errors, and better customer service. The quality of work space was negatively associated with outcomes reflecting mental demands due to the desk space needs of some complex jobs (e.g., processor and coder).

Relations between job-design and outcome scales were calculated across samples to avoid common method bias (see Table 8). Correlations were largely as we had expected from previous research. Better motivational design was related to more satisfaction, less mental underload, greater chances of catching errors, better customer service, more mental overload, higher training and skill requirements, higher compensable factors, and worse work space. Unexpectedly, better motivational design was related to higher job efficiency in the within-sample correlations (not shown, but available on request).

Better mechanistic design was related to less satisfaction, more mental underload, less mental overload, lower training and skill requirements, lower compensable factors, and better work space. The lack of relation between mechanistic design and job efficiency was unexpected. The perceptual-motor design scale showed relations similar to mechanistic design. Finally, the biological design scale did not relate consistently to any outcome scale, including physical comfort.

Within-sample correlations were of a similar size (average $r = .53$ within samples versus .50 across samples) and pattern (correlations between sets of correlations ranged from .77 to .91). Correlations were smaller at the individual level (the average correlation was .22 to .26 smaller), but they had a similar pattern (correlations between sets of correlations ranged from .78 to .97).[1]

Individual Differences

We used multiple regression (i.e., test contribution of interaction terms; Champoux & Peters, 1980) to analyze demographic variables and incumbents' preferences and tolerances for types of work as moderators of job-design–outcome relations. Because the design scales related to outcomes beyond just their predicted outcomes, we performed these analyses for every design–outcome combination (48 analyses). (More detailed regression and analysis of covariance results for the individual-differences measures and the selection effects are available on request.)

Descriptive statistics suggested that incumbents generally preferred the motivational design ($M = 4.15$, $SD = 0.47$, internal consistency $r = .80$), were ambivalent about mechanistic ($M = 3.22$, $SD = 0.62$, $r = .68$) and biological designs ($M = 3.40$, $SD = 0.55$, $r = .51$), but were more tolerant of poor perceptual-motor design ($M = 3.68$, $SD = 0.67$, $r = .80$). The interaction

[1] Results of within-sample correlational analyses at the job and respondent levels are available on request. Pattern similarity between sets of correlations was determined by calculating correlations between the sets of correlations. This method provides clearer results than coefficients of congruence, which reflect pattern and level similarity simultaneously.

Table 3
Means and Analyses of Variance of Incumbents' Responses to the Outcome Measures

Job	Satisfaction	Mental underload	Catching errors	Customer service	Mental overload	Training requirements	Basic skills	Making errors	Job efficiency	Compensable factors	Work space	Physical comfort
Sorter	3.65$_{bc}$	2.20$_{bc}$	3.65$_{ab}$	3.59$_{ab}$	2.32$_{a}$	3.09$_{b}$	2.58$_{a}$	3.20$_{a}$	4.89$_{bc}$	3.51$_{b}$	3.71$_{bc}$	3.13$_{ab}$
Preparer	3.48$_{b}$	2.56$_{c}$	3.83$_{abc}$	3.75$_{abc}$	2.30$_{a}$	2.39$_{a}$	2.76$_{a}$	3.08$_{a}$	3.88$_{bc}$	3.14$_{a}$	3.67$_{bc}$	3.37$_{ab}$
Coder	3.72$_{bcd}$	2.02$_{bc}$	3.54$_{ab}$	3.67$_{abc}$	3.05$_{bc}$	3.95$_{cde}$	3.59$_{c}$	4.02$_{b}$	3.67$_{abc}$	4.09$_{c}$	3.62$_{bc}$	3.20$_{ab}$
Caller	3.68$_{bc}$	2.19$_{bc}$	4.10$_{bc}$	4.30$_{de}$	2.67$_{abc}$	2.41$_{a}$	3.32$_{bc}$	2.62$_{a}$	3.94$_{bc}$	3.42$_{ab}$	3.87$_{bc}$	3.54$_{b}$
Keyer	3.72$_{bcd}$	2.45$_{c}$	3.56$_{ab}$	3.73$_{abc}$	3.12$_{bc}$	2.70$_{cd}$	2.95$_{ab}$	4.06$_{b}$	3.67$_{abc}$	3.96$_{c}$	3.82$_{bc}$	3.04$_{a}$
Quality checker	3.08$_{a}$	3.44$_{d}$	3.33$_{a}$	3.45$_{a}$	2.70$_{abc}$	3.02$_{b}$	2.71$_{a}$	2.81$_{a}$	3.39$_{a}$	3.31$_{ab}$	4.03$_{c}$	3.11$_{ab}$
Special coder	3.68$_{bc}$	2.39$_{c}$	3.36$_{a}$	3.47$_{a}$	2.92$_{bc}$	4.01$_{de}$	4.35$_{d}$	3.74$_{b}$	3.50$_{ab}$	4.03$_{c}$	3.19$_{a}$	3.38$_{ab}$
Phone representative	4.06$_{d}$	1.56$_{ab}$	3.88$_{abc}$	4.08$_{cd}$	3.25$_{c}$	3.92$_{cde}$	4.01$_{d}$	2.95$_{a}$	3.87$_{bc}$	4.15$_{c}$	3.69$_{bc}$	3.49$_{b}$
Written representative	4.07$_{d}$	1.32$_{a}$	4.21$_{c}$	4.67$_{c}$	2.87$_{abc}$	4.31$_{e}$	4.18$_{d}$	3.11$_{a}$	3.88$_{bc}$	4.29$_{c}$	3.68$_{bc}$	3.55$_{b}$
Typist	3.92$_{cd}$	1.70$_{ab}$	3.79$_{abc}$	3.90$_{bcd}$	2.53$_{ab}$	3.59$_{c}$	2.71$_{a}$	2.82$_{a}$	3.98$_{c}$	3.42$_{ab}$	3.74$_{bc}$	3.25$_{ab}$
Processor	3.85$_{cd}$	1.65$_{ab}$	3.59$_{ab}$	4.01$_{bcd}$	3.12$_{bc}$	4.06$_{de}$	3.34$_{bc}$	3.89$_{b}$	3.77$_{abc}$	4.10$_{c}$	3.52$_{ab}$	3.11$_{ab}$
M	3.75	2.08	3.68	3.86	2.89	3.61	3.38	3.45	3.76	3.84	3.64	3.27
SD	0.64	1.25	0.95	0.76	0.99	0.88	0.94	1.10	0.72	0.70	0.72	0.82
F	5.16**	6.41**	2.30**	6.47**	3.73**	27.79**	21.66**	10.10**	1.87**	13.83**	2.99**	1.74*

Note. Larger values indicate a greater amount of the attribute. Means in the same column with the same subscript are not significantly different (Duncan's test, $p < .05$).
* $p < .10$. ** $p < .05$.

terms were significant ($p < .05$) in only 8 of the 48 analyses, percentages of variance explained were small (i.e., 1% to 1.5%), and in no case did the moderator operate on the relation between a job-design scale and its main predicted benefits. Managers' data showed similar means, variances, and reliabilities, but only three significant interaction terms emerged and none with predicted benefits.

Demographic data showed wide range and variation: age (M = 31.73, SD = 10.49), company tenure (M = 6.26, SD = 6.96), education (M = 5.36, SD = 1.95), performance appraisal rating (M = 1.70, SD = 0.76), previous rating (M = 1.70, SD = 0.73), pay (M = 33.52, SD = 29.30), job tenure (M = 3.21, SD = 1.62), overtime (M = 1.90, SD = 1.95), and absenteeism (M = 2.11, SD = 1.91). Moderator analyses were performed for each demographic variable for each design–outcome combination. Only 10.2% of the 432 interactions were significant ($p < .05$). No variable had more than 8 significant interactions. About 25% of the interactions were with a job-design scale and its predicted benefit, but this was the chance level with each outcome associated with one of four scales. Average variance accounted for was only 1.6%.

Selection Effects

The demographic variables were used to determine whether results could be attributed to differences between employees assigned to jobs rather than to the jobs themselves. All variables, except education, showed significant ANOVAs across the 11 jobs ($p < .05$), and several showed significant correlations with design and outcome scales. Therefore, analyses of covariance (ANCOVAs) were conducted with the demographic variables as covariates. With one exception, differences across jobs on all scales remained virtually unchanged. ANCOVAs were significant at levels approximately equal to the ANOVAs reported in Tables 2 and 3, no ANCOVAs were nonsignificant ($p < .05$), and F values increased in a third of the cases. Although controlling for pay slightly reduced differences across jobs on several scales, the differences remained significant.

As a more exact test, we ran ANCOVAs to compare the processor job with the coder and keyer jobs. Again, with one exception, ANCOVAs were significant at about the same levels as the ANOVA equivalents of the t tests reported in Table 4, and the F values increased in half the cases. But controlling for pay made most scales marginally significant or nonsignificant: motivational t = 1.42, $p < .10$; mechanistic, t = 1.08, *ns;* satisfaction, t = .22, *ns;* mental underload, t = 1.30, $p < .10$; customer service, t = 1.37, $p < .10$; training requirements, t = 1.30, $p < .10$; and work space, t = 1.08, *ns.*

Discussion

Summary of Findings

In this study, we used an interdisciplinary framework (Campion, 1988, 1989; Campion & Thayer, 1985) to examine the costs and benefits of enlarging jobs. As predicted, the combined processor job was more complex than separate coder and keyer jobs, and jobs with ancillary duties were more complex than jobs without ancillary duties. Enlarged jobs had better

Table 4
Comparisons (t Tests) of the Processor Job With the Coder and Keyer Jobs on the Job-Design and Outcome Measures for All Samples

Measure	Incumbents	Managers	Analysts
Job design			
Motivational	2.91**	2.75**	0.60
Mechanistic	−1.85**	−2.77**	−0.64
Biological	−0.49	0.43	0.90
Perceptual motor	−0.59	−0.90	0.33
Outcome			
Benefits predicted			
Satisfaction	1.38*	2.36**	—
Mental underload	3.20**	2.42**	—
Catching errors	0.26	1.73**	—
Customer service	2.68**	2.21**	—
Costs predicted			
Mental overload	−0.24	0.37	—
Training requirements	−2.70**	−0.72	—
Basic skills	−0.55	2.20**	—
Making errors	0.94	1.10	—
Job efficiency	0.87	0.73	—
Compensable factors	−0.76	−1.73**	—
Work space	−1.84**	0.30	—
No effect predicted			
Physical comfort	−0.08	0.39	—

Note. For the processor job, n = 56 for incumbents, n = 10 for managers, and n = 10 for analysts. For coder and keyer jobs, n = 95 for incumbents, n = 18 for managers, and n = 20 for analysts. Analysts did not complete outcome measures. Positive t tests (one-tailed) indicate better design or more favorable outcome for the processor job.
* $p < .10$. ** $p < .05$.

motivational and worse mechanistic design. They had the predicted benefits of more employee satisfaction, less mental underload, greater chances of catching errors, and better customer service, and the predicted costs of higher training requirements, higher basic skills, and higher compensable factors (see Appendix).

Contrary to predictions, enlarged jobs occasionally had better perceptual-motor design and the benefits of lower basic skills, higher job efficiency, smaller chances of making errors, and more physical comfort. They also occasionally had the additional costs of more mental overload and worse work space.

That some predicted costs turned out to be benefits and other costs were inconsistent is noteworthy because it suggests that not all potential costs necessarily occur. Trade-offs may not be absolute. It may be possible to gain benefits through job redesign without incurring every cost. Of course, these conclusions must be tentative because there are always explanations for inconsistent findings.

Findings were comparable for both incumbents and managers and were replicated across sites. However, analyst data showed no effect, perhaps because analysts were less able to distinguish among measures (as suggested by the high intercorrelations among their job-design ratings), or because analysts had a different perspective (as suggested by the lower agreement between their ratings and those of incumbents and managers), or because there was too little statistical power.

A second purpose of this study was to replicate previous research but in the service industry. Findings were as expected. Motivational design was related positively to outcomes reflecting higher mental demands, whereas mechanistic and perceptual-motor design was related to outcomes reflecting lower mental demands. Motivational design was also related to enhanced customer service. These relations were found in the incumbent and manager samples and at the job and individual levels of analysis. As expected (Campion, 1988), job-level relations were larger than individual-level relations. Also demonstrated was another way to avoid common method bias (cf. Campion, 1988; Campion & Thayer, 1985). Cross-sample correlations were calculated between design data from one sample (e.g., managers) and outcome data from another (e.g., incumbents), and results were very similar to those observed within samples.

Several unexpected findings occurred. Motivational design was positively related to job efficiency, perhaps because incumbents were free to use different methods. Motivational design was related negatively to work space, probably because complex jobs require more desk space. Biological design did not relate consistently with any outcome, possibly because of the low physical demands of the jobs evaluated or because of the low reliabilities of the physical measures.

Research has generally shown that individual differences in growth need strength moderate motivational-design–satisfaction relations (Loher, Noe, Moeller, & Fitzgerald, 1985). Campion (1988) suggested that individual differences in preferences or tolerances existed for all the approaches to job design and that these individual differences might moderate the relations between the designs and the outcomes. As with the previous study (Campion, 1988), however, few moderators were found. Demographic variables also did not moderate the design–outcome relations. This lack of moderation may be positive in that jobs are often designed to accommodate a range of workers, including future workers whose preferences and demographics are unknown.

Limitations

A primary limitation of this quasi-experimental study was selection (Cook & Campbell, 1979). Employees in enlarged jobs were not randomly sampled. To explore this potential threat, we examined indicators of differences through a large set of demographic variables (e.g., age, job tenure, education, performance appraisal ratings). Findings were generally not altered when these variables were controlled. The exception was pay, which did somewhat reduce job differences.

If pay were viewed as a selection effect, the argument would be that higher paid employees were assigned to these new enlarged jobs before lower paid employees. Thus, employees in enlarged jobs were unrepresentative of the employee population. However, it is also possible that some employees were given an increase in pay as an inducement for taking the enlarged job. This potential cost of enlargement is why we assessed compensable factors as a dependent variable. Either way, the causal direction is more likely to be from job design to pay rather than the reverse (also see Campion & Berger, 1990, for theoretical arguments supporting this causal direction), so par-

Table 5
Comparisons (t Tests) of Jobs With and Without Ancillary Duties on Incumbents' Responses to Job-Design and Outcome Measures

Measure	Calling added to coder job	Calling added to processor job	Quality checking added to keyer job	Quality checking added to processor job	Calling and quality checking added to processor job
Job design					
Motivational	−0.33	2.25**	0.70	2.32**	3.55**
Mechanistic	0.63	0.64	−2.24**	−2.18**	−1.61*
Biological	−0.52	1.29*	0.48	−0.60	0.35
Perceptual motor	2.41**	1.48*	−1.12	−0.37	0.45
Outcome					
Benefits predicted					
Satisfaction	−0.07	−0.39	−0.10	2.72**	1.39*
Mental underload	−1.08	2.41**	−0.40	0.82	2.36**
Catching errors	1.65**	1.65**	2.83**	0.21	0.46
Customer service	2.65**	1.29*	0.69	0.76	1.26*
Costs predicted					
Mental overload	−0.39	−0.04	−1.91**	−0.90	−0.39
Training requirements	1.26*	−1.16	−1.78**	−2.71**	−2.57**
Basic skills	2.09**	0.58	−2.20**	−2.79**	−1.69**
Making errors	0.85	1.55*	−1.25	0.08	0.83
Job efficiency	1.99**	0.35	1.95**	1.05	0.69
Compensable factors	1.04	0.23	−1.33*	−0.97	−0.41
Work space	−0.10	0.27	0.85	−0.46	0.35
No effect predicted					
Physical comfort	0.73	2.23**	0.47	−1.12	1.11
No. of incumbents					
With ancillary duties	11	37	16	45	29
Without ancillary duties	35	19	33	11	27

Note. Positive *t* tests (one-tailed) indicate better design or a more favorable outcome for the enlarged job.
* $p < .10$. ** $p < .05$.

tialling pay out may be an overly stringent test because it removes some true job-design differences.

Potential selection effects can be avoided in future research by assigning random or representative samples of employees to enlarged jobs or by using a within-subjects design in which the same employees are studied before and after their jobs are enlarged.

Another potential concern with pay is that even though employees in enlarged jobs might have to be paid more, the real costs for the company may not be higher (e.g., increased productivity or fewer line employees might result in savings).

A different potential limitation involves demand effects. Employees may have been trying to provide "good" answers to questions. Although this bias can rarely be completely ruled out, it was not likely here because respondents indicated costs as well as benefits, some expected benefits were not always found, and some unchanged jobs had more benefits than the enlarged jobs. Furthermore, relatively stable findings across multiple replications, sources of information, and measures seem implausible under a simple demand-effects explanation. Research on demand effects also indicates that the bias is often small (e.g., Carlston & Cohen, 1980).

Finally, in the present study, we dealt only with enlargement and not with enrichment (i.e., adding tasks of a similar skill level rather than tasks of a higher skill level; Herzberg, 1966). Results for enrichment could differ both quantitatively (e.g., greater effects on costs and benefits) and qualitatively (e.g., enrichment might reduce overload because it enhances autonomy and decision latitude).

Table 6
Intercorrelations Among Job-Design Measures

Measure	1	2	3	4
1. Motivational	—	−.72**	−.23	−.52**
2. Mechanistic		—	.51*	.88**
3. Biological			—	.29
4. Perceptual motor				—

Note. $N = 11$ jobs. Positive correlations indicate that better design scores on one measure are associated with better design scores on the other measure, whereas negative correlations indicate that better design scores on one measure are associated with worse design scores on the other measure.
* $p < .10$. ** $p < .05$.

Implications and Future Research

This study replicates previous studies in organizational behavior by showing that job enlargement can increase motivational features and intended outcomes, such as satisfaction. The

Table 7
Intercorrelations Among Outcome Measures

Measure	1	2	3	4	5	6	7	8	9	10	11	12
1. Satisfaction	—	−.97**	.58**	.67**	.42*	.62**	.54**	.12	.62**	.67**	−.37	.43*
2. Mental underload		—	−.62**	−.72**	−.32	−.57**	−.48*	−.07	−.68**	−.61**	.35	−.42*
3. Catching errors			—	.91**	−.14	.12	.20	−.51*	.81**	−.05	.21	.74**
4. Customer service				—	.19	.19	.40	−.31	.63**	.35	.12	.66**
5. Mental overload					—	.72**	.63**	.53**	−.31	.84**	−.24	−.01
6. Training requirements						—	.64**	.55**	−.18	.90**	−.50*	−.05
7. Basic skills							—	.22	−.12	.78**	−.61**	.61**
8. Making errors								—	−.39	.58**	−.52**	−.51*
9. Job efficiency									—	−.11	.10	.43*
10. Compensable factors										—	−.49*	.13
11. Work space											—	−.16
12. Physical comfort												—

Note. $N = 11$ jobs. Positive correlations indicate that more of one outcome measure is associated with more of the other outcome measure, whereas negative correlations indicate that more of one outcome measure is associated with less of the other outcome measure.
* $p < .10$. ** $p < .05$.

main contribution of this study is the identification of costs and additional benefits of enlargement. Practically, it is important to identify the costs of such popular interventions, but prior research has not addressed costs either directly or indirectly. It is also important to identify additional benefits (e.g., enhanced customer service, reduced mental underload, increased chances of catching errors, and some efficiencies).

Although the study took place after jobs had been enlarged, it yielded insights into implementation. Confirming previous advice, the results point to the importance of focusing on key jobs (Ford, 1969), assessing the effect of enlargement on other systems, such as training (Hackman & Oldham, 1980), and considering the entire work setting (Griffin, 1982). In addition, the results highlight the importance of (a) linking interventions to organizational goals (e.g., customer service) and (b) management's prior realization that not all goals can be sought simultaneously (e.g., increased productivity). The results also show that improvements in work methods may occur as a by-product of job enlargement. For example, at one site, processors performed coding and keying in one step rather than sequentially, thus enhancing efficiency. Finally, the results illustrate how organizational constraints can influence job designs in that there were slight differences between sites in the content of the enlarged jobs.

Table 8
Cross-Sample Correlations Between Job-Design and Outcome Measures

	Job-design measure			
Outcome measure	Motivational	Mechanistic	Biological	Perceptual motor
Satisfaction	.73**	−.59**	.10	.47*
Mental underload	−.69**	.60**	.14	.40
Catching errors	.45*	.00	.15	.37
Customer service	.61**	−.34	.05	−.28
Mental overload	.64**	−.77**	−.35	−.75**
Training requirements	.71**	−.84**	−.09	−.78**
Basic skills	.72**	−.71**	.21	−.73**
Making errors	−.01	−.25	−.24	−.24
Job efficiency	.34	.09	.18	.06
Compensable factors	.83**	−.85**	−.09	−.82**
Work space	−.47**	.51*	−.32	.53**
Physical comfort	.04	.24	.37	.25

Note. $N = 11$ jobs. Values reported are the average of four correlations computed across samples (i.e., incumbents' job-design ratings with managers' outcome ratings, managers' job-design ratings with incumbents' outcome ratings, and analysts' job-design ratings with incumbents' and managers' outcome ratings).
* $p < .10$. ** $p < .05$.

Without an interdisciplinary perspective, the costs and trade-offs of job design may not be recognized. Examining job change adds stronger causal support for the existence of these trade-offs than had earlier research on static jobs (Campion, 1988; Campion & Thayer, 1985). An important challenge for future research is to discover ways to minimize trade-offs by finding designs that enhance benefits without incurring all costs. The results of the present study are encouraging because many, but not all of these trade-offs were present in the enlarged job.

Interdisciplinary research demonstrates the influence of job design on human resource systems. For example, by altering abilities demanded by jobs, job design may influence selection and training requirements (Campion, 1989) and compensation needs (Campion & Berger, 1990). In the future, the influences of job design on other ability-related systems, such as performance appraisal and career development, might be explored. Interdisciplinary relations with multiple outcomes may also allow job-design links to other systems. For example, job-design relations with satisfaction, compensation, and working conditions allow a link to labor relations. Relations with physical demands, accident likelihoods, and working conditions allow a link to industrial hygiene and safety. Relations with errors and efficiency allow links to quality and productivity. Thus, interdisciplinary job design may have value for the development of an integrated model of human resource systems.

The results of this study highlight the degree to which outcomes from job redesign can be predicted. Much previous research guided by motivational models has shown mixed results. Although combining jobs generally produced the expected results in this study, the addition of calling produced mostly benefits, whereas the addition of quality checking produced mostly costs. Predictability may be enhanced by the consideration of interdependence or similarity of the tasks to be combined (Wong & Campion, 1990).

We made some observations that are not easily explained by our job-design theories. Though not actual findings, these observations may have heuristic value. As one example, some incumbents claimed that management had informally enlarged jobs on occasion in the past but that whenever workload rose, management made jobs more mechanistic. If true, this may mean that outcome priorities change over time. Perhaps job designs should be flexible so that they can change as desired outcomes change. This conclusion is analogous to realizing that bureaucratic structures are appropriate in some instances and that matrix structures are appropriate in other instances (Daft, 1983).

As another example, many incumbents assisted on other jobs when they finished their work, and they preferred to be assigned to one other job rather than to different jobs each time. Though this preference appears to contradict the assumptions of motivational models, which encourage variety, being assigned the same job gave workers the opportunity to build their skills.

As a final example, some employees responded to their enlarged jobs by simplifying them (e.g., breaking the job down into subtasks, performing them repetitively, etc.). Such a tendency may be a carryover from prior job designs or a natural predisposition to design jobs efficiently (Campion & Stevens, 1989). More needs to be known about how managers and incumbents think about and design jobs for themselves and others.

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Appendix

Summary of Findings on the Benefits and Costs of Enlarged Jobs

Benefits

1. More satisfaction.
2. Less mental underload.
3. Greater chances of catching errors.
4. Better customer service.

Inconsistent (and Unpredicted) Benefits

1. Lower basic skills.
2. Higher job efficiency.
3. Smaller chances of making errors.
4. More physical comfort.

Costs

1. Higher training requirements.
2. Higher basic skills.
3. Higher compensable factors.

Inconsistent Costs

1. More mental overload.
2. Worse work space.

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