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Follow-Up and Extension of the Interdisciplinary Costs and Benefits of Enlarged Jobs

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This study provided a 2-year follow-up, including pretest–posttest and posttest-only quasi experiments, of M. A. Campion and C. L. McClelland's (1991) interdisciplinary evaluation of costs and benefits of a job enlargement intervention. Data were collected on 445 clerical employees and 70 managers in a financial services company. Costs and benefits changed substantially, depending on the type of enlargement. Task enlargement, the focus of the original study, had mostly long-term costs (less satisfaction, efficiency, and customer service and more mental overload and errors). Knowledge enlargement, which emerged since the original study, had mostly benefits (more satisfaction and customer service and less overload and errors). Findings have implications for the enlargement–enrichment distinction and for resolving conflicts between motivational (psychological) versus mechanistic (engineering) models of job design.

Job enlargement is a widespread workplace intervention based on organizational psychology. Previous evaluative research has examined only expected benefits such as satisfaction. This sole focus on benefits is due to a single disciplinary orientation of most studies. Using an interdisciplinary perspective and large field quasi experiment, Campion and McClelland (1991) demonstrated that enlargement has many costs as well as additional benefits.

Purposes of the Study

The present study has four related purposes, which are explained below.

Interdisciplinary Focus

The first purpose is to enhance understanding of job design by using an interdisciplinary viewpoint (Campion, 1988, 1989; Campion & Berger, 1990; Campion & Thayer, 1985, 1987). Previous research has revealed four distinct models of job design, and each comes from a different discipline, recommends different design features, and attempts to maximize different benefits: (a) A motivational model from organizational psychology recommends enlargement and enrichment and has the intended benefits of satisfaction and motivation, (b) a mechanistic model from classic industrial engineering recommends simplification and specialization and has the intended benefits of human resource efficiencies such as easier staffing and training, (c) a biological model from ergonomics and related disciplines (e.g., work physiology and biomechanics) recommends reduced physical stress and strain and has the intended benefits of physical comfort and health, and (d) a perceptual-motor model from human factors and experimental psychology recommends reduced attention and concentration requirements and has the intended benefits of increased reliability and usability. Costs exist because of divergence among the models. In particular, the motivational model with its individual orientation (e.g., to increase satisfaction) conflicts with the mechanistic and perceptual-motor models with their organizational orientations (e.g., to decrease training and errors). An intervention such as job enlargement, which is based on the motivational model, is expected to have costs reflecting foregone benefits of the mechanistic and perceptual-motor models. Therefore, an interdisciplinary focus leads to an evaluation of costs as well as benefits.

Conceptual Extension

The second purpose is to conceptually extend the Campion and McClelland (1991) study. The present study replicates the evaluation of job enlargement based on adding tasks, as in the original study, but it also evaluates enlargement based on adding knowledge areas. *Knowledge enlargement* is defined here as adding requirements to the job for understanding procedures or rules relating to different products sold by the organization, whereas *task enlargement* is defined as adding requirements for doing other tasks on the same product (see Method section). One form of enlargement may be experienced more like enrichment, which means adding higher level responsibilities to the job, than enlargement, which means adding responsibilities of the same level (Herzberg, 1966).

Whether knowledge or task enlargement is more enriching is unclear for several reasons. First, *enrichment* has been mainly used to refer to adding tasks to enhance authority, accountabil-

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ity, and responsibility levels of the job (Ford, 1969; Herzberg, 1966). Whether a job can be enriched by adding knowledge requirements is not certain. Second, it is unclear whether adding tasks of the same level (defined here as *task enlargement*) could be equally enriching. Adding tasks of the same level may be needed to form a natural unit of work (called *identity*) that is a principle of enrichment (Herzberg, 1968; Turner & Lawrence, 1965). Task enlargement in the present study allows the performance of a whole unit of work. Furthermore, recent research suggests that adding interdependent tasks to a job enhances motivation (Wong & Campion, 1991). Third, prior research explicitly recognizing the enlargement–enrichment distinction has been more descriptive than experimental (Ford, 1969; Paul, Robertson, & Herzberg, 1969). There has been no research directly comparing enlargement versus enrichment. Finally, more recent motivational job design research has not maintained this distinction. Both the job characteristics model (Hackman & Lawler, 1971; Hackman & Oldham, 1980) and the interdisciplinary research have tended to recommend design features involving both enrichment (e.g., autonomy) and enlargement (e.g., variety).

Knowledge enlargement may be more enriching than task enlargement for four reasons. First, knowledge enlargement mainly enhances mental processes and may thus be more psychologically meaningful than task enlargement, which mainly enhances job activities. Second, motivational job design is positively related to mental ability requirements of jobs (Campion, 1989; Dunham, 1977; Gerhart, 1988; Rousseau, 1982; Schneider, Reichers, & Mitchell, 1982), which are related to positive employee outcomes like satisfaction (Schneider et al., 1982; Wong & Campion, 1991) and compensation (Campion & Berger, 1990; Taber, Beehr, & Walsh, 1985). Knowledge enlargement is likely to have a greater influence on mental ability requirements (such as verbal, numerical, and memory) and compensable factors (such as education and skill) than is task enlargement.

Third, enhanced identity is a key motivating design feature increased by task enlargement, but knowledge enlargement would have no less identity in this setting than task enlargement. Knowing all the product areas means an employee can do work on any product that might come into the department. With the increased emphasis on customer service in the organization, this type of identity may be more enriching than that provided by completing all the tasks on a given piece of work that results from task enlargement. Fourth, although not enrichment in the traditional job design sense, the compensation system in the organization under study had just been revised from task based to knowledge based. That is, job titles and compensation grade levels were changed from being based on the tasks one performs to the number of product areas one knows. At the time of the present study, virtually all employees were in the same compensation level, but perhaps the anticipation of eventual rewards for additional knowledge areas makes the compensation system more congruent and supportive of knowledge enlargement. Thus, the study may contribute to understanding of the enlargement–enrichment distinction by examining whether adding knowledge requirements to a job has a more positive effect than adding tasks.

Methodological Extension

The study provides a stronger experimental test than Campion and McClelland (1991). They used a posttest-only quasi experiment with nonequivalent comparison groups (Cook & Campbell, 1979). Data were collected only after jobs had been enlarged. The internal validity of a posttest-only strategy is threatened by potential selection effects because employees assigned to the enlarged jobs may have differed in systematic ways from those not assigned to enlarged jobs (e.g., performance, tenure, education, etc.). Although the original study did not find much evidence of selection effects based on a variety of control variables, this study provides a stronger test by using a pretest–posttest quasi experiment with nonequivalent comparison groups. Data are compared both before and after employees' jobs are enlarged. This allows a within-subjects evaluation of the hypotheses wherein pretest differences on the dependent variables are statistically adjusted.

The study also provides a replication of the original study by including a posttest-only analysis and an analysis of managers' judgments of job designs and outcomes. Replicating the original research strategies allows differences in results from the original study to be attributed to factors other than differences in research strategies. Furthermore, the posttest-only analyses have enhanced statistical power by including a large random sample of employees in addition to those who were in the original study. Finally, this study incorporates a multiple nonequivalent, dependent-variables design (Cook & Campbell, 1979) because there are differential predictions for different outcomes (i.e., positive effects, or benefits, and negative effects, or costs). The alternative explanation of history effects (e.g., overall improvement or deterioration of employee morale) may be reduced because some outcomes are expected to be judged positively and others negatively. The threat of demand effects may be somewhat reduced for the same reason. Strong theoretical contexts that allow differential predictions for multiple outcomes can strengthen causal interpretation when added to other quasi-experimental designs (Cook & Campbell, 1979).

Long-Term Evaluation

The fourth purpose is to provide a 2-year follow-up evaluation of a job design intervention. Although there have been nearly 200 studies of job design in the psychological literature (Fried & Ferris, 1987), there have only been about 20 field interventions. Typically, these evaluations have been over a period of less than 1 year, with a mode of about 6 months. This was the usual time period for studies attempting to increase the motivational design of clerical jobs, as in this study (Ford, 1969; Frank & Hackman, 1975; Graen, Scandura, & Graen, 1986; Griffeth, 1985; Lawler, Hackman, & Kaufman, 1973; Locke, Sirota, & Wolfson, 1976; Orpen, 1979), as well as the time period for studies of jobs other than clerical (Coch & French, 1948; Davis & Valfer, 1965; Ford, 1969; Griffin, 1983; Paul et al., 1969). This was also the typical time period for studies that evaluated other job design interventions (Bhagat & Chassie, 1980; Billings, Klimoski, & Breaugh, 1977; Hackman, Pearce, & Wolfe, 1978; Hall, Goodale, Rabinowitz, & Morgan, 1978; Latack & Foster,

1985). One notable exception is Griffin (1991), who followed up a motivational job design intervention among clerical jobs for a period of 4 years.

That costs and benefits may change over time is expected based on both empirical and logical reasons. Empirically, the only long-term study showed a changing pattern of costs and benefits (Griffin, 1991). Attitudinal outcomes initially increased after redesign but then decreased to previous levels. Conversely, performance outcomes initially showed no change but later increased. Katz (1978) also argued that attitudes would change over time, but he suggested that satisfaction with motivational job design would increase with time because veterans react more to job features than do newcomers (who are busy learning the job). Katz showed more positive correlations between design and satisfaction after 3 months on the job, but the cross-sectional nature of his study limits inferences that can be made regarding longitudinal effects.

Logically, some costs and benefits may dissipate or be delayed in time (Campion & Medsker, 1992). In terms of dissipating benefits, the Hawthorne effect (Mayo, 1933) suggests there may be a short-lived period of positive affect due to the novelty of the redesigned job. Costs may also dissipate. Heightened training requirements and staffing difficulties may decrease after jobs are staffed and everyone is trained. These costs may not disappear, but they could be less salient after initial start-up and until turnover occurs.

In terms of delayed costs, compensation requirements may increase with time as employees realize that the redesigned (e.g., enlarged) job is more demanding and important (Campion & Berger, 1990). Likewise, stress and fatigue may take time to build up after a job's mental demands are increased, or boredom may take a while to set in after mental demands are decreased. Benefits may also be delayed. Productivity and quality may improve only after practice.

Hypotheses

Hypotheses are based mainly on interdisciplinary job design theory and the findings of Campion and McClelland (1991). Both knowledge and task enlargement are expected to have similar effects because they are derived from the motivational model (Hypotheses 1–4). However, the enlargement–enrichment distinction suggests knowledge enlargement may be more beneficial than task enlargement (Hypothesis 5). Although reasons exist to speculate that costs and benefits could change over time, there are inadequate data or theories to make specific predictions. For these reasons, hypotheses are considered somewhat exploratory, and reversals are interpreted even though the hypotheses are directional.

Hypothesis 1

Enlarged (compared to unenlarged) jobs will be higher on the job characteristics of the motivational model of job design and lower on the characteristics of the mechanistic and perceptual-motor models. This is based on the fact that job enlargement is an intervention from the motivational model, and that model has been found to be negatively related both conceptually and empirically to mechanistic and perceptual-motor models.

Hypothesis 2

Enlarged jobs will have the benefits of more satisfaction, less mental underload, greater chances of catching errors, and better customer service. These are expected benefits of the motivational model, and they were found in the original study.

Hypothesis 3

Enlarged jobs will have the costs of more mental overload, higher training requirements, higher basic skills, greater chances of making errors, lower job efficiency, and higher compensable factors. Training, skill, and compensation costs are lost benefits of the mechanistic model as found in the original study. The remaining costs were predicted though not clearly supported in the original study, but they are included here for long-term evaluation.

Hypothesis 4

Enlargement will have no effect on the job characteristics of the biological model or the work space or physical comfort outcomes, because physical aspects of jobs should not be related to motivational interventions.

Hypothesis 5

Knowledge enlargement will have more benefits and fewer costs than task enlargement, because knowledge enlargement may be more enriching.

Method

Setting and Research Strategy

The setting was a large financial services company, and the jobs were clerical. The study took place in five units of the company that processed paperwork for other units that sold products. Prior to the original study, jobs had been designed based on the mechanistic model with separate employees performing each task. Based on the motivational model, management was enlarging the jobs by combining tasks. In particular, they combined two of the most critical tasks, coding and keying, into an enlarged "processor" job. The intended goals of the intervention were to increase employee satisfaction and customer service. The previous study conducted an evaluation of the intervention by comparing enlarged versus unenlarged jobs (i.e., combined vs. separate jobs) in a posttest-only quasi experiment.

In the 2 years since the original study, management has enlarged the jobs of many other employees. The purpose of the present study is to conduct a follow-up evaluation of this continuing job enlargement intervention. Data for the previous study were collected in 1988, when the enlargement intervention was just starting and employees had been in enlarged jobs for several months on average. Data for this study were collected in 1990. By then, enlargement was more common, and many employees were in enlarged jobs for a longer time (ranging from several months to over 2 years). The study is described as long-term because it evaluates the long-term experience of an organization with an intervention, even though everyone may not have been in an en-

larged job for a long time. Furthermore, the changes did not occur on exact dates, and employees' responsibilities may have changed over several months or longer. The enlargement process was iterative and continuous for most employees.

The study provides a pretest–posttest quasi experiment with two groups: employees in unenlarged jobs at pretest but enlarged jobs at posttest, and employees in unenlarged jobs at pretest and still in unenlarged jobs at posttest. A small group of employees in enlarged jobs at pretest and still in enlarged jobs at posttest are also examined as a longitudinal assessment of enlargement. (Note that no employees in enlarged jobs at pretest are in unenlarged jobs at posttest.) Furthermore, this study provides a posttest-only replication of the comparison between enlarged and unenlarged jobs in a large sample that includes additional current employees. Details on samples and jobs are contained in the sections below.

In the original study, each employee only worked in one of four product areas: new contracts for Product A, revisions to contracts for Product A, new contracts for Product B, and revisions to contracts for Product B. The tasks were the same in each area, but the knowledge requirements were different. In the 2 years since the original study, the jobs of many employees have been enlarged in terms of the number of areas in which they worked. Thus, the study evaluates job enlargement on the basis of number of knowledge areas using three groups: 1, 2, and 4 knowledge areas. An inadequate number worked in exactly three areas to allow analyses.

In summary, the intervention in this setting has been a continuing process of enlarging jobs over time. It has been driven by management and supported by the employees. Many jobs have been enlarged in one or both of two ways: task and knowledge enlargement. The study evaluates this natural field experiment.

Sample

All employees participating in the original study and still with the organization were included ($n = 178$, 47.2% of original sample). Statistical power to detect a 0.50 standard deviation difference between groups (i.e., a medium effect size; $p < .10$; Cohen, 1977) averaged 92% for task and knowledge enlargement, but power to detect a 0.20 standard deviation difference (i.e., a small effect size) averaged only 34%. A 0.50 effect size was observed in the original study, thus power was expected to be adequate for the pretest–posttest analyses. However, an additional sample of 267 employees was obtained to ensure high-power posttest-only analyses ($N = 445$). Statistical power to detect a 0.50 standard deviation difference was 99% for both task and knowledge enlargement, and the power to detect a 0.20 difference averaged 61% ($p < .10$; Cohen, 1977).

Most employees were female (96.1%). Age averaged 32.9 years ($SD = 9.9$), with half being 30 years or younger. Tenure averaged 6.0 years ($SD = 6.3$), with half having 3 years or less. Nearly half (44.2%) had a high school education, about half (51.9%) had some college or technical school, but only 1.6% had a 4-year college degree or more.

The same data were also obtained from 70 managers. Statistical power was 68% to detect a 0.50 standard deviation difference, but only 22% to detect a 0.20 difference ($p < .10$; Cohen, 1977). Thus, power was low for analyses of manager data. About half the managers were female (51.5%). Age averaged 29.3 years ($SD = 3.6$), with 69.1% under 30. Tenure averaged 3.9 years ($SD = 2.5$), with 63.2% having 2 or 3 years. Nearly all had a 4-year college degree or more (92.6%).

Power may be somewhat lower than these figures because of missing data. Due to lower power for small effects and some samples, the $p < .10$ level of significance was interpreted but described as marginal.

Measures

Job content. In the original study, involvement in the various clerical tasks was assessed on a checklist (e.g., sorter, coder, caller, keyer, quality checker, customer service representative, typist, etc.). See Campion and McClelland (1991) for a description of the tasks and their *Dictionary of Occupational Titles* codes (U.S. Department of Labor, 1977). This study also used the checklist, and the operational definition of *task enlargement* was whether both coding and keying were performed. An enlarged processor job involved both tasks, whereas an unenlarged job involved only coding or keying. These tasks were of main interest because of their centrality to the primary function of the organizational units. Nearly all employees performed one or both of these tasks as their main responsibility. This was an example of enlargement through combining later and earlier work stages (Ford, 1969), because a coder's output was a keyer's input.

The job titles and compensation grade levels were recently revised from being based on tasks to being based on knowledge areas, with three classifications: Level 3 for employees who knew all tasks for all four product areas; Level 2 for those who knew all tasks for two areas but less than all tasks for all four areas; and Level 1 for those who knew less, ranging from less than all tasks in one area to all tasks in one area and most tasks in another. The tasks were the same, but each product area required different knowledge (e.g., different information, cost structures, coding rules, and data inputting procedures). Because the compensation system was new, because movement to higher levels required knowing all tasks in multiple areas (which took years to attain), and because training was limited, nearly all (94.6%) employees were classified as Level 1 even though many knew some aspects of multiple areas.

The task checklist was expanded to also indicate product areas. The operational definition of *knowledge enlargement* was the number of product areas. It ranged from 0 to 4, with only those who worked in 1, 2, or 4 areas analyzed. Those with 0 areas were in support roles (e.g., typists), and very few worked in 3 areas. The correlation between task enlargement (scored 0 or 1) and knowledge enlargement (scored 1, 2, or 4) was .02 (*ns*), indicating that the two forms of enlargement were independent.

Job design. The Multimethod Job Design Questionnaire (MJDQ; Campion, 1988) was used, modified as in the previous study (e.g., reworded to first person). Psychometric qualities of the MJDQ (including internal consistency, interrater reliability, alternate-forms reliability, and convergent and discriminant validity) have been previously demonstrated in several independent samples (Campion, 1988; Campion, Kosiak, & Langford, 1988; Campion & McClelland, 1991). It yields scores on the job characteristics based on the four models of job design: motivational (21 items, α internal consistency in the present sample = .86), mechanistic (10 items, $\alpha = .56$), biological (12 items, $\alpha = .69$), and perceptual-motor (12 items, $\alpha = .72$). The alphas are somewhat lower than in previous studies, perhaps because the jobs are more homogeneous (e.g., all clerical and fairly enlarged). A 5-point response format was used ranging from 5 = *strongly agree* to 1 = *strongly disagree*. Scores were averages of applicable items, with larger values indicating better design on each model.

Outcomes. The 12 outcomes, developed in the previous study to cover a wide range of benefits and costs of enlargement, were used. Predicted benefits were more satisfaction (10 items, $\alpha = .91$), less mental underload (2 items, $\alpha = .73$), greater chances of catching errors (1 item), and better customer service (3 items, $\alpha = .85$). Predicted costs were more mental overload (3 items, $\alpha = .64$), higher training requirements (3 items, $\alpha = .41$), higher basic skills (4 items, $\alpha = .68$), greater chances of making errors (1 item), lower job efficiency (3 items, $\alpha = .86$), and higher compensable factors (4 items, $\alpha = .59$). No effect was predicted for two outcomes: work space (5 items, $\alpha = .81$) and physical comfort (6 items, $\alpha = .72$). Internal consistencies are somewhat lower than in the original study because the jobs are more homogeneous (e.g., more enlarged as a group), and some scales were formed by factor analysis in the original study and so may have capitalized on sample

specific covariance. All the scales were used in the present study so that comparisons could be made, but results for scales with lower reliabilities should be interpreted cautiously. Five-point response formats were used, and total scores were calculated as averages of the items with larger values indicating greater amounts of the outcomes.

Manager data. Managers were asked to provide the same judgments on the job design and outcome measures as employees. However, they were asked to evaluate only knowledge enlargement, for two reasons. First, knowledge enlargement was new to the study, so additional information was desired. Second, the system of job titles had changed to more closely reflect knowledge enlargement. With the fact that employees' jobs varied widely in terms of specific responsibilities, a comparison between titles was the only clear evaluation managers could make. Managers were randomly assigned to respond to the questionnaires with respect to either a Level 1 or 2 job. Even though a Level 1 job could be enlarged in terms of tasks, the primary distinction between Level 1 and 2 is number of knowledge areas. For job design questions, managers were instructed to describe the job. For outcome questions, they were instructed to describe how their typical employee in the job would respond. Questionnaires did not refer to any particular product area, but each manager knew all product areas. Manipulation checks were included at the ends of both the job design and outcome portions of the questionnaire to verify that they were evaluating the correct job, which resulted in two managers being excluded from analyses.

Other measures. Many other measures were collected as control variables. First, preferences and tolerances for each of the four models of job design were collected as individual difference measures within the interdisciplinary perspective (Campion, 1988): motivational (six items, $\alpha = .74$), mechanistic (four items, $\alpha = .62$), biological (four items, $\alpha = .52$), and perceptual-motor (four items, $\alpha = .73$). Five-point response formats were used, and scores were averages of the items, with larger values indicating greater preferences or tolerances. Second, six demographic and other measures were collected from personnel files: sex, age, company tenure, performance appraisal rating, pay, and education. Finally, four additional control measures were collected on the questionnaire: work load, overtime, and attendance in two training programs intended to increase employee awareness and skills in providing customer service.

Procedures

The authors visited two of the five sites prior to data collection in order to assess the progress of the job design intervention after 2 years. Focused group discussions were conducted with employees and managers. No new costs or benefits were suggested, but research planning information was gained.

All departments at each site were sampled. The departments performed the same work, but the jobs within each department varied widely in terms of enlargement. Starting with employees in the original study who were still with the company, we chose additional employees using a random number table and alphabetical listings so that five employees were included per department.

All employees solicited agreed to participate, but 51 were unavailable because of absenteeism or scheduling problems and were replaced by random alternates. Questionnaires were completed at their desks on company time. They were identified by code so that longitudinal and demographic data could be linked.

There were 80 departments at the five sites. Managers of 77 departments were available and were asked to provide their judgments of the costs and benefits of enlargement by completing the same questionnaire. All managers solicited agreed to participate, but because 7 managed 2 departments each the sample size was 70. Because of rotation among management positions, only a few had participated in the previous study.

Results

Descriptive Statistics

Descriptive statistics and intercorrelations are shown in Table 1. Supporting earlier speculation that lower reliabilities might be due to more homogeneous jobs, the standard deviations tend to be slightly smaller than in the original study, 0.07 standard deviation smaller on average for job design scales, $F(456, 514) = 1.37$, $p < .05$, and 0.09 standard deviation smaller on average for outcome scales, $F(456, 514) = 1.25$, $p < .05$.

The pattern of intercorrelations is somewhat similar to the original study and to previous studies in different industries (Campion, 1988; Campion & Thayer, 1985). For example, the motivational scale is positively related to satisfaction, customer service, and basic skills and negatively related to underload. The mechanistic and perceptual-motor scales are positively related to each other and to underload and negatively related to overload, training, and skills. There are a few noteworthy changes in the pattern of correlations compared with previous studies, however. Most notably, the strong negative correlations usually seen between the motivational scale and the mechanistic and perceptual-motor scales are not present. This allows all three scales to be positively related to several outcomes, such as customer service and efficiency.

Correlations appear smaller in magnitude than in previous studies. One potential explanation is that this is due to the individual level of analysis presented here compared to the job level of analysis usually presented previously. Campion (1988) observed a .20 difference between individual and job levels, and Campion and McClelland (1991) observed a .24 difference. It has been speculated that aggregation increases correlations because it reduces the effects of random error and perceptual differences (Campion, 1988).

The pretest–posttest correlations are all positive and significant, with an average of approximately .30. They indicate some stability in employee responses on these measures over time, at least in terms of rank order of people. The correlations are low probably because of the intervening changes in the jobs, and the means on the measures may have changed, as addressed below.

Pretest–Posttest Analyses

Of the 178 employees who participated in the original study, 25 had enlarged tasks before and still have enlarged tasks, 74 have had their tasks enlarged, 78 still have unenlarged tasks, and 1 person did not report. Of the 178 employees, 38 still worked in one knowledge area, 51 had their areas enlarged to two, 10 had their areas enlarged to three, 65 had their areas enlarged to four, and 14 worked in support jobs. The 25 employees who had enlarged tasks in the original study were analyzed separately because there were too few per cell (e.g., only 3 worked in one area), and the 24 employees who worked in support jobs or in three areas were excluded because of their small number. Thus, the sample of 178 was reduced to 129 for the

Table 1
Means, Standard Deviations, and Intercorrelations Among the Measures

Measure	*M*	*SD*	Intercorrelations															
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Job design																		
1. Motivational	3.79	0.47	.44															
2. Mechanistic	2.90	0.42	−.05	.39														
3. Biological	3.54	0.46	.30	.07	.28													
4. Perceptual-motor	2.75	0.43	.11	.50	.31	.55												
Benefits																		
5. Satisfaction	3.68	0.64	.63	−.09	.22	.12	.51											
6. Mental underload	1.69	0.99	−.36	.22	−.05	.19	−.06	.36										
7. Catching errors	3.39	0.96	.14	.08	.10	.08	.18	.00	.14									
8. Customer service	3.71	0.79	.34	.19	.23	.27	.32	−.05	.23	.39								
Costs																		
9. Mental overload	3.38	0.90	−.12	−.18	−.31	−.41	−.06	−.14	−.09	−.22	.43							
10. Training requirements	3.85	0.59	.14	−.31	−.04	−.30	.20	−.24	−.03	.01	.27	.35						
11. Basic skills	3.32	0.78	.23	−.23	−.05	−.27	.30	−.33	.09	.10	.18	.31	.58					
12. Making errors	3.81	0.99	−.14	−.13	−.12	−.26	−.13	.03	−.12	−.16	.20	.05	.04	.27				
13. Job efficiency	3.48	0.77	.32	.24	.20	.36	.30	−.03	.20	.49	−.24	−.11	−.04	−.15	.26			
14. Compensable factors	3.89	0.58	.17	−.14	−.17	−.35	.30	−.26	.04	.01	.33	.31	.47	.15	−.03	.37		
No effect predicted																		
15. Work space	3.91	0.60	.28	.08	.39	.25	.20	−.02	.02	.16	−.13	.00	.03	−.03	.17	−.04	.26	
16. Physical comfort	3.18	0.77	.18	.06	.47	.31	.11	.14	.01	.16	−.42	−.05	−.08	−.15	.15	−.22	.25	.44

Note. Larger means indicate better design or a greater amount of outcome. Correlations on the diagonal are between pretest and posttest data (n = 178, all are significant at $p < .05$). Off-diagonal correlations are among posttest-only data (n = 515, r = .08 or larger are significant at $p < .05$, one-tailed).

main analyses. Table 2 shows the distribution of the 129 employees in terms of task and knowledge enlargement.

Two-way (Task × Knowledge Enlargement) analyses of covariance (ANCOVAs) are used to examine pretest–posttest data for within-subjects effects, with the pretest values used as covariates. This helps adjust somewhat for prior differences between samples, such as potential selection effects created by the lack of random assignment to jobs. These analyses are preceded by multivariate analyses of covariance (MANCOVAs) to contain experimentwise error rates. Post hoc mean comparisons are used to interpret significant effects, with two-tailed tests and significance levels at $p < .05$ to reduce Type I errors.

The MANCOVA on the job design scales is not significant for main effects but is significant for the interaction ($p < .05$). Two ANCOVA interactions are also significant (Table 2). Consistent with Hypothesis 1, the mean comparisons suggest that jobs with enlarged tasks and jobs with enlarged knowledge areas but unenlarged tasks tend to be somewhat lower on the mechanistic and perceptual-motor scales. No effects are observed for the motivational scale.

Post hoc ANCOVAs on the individual items of the job design scales reveal significant effects (at $p < .10$ or less) for 11 of the 21 items of the motivational scale. Nine items are significantly higher for knowledge-enlarged jobs or show significant interactions such that the positive effects of knowledge enlargement are stronger (or exist only) when tasks are unenlarged. These items include all 3 items in the motivational scale that deal with knowledge and skills. Four items are significant for task enlargement; 2 are higher for enlarged jobs (e.g., task variety) but 2 are lower (e.g., task clarity). These findings lend some modest support to the hypothesized influence of the intervention on the motivational job design scale. Post hoc analyses of the individual items of the other job design scales reveal results essentially similar to those described in Table 2.

The MANCOVA on benefits and costs is significant for the task enlargement main effect ($p < .05$), and many ANCOVA main effects and interactions are also significant (Table 2). Contrary to Hypothesis 2, there are reversals for the expected benefits of satisfaction, catching errors, and customer service in that they are lower (become costs) for task enlargement. However, consistent with Hypothesis 2, knowledge enlargement has the expected benefits of less mental underload (for jobs with unenlarged tasks only), greater chances of catching errors, and better customer service. Results for knowledge enlargement should be interpreted cautiously because of the nonsignificant main effect in the MANCOVA.

Supporting Hypothesis 3, task enlargement has the cost of greater chances of making errors. Contrary to Hypothesis 3, reversals occur for knowledge enlargement. It has the unexpected benefits of lesser chances of making errors, less mental overload (when there are four areas), and lower training requirements (when there are four areas and enlarged tasks). No effects are observed for basic skills, job efficiency, and compensable factors.

Consistent with Hypothesis 4, physical aspects of work are also unaffected. Consistent with Hypothesis 5, knowledge enlargement has more benefits and fewer costs than task enlargement.

The 25 employees with enlarged tasks in the original study were examined to assess longitudinal changes in costs and benefits over the 2-year period. Paired t tests on pretest–posttest differences (not shown) indicate that less underload becomes

Table 2
Adjusted Means and Analyses of Covariance on Pretest–Posttest Evaluation of Enlargement

Measure	Task unenlarged			Task enlarged			Task enlargement F	Knowledge enlargement F	Interaction F
	(1, n = 16)	(2, n = 12)	(4, n = 29)	(1, n = 18)	(2, n = 27)	(4, n = 27)			
Job design									
Motivational	3.7	3.8	4.0	3.8	4.0	3.8	0.00	1.75	1.78
Mechanistic	3.1_{c}	3.1_{bc}	2.8_{a}	2.9_{ab}	2.9_{ab}	3.0_{abc}	5.17**	1.48	1.05
4.39**									
Biological	3.5	3.6	3.6	3.5	3.5	3.5	2.05	0.03	0.50
Perceptual-motor	2.9_{ab}	3.0_{b}	2.7_{a}	2.6_{a}	2.8_{ab}	2.8_{ab}	2.58	1.69	2.88*
Benefits									
Satisfaction	3.9_{ab}	3.9_{ab}	4.0_{b}	3.7_{ab}	3.9_{b}	3.6_{a}	9.16**	4.20**	0.37
1.09									
Mental underload	2.3_{b}	1.5_{a}	1.3_{a}	1.5_{a}	1.4_{a}	1.5_{a}	2.44	2.94*	3.20**
Catching errors	3.4_{ab}	3.9_{b}	3.8_{b}	3.0_{a}	3.5_{ab}	3.4_{ab}	5.32**	2.39*	0.01
Customer service	4.0_{bcd}	4.2_{cd}	4.3_{d}	3.3_{a}	3.8_{bc}	3.6_{ab}	20.02**	3.32**	0.50
Costs									
Mental overload	3.2_{a}	3.5_{ab}	3.1_{a}	3.5_{ab}	3.7_{b}	3.3_{a}	2.20	2.61*	0.09
Training requirements	3.8_{ab}	3.9_{ab}	4.1_{b}	4.1_{ab}	4.0_{ab}	3.7_{a}	0.04	0.05	3.17*
Basic skills	3.3	3.4	3.6	3.5	3.6	3.5	10.49**	0.56	0.32
0.92									
Making errors	4.1_{b}	3.8_{b}	3.2_{a}	4.3_{b}	3.9_{b}	3.9_{b}	2.81*	5.63**	1.26
Job efficiency	3.7	3.8	3.6	3.5	3.5	3.4	2.49	0.57	0.00
Compensable factors	4.0	3.8	4.1	4.1	3.9	3.9	0.00	1.18	0.92
No effect predicted									
Work space	4.0	4.0	4.0	4.1	3.7	3.9	0.23	0.60	0.67
Physical comfort	2.9	3.1	3.4	3.4	3.1	3.3	0.78	1.24	1.17

Note. All jobs were task unenlarged and had only one knowledge area at pretest. 1, 2, and 4 = number of product knowledge areas at posttest. Pretest values are used as covariates, and means are adjusted for covariates. Larger means indicate better design or a greater amount of outcome. Means in same row with same subscript are not significantly different at $p < .05$, two-tailed.
* $p < .10$. ** $p < .05$.

even more of a benefit and less efficiency even more of a cost. However, like the results for task enlargement and contrary to Hypothesis 2, the expected benefit of customer service becomes worse over the 2 years.

In summary, the pretest–posttest analyses suggest that job enlargement has some of the expected effects on the job design scales, but there are many changes in the costs and benefits of enlargement since the original study. Comparisons between jobs that had been enlarged versus those that remained unenlarged reveals that the effects of task enlargement are primarily costs, whereas the effects of knowledge enlargement are primarily benefits.

Posttest-Only Analyses

Of the total sample of 445 employees, 265 had enlarged tasks and 115 had unenlarged tasks. The other 65 performed neither focal task (coding or keying); they were in support jobs (e.g., typing) or were new to the company and performed only beginner tasks (e.g., sorting, calling). Of the 445 employees, 134 worked in one knowledge area, 106 in two, 152 in four, and 53 in support jobs or in three areas. Excluding those not performing focal tasks or in three areas, the 445 was reduced to 360 for the main analyses. Table 3 shows the distribution of the 360 employees in terms of task and knowledge enlargement.

Two-way (Task × Knowledge Enlargement) analyses of variance (ANOVAs) examine posttest-only data for between-job effects, preceded by multivariate analyses of variance (MANOVAs) to contain experimentwise error rates.

The MANOVA on the job design scales is significant for both main effects ($p < .05$) and the interaction ($p < .10$), as are many of the main effects and interactions of the individual ANOVAs (Table 3). As predicted by Hypothesis 1, task-enlarged jobs have lower mechanistic and perceptual-motor design. Knowledge-enlarged jobs have higher motivational design, especially if tasks are not enlarged, and lower mechanistic design.

The MANOVA on the outcome scales is also significant for both main effects and the interaction ($p < .05$), as are many of the main effects and interactions of the individual ANOVAs (Table 3). Findings are similar to the pretest–posttest analyses. Contrary to Hypothesis 2, some reversals occur for task enlargement in that the expected benefits of catching errors and customer service are worse (become costs). Consistent with Hypothesis 2, knowledge enlargement has all the expected benefits of more satisfaction, less mental underload, greater chances of making errors, and better customer service, but this is primarily (and often only) the case when tasks are unenlarged.

Consistent with Hypothesis 3, task enlargement has the expected costs of more mental overload, greater chances of making errors, and lower efficiency, and knowledge enlargement has higher basic skills. Contrary to Hypothesis 3, reversals occur for knowledge enlargement in that some expected costs become benefits. There are lesser chances of making errors and higher efficiency when knowledge is enlarged and tasks are unenlarged. No effects are observed for training and compensable factors.

Regarding Hypothesis 4, enlargement has no effect on work space, as expected, but task enlargement has lower biological design and physical comfort, especially if knowledge is also enlarged. Hypothesis 5 is supported in that knowledge enlargement has more benefits and fewer costs than task enlargement.

In summary, like the pretest–posttest analyses, the posttest-only analyses indicate enlargement has many of the expected effects on the job design scales, but there are changes in the pattern of costs and benefits compared to Campion and McClelland (1991). Overall, the effects of task enlargement are primarily costs, whereas the effects of knowledge enlargement are primarily benefits.

Regarding manager data, the MANOVAs on job design and outcomes scales are nonsignificant. Several ANOVAs are significant (Table 4), but they should thus be interpreted with less confidence. According to managers, knowledge-enlarged jobs have more motivational design (Hypothesis 1), the benefit of better customer service (Hypothesis 2), the cost of higher training requirements (Hypothesis 3), and no effect on physical aspects (Hypothesis 4). Contrary to predictions, managers felt enlarged jobs had more underload and less overload. Therefore, managers indicate both costs and benefits for knowledge enlargement.

Effect sizes for significant hypotheses tests average 0.35 standard deviations, which is smaller than the 0.50 observed in the original study. Using actual sample sizes from the above analyses, this means that statistical power averages 86% for the posttest-only data but only 47% for pretest–posttest data and only 36% for manager data. Thus, low statistical power may account for the relatively fewer significant differences observed in Tables 2 and 4.

Supplementary Analyses

Three sets of control variables address selection effects, defined here as whether results could be attributed to differences between employees assigned to jobs rather than to the jobs themselves.[1] The first set are preferences and tolerances for each type of job design model. They are more highly correlated from pretest to posttest than other measures, average $r = .52$ vs. .30, $t(175) = 2.76$, $p < .05$, perhaps because they are reports about personal attributes rather than descriptions of changing jobs. Preference for motivational design decreased slightly (M difference = −0.08, $p < .05$), mechanistic increased ($M = 0.10$), biological increased ($M = 0.07$), and perceptual-motor stayed the same. Similar to previous research (Campion, 1988; Campion & McClelland, 1991), ANCOVAs showed little substantial moderation of design–outcome relations in either pretest–posttest or posttest-only analyses.

A second set of controls are the demographics and personnel file measures. Age, tenure, performance appraisal, pay, and education have little influence on pretest–posttest effects and only slightly reduce effects in posttest-only analyses.

A third set of controls was suggested by employees and managers. Work load and overtime have increased for some employees, which may influence reactions to their jobs. There have been no layoffs, but employees may be concerned about job

[1] To save space, results of analyses with control variables are summarized verbally here. Details can be obtained from Michael A. Campion.

Table 3
Means and Analyses of Variance on Posttest-Only Evaluation of Enlargement

Measure	Task unenlarged			Task enlarged			Task enlargement F	Knowledge enlargement F	Interaction F
	(1, n = 47)	(2, n = 17)	(4, n = 42)	(1, n = 84)	(2, n = 83)	(4, n = 87)			
Job design									
Motivational	3.6_{a}	4.0_{c}	3.9_{bc}	3.7_{ab}	3.8_{bc}	3.8_{bc}	0.16	8.48**	2.66*
Mechanistic	3.1_{b}	3.1_{b}	2.9_{a}	3.0_{ab}	2.9_{a}	2.9_{a}	7.49**	3.62**	0.99
Biological	3.6_{bc}	3.6_{c}	3.6_{c}	3.6_{bc}	3.4_{ab}	3.3_{a}	7.68**	0.80	3.20**
Perceptual-motor	2.8_{a}	3.0_{b}	2.8_{a}	2.7_{a}	2.7_{a}	2.7_{a}	10.87**	0.95	1.91
Benefits									
Satisfaction	3.5_{a}	3.9_{c}	3.8_{bc}	3.5_{a}	3.7_{bc}	3.7_{ab}	1.98	6.06**	1.59
Mental underload	2.2_{b}	1.6_{a}	1.4_{a}	1.7_{a}	1.6_{a}	1.6_{a}	0.57	7.66**	3.33**
Catching errors	3.1_{a}	3.7_{bc}	3.9_{c}	3.3_{a}	3.3_{ab}	3.3_{ab}	5.03**	5.59**	3.68**
Customer service	3.6_{ab}	3.9_{bc}	4.1_{c}	3.6_{ab}	3.6_{ab}	3.5_{a}	3.95**	8.93**	2.76*
3.67**									
Cost									
Mental overload	3.4_{ab}	3.1_{a}	3.1_{a}	3.4_{ab}	3.4_{ab}	3.6_{b}	4.66**	0.51	1.43
Training requirements	3.7	3.9	4.0	3.8	3.9	3.8	0.04	1.70	2.16
Basic skills	3.0_{a}	3.2_{ab}	3.4_{b}	3.2_{ab}	3.3_{b}	3.4_{b}	2.25	4.19**	0.53
Making errors	4.1_{b}	3.4_{a}	3.3_{a}	4.0_{b}	3.8_{b}	4.0_{b}	7.64**	6.38**	4.51**
Job efficiency	3.4_{a}	3.9_{b}	3.7_{ab}	3.5_{a}	3.4_{a}	3.4_{a}	3.82**	1.68	4.41**
Compensable factors	3.9	3.9	4.0	3.9	4.0	4.0	0.03	0.83	0.11
No effect predicted									
Work space	4.0	3.9	4.0	4.0	3.8	3.8	1.72	0.64	0.45
Physical comfort	3.0_{a}	3.5_{c}	3.4_{bc}	3.3_{abc}	3.1_{ab}	3.1_{ab}	3.08*	1.13	6.27**

Note. 1, 2, and 4 = number of product knowledge areas. Larger means indicate better design or a greater amount of outcome. Means in same row with same subscript are not significantly different at $p < .05$, two-tailed.
* $p < .10$. ** $p < .05$.

Table 4
Means and t Tests on Posttest-Only Evaluation of Knowledge Enlargement (Managers' Data)

Measure	1 knowledge area (n = 36)	2 knowledge areas (n = 32)	t
Job design			
Motivational	3.69	3.89	2.36**
Mechanistic	2.67	2.67	0.26
Biological	3.72	3.76	0.49
Perceptual-motor	2.74	2.70	−0.45
Benefits			
Satisfaction	3.56	3.67	1.02
Mental underload	1.69	2.00	1.42*
Catching errors	2.94	3.22	1.21
Customer service	3.52	3.81	2.01**
Costs			
Mental overload	3.67	3.44	−1.45*
Training requirements	3.89	4.09	1.82**
Basic skills	3.03	3.05	−0.19
Making errors	4.06	3.81	−1.16
Job efficiency	3.26	3.36	0.60
Compensable factors	3.65	3.56	0.70
No effect predicted			
Work space	4.04	3.98	−0.60
Physical comfort	3.45	3.28	−1.11

Note. Larger means indicate better design or a greater amount of outcome.
* $p < .10$, one-tailed. ** $p < .05$, one-tailed.

security because of potential staffing implications of automation. Because some employees do not have direct customer service responsibilities, perhaps different assignments may explain differences in customer service perceptions. Finally, training programs on quality and customer service could influence skills and reactions to jobs. ANCOVAs indicated that work load and overtime reduced the effects slightly. Outcomes from enlargement may be more pronounced when work load is high; alternatively, poor design may contribute to work load.

In summary, similar to the previous study, selection effects do not appear to offer a strong alternative explanation for the effects of job enlargement.

Discussion

Summary of Findings

The study provided a 2-year follow-up evaluation of an ongoing job design intervention initially described by Campion and McClelland (1991). The results indicated a fairly substantial change in costs and benefits of task enlargement compared to the original report. The study also revealed the intervention had developed another form of enlargement, called *knowledge enlargement,* that has different effects than task enlargement.

A pretest–posttest research strategy was used to strengthen the quasi experiment in the previous study. In addition, posttest-only analyses and analyses of manager data provided a replication of the research strategies used in the previous study to ensure that differences in findings are not due to differences in methodologies. These additional data also enhanced statistical power. The overall pattern of findings is comparable across all three analyses. Table 5 summarizes the results of this and the previous study.

Mostly costs are observed for task enlargement (Hypothesis 5). Three of six expected costs (i.e., more mental overload, greater chances of making errors, and lower job efficiency; Hypothesis 3), which were inconsistent in the original study, are found to be costs in this follow-up. The other three expected costs (i.e., higher training requirements, basic skills, and compensable factors), which are the primary costs observed in the original study, are generally not observed in this follow-up. However, three of the four expected benefits turn out to be costs (i.e., less satisfaction, less chances of catching errors, and worse customer service; Hypothesis 2). Task-enlarged jobs are lower on mechanistic and perceptual-motor designs as expected (Hypothesis 1), but they differ on motivational design only in supplemental analyses. Finally, there are few differences on physical aspects of jobs, as expected (Hypothesis 4).

On the other hand, mostly benefits are observed for knowledge enlargement (Hypothesis 5). All four expected benefits are found (i.e., more satisfaction, less mental underload, greater chances of catching errors, and better customer service; Hypothesis 2). The only contrary finding is managers' judgments of more underload. This may reflect that they evaluated jobs based on salary classification and had enhanced expectations for higher paid employees. Three of six expected costs turn out to be benefits (i.e., less mental overload, lesser chances of making errors, and higher efficiency; Hypothesis 3), which were also occasionally seen in the previous study. Knowledge enlargement may create these reversals because employees with more knowledge are able to handle higher work loads with greater quality and efficiency.

Many interactions are observed in that benefits of knowledge enlargement are often only apparent when tasks are unenlarged. At least three explanations can be given for these interactions. First and most simply, task enlargement has mostly costs, so perhaps the benefits of knowledge enlargement can only be detected when tasks are unenlarged. Second, two of the most consistent costs of task enlargement relate to errors, and such costs are very salient in a service-related organization. Thus, when errors are high due to task enlargement, the potential positive effects of knowledge enlargement may be overshadowed. Third, it may be that when both tasks and knowledge are enlarged, a condition of overenlargement exists such that employees think successful performance is less feasible and thus less motivating (Klein, 1990).

Knowledge enlargement does have the expected costs of higher basic skills and (for manager data only) higher training requirements. Compensable factors are nonsignificant, perhaps due to the new compensation system wherein nearly all employees are in the same salary grade even though they differ in number of product areas they know. This cost may also be less noticeable because normal salary increases have been given in the intervening 2 years. Finally, knowledge-enlarged jobs are higher on motivational and lower on mechanistic design, as expected (Hypothesis 1), and there are no differences on physical aspects, as expected (Hypothesis 4).

Another finding is that preferences and tolerances for types of work have changed in 2 years. Preference for motivational

Table 5
Summary of Findings

Measure	Task enlargement			Knowledge enlargement		
	Campion & McClelland 1991	Pretest–posttest	Posttest-only	Pretest–posttest	Posttest-only	Managers
Job design						
Motivational	T				IK	K
Mechanistic	T		T	IK	K	
Biological	T	T	RIB	K	RIB	
Perceptual-motor	T		T	IK		
Benefits						
Satisfaction	T	RT			K	
Mental underload	T			IK	IK	RK
Catching errors	T	RT	RT	K	IK	
Customer service	T	RT	RT	K	IK	K
Costs						
Mental overload	T		T	RK		RK
Training requirements	T	RIB		RIB		K
Basic skills	T				K	
Making errors	RT	T	T	RK	RIK	
Job efficiency	RT		T		RIK	
Compensable factors	T					
No effect predicted						
Work space	T	T	T	K	K	K
Physical comfort	T	T	RIB	K	RIB	K

Note. T = support for task enlargement; K = support for knowledge enlargement; IT = support for interaction in which task was enlarged but knowledge was unenlarged; IK = support for interaction in which knowledge was enlarged but task was unenlarged; IB = support for interaction in which both were enlarged; and R = reversal. Managers only evaluated knowledge enlargement, and Campion & McClelland (1991) only evaluated task enlargement.

design has decreased slightly, whereas preference for mechanistic design has increased slightly. It is tempting to speculate that after 2 years of continuing job enlargement, the employees' enthusiasm for even more motivating jobs is becoming tempered.

Limitations

Campion and McClelland (1991) used a posttest-only research strategy that was limited by the threat of selection (Cook & Campbell, 1979). Employees assigned to enlarged jobs may have differed in systematic ways that could influence the findings. Controlling for a range of demographic variables (e.g., tenure, education, performance appraisal) did not change the results. The present study examined the same variables as controls as well as preferences for the four job design models and a host of other potentially influential factors as suggested by employees and managers (e.g., work load, overtime, job security perceptions, customer service tasks, and training). With the exception of work load and overtime, which reduced effects slightly, all these variables had little effect on the results. The study also provides a stronger test by using a pretest–posttest research strategy. Such within-subjects strategies allow experimental conditions to be statistically adjusted by controlling for pretest differences on the job design and outcome measures. Nevertheless, statistical controls probably underadjust (Cook & Campbell, 1979), and without random assignment there might still be other extraneous influences that could confound the findings. Therefore, selection does not appear to be a major limitation, but it cannot be ruled out totally.

Another limitation is statistical power. Although high for posttest-only analyses, it is low for pretest–posttest and manager analyses. All current employees who were in the pretest and all available managers were included in the study, and initial power estimates appeared adequate. However, effect sizes are smaller than in the original study (0.35 vs. 0.50 standard deviation mean difference), so power is lower than planned. Therefore, lack of statistical power offers an explanation for why there are fewer significant effects for pretest–posttest and manager analyses as compared to the posttest-only analyses. For example, lack of power may explain why the motivational scale is not significant in the pretest–posttest analysis, when it is significant in the other analyses.

The smaller effect sizes suggest that another potential limitation is that the intervention was not that effective in changing job design perceptions. Perhaps the general level of enthusiasm for the job enlargement intervention has waned in the 2 years since it was begun, as suggested by the changes in the preferences for motivational job design. This reduced enthusiasm could potentially depress scores on motivational questions. Alternatively, with more of the jobs in the organization enlarged, the differences between enlarged and unenlarged jobs may have appeared smaller due to the comparison process employees undertake when making job design judgments (Oldham et al., 1982). This explanation may be particularly relevant to the

lack of significant effects on the motivational scale in the pretest–posttest analysis.

Other limitations include the slight drop in internal consistencies of some measures. Although perhaps explainable by the more homogeneous nature of the current sample, it reduces the likelihood of finding significant effects. Finally, the lack of other more objective measures, such as customer service, quality, productivity, and turnover, is a limitation of the study.

Implications and Future Research

The first implication is that both costs and benefits occur as a result of changes in job design, and an interdisciplinary perspective is needed to show both types of outcomes. When an intervention based on one discipline is implemented, benefits may be obtained, but there may also be costs incurred due to the lost benefits of other disciplines. In the case of job enlargement, benefits of the motivational model may be gained, but benefits of mechanistic and perceptual-motor models may be lost. Recognition of these trade-offs can help make more informed decisions regarding job design interventions. This and the previous study (Campion & McClelland, 1991) provide quasi-experimental demonstrations of these conflicts as initially suggested by cross-sectional research (Campion, 1988, 1989; Campion & Berger, 1990; Campion & Thayer, 1985).

The second implication is that there may be different types of job enlargement. The difference between knowledge and task enlargement is enlightening in that adding tasks leads primarily to negative outcomes, whereas adding knowledge areas leads primarily to positive outcomes. Invoking the distinction between enlargement and enrichment (Herzberg, 1966) may help understand these results. Knowledge enlargement may be more like enrichment than task enlargement because it enhances the level of mental requirements as opposed to just enhancing the number of activities. It may add a higher level of mental abilities as opposed to more tasks of the same ability level. In this setting, knowledge enlargement also appears to have as much or more identity as task enlargement. Finally, the new compensation system encourages the acquisition of knowledge. Even though the system does not distinguish among current levels of employee knowledge, perhaps the anticipation of future rewards may be supporting the more positive effect of knowledge enlargement. Future research should continue to examine differences between types of enlargement interventions as well as the differences between enlargement and enrichment in general. Perhaps the enlargement–enrichment distinction should be more prominent in current theories and research on motivational job design.

The findings on knowledge and task enlargement also provide insight into how to minimize trade-offs between job design models. The motivational and mechanistic models have been negatively related to each other and to each other's outcomes in all previous research. Campion and McClelland (1991) encouraged optimism that such trade-offs may not be absolute because they found that all predicted costs of enlargement did not occur. This study offers further encouragement by finding that motivational and mechanistic models do not have to be negatively related and can both be positively related to some outcomes. More important, the study identifies a type of enlargement in this setting that seems to result in many of the benefits but few of the costs that conflicts between the models would predict. It is possible that knowledge and task enlargement are highly correlated in other settings, and perhaps knowledge enlargement may not be as positive in some settings. Nevertheless, their independent effects as illustrated in this study offer a starting place for future research. Future research should attempt to develop a theory or a technology to minimize trade-offs and maximize the benefits of all models.

The third implication is that research evaluating job design interventions should be long-term. The 2-year period in this study is substantially longer than most previous studies. It found that the experiences of an organization with costs and benefits of task enlargement change over time. Confirming the only other published long-term evaluation (Griffin, 1991), the beneficial influence on satisfaction dissipates due perhaps to a transient Hawthorne effect. Other benefits, like perceptions of errors, reverse from less to more likely with time, which might explain other reversals like customer service changing from better to worse. Some costs, like training, appear to dissipate somewhat, possibly because such costs become less noticeable after the initial period of change when many employees are experiencing it. Higher compensation requirements also dissipate, probably because raises have been given or because the compensation system has been changed. Other costs, like overload and efficiency, appear to be delayed, perhaps because such costs take time to build up within the worker or take time to be realized because of heightened effort and enthusiasm exhibited during periods of change.

Individual differences are an important part of the motivational model of job design. It is unexpectedly observed that preferences for motivational work changed over the 2-year period. Previous research has not addressed whether such individual differences change over time, but presumably such dispositions are thought to be stable. These findings should encourage future researchers to explore other conditions under which such individual differences change.

Long-term evaluations also reveal that naturalistic interventions can take different forms over time. Future research should continue to study such interventions, because the jobs as well as the costs and benefits may continue to change. Job design may not be as static as assumed in previous research.

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