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A Preliminary Study of a Job Analytic Inventory Derived From a Behavioral Consistency Method for Assessing Intrinsic Motivation

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A PRELIMINARY STUDY OF A JOB ANALYTIC INVENTORY DERIVED FROM A BEHAVIORAL CONSISTENCY METHOD FOR ASSESSING INTRINSIC MOTIVATION

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DEDICATION

To Arthur F. Miller, Jr.

for his pioneering work in the assessment of intrinsic motivation

and its application in the work place.

ABSTRACT

A Preliminary Study of a Job Analytic Inventory

Derived From A Behavioral Consistency Method

For Assessing Intrinsic Motivation

William J. Banis
Old Dominion University 1993
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The research question for this study asked if the Job Specifications Inventory (JSI) had acceptable internal reliability and an ability to differentiate among occupational groups. The JSI was designed to have subject matter experts rate the importance of skill, content, context, relationship and work focus requirements of jobs or occupations. The JSI used a taxonomy of 268 behavioral elements derived from the content analyses of satisfying achievements reported by a large, diverse clientele. A clinical-type behavioral consistency method was used to extract performance dimensions from clients' achievements to build the taxonomy. The achievement-based taxonomy was seen as potentially enhancing productivity for employers and job satisfaction for employees.

The JSI was intended to be used in conjunction with behavioral consistency methods to address individual and organizational problems associated with person-job fit. The relationship between persons and jobs was viewed as having important consequences for individuals, organizations and society. Person-job fit has been linked to employment

outcomes associated with productivity, job satisfaction, and work-related stress. A content validity strategy guided JSI development to support fairness and to avoid adverse impact in employment decisions.

The JSI was administered to 614 subject matter experts in seven occupational groups--certified public accountants, civil engineers, elementary teachers, insurance sales agents, musicians, personnel managers, and secretaries. Internal reliability estimates ranged from .96 to .98 across occupational groups and from .72 to .96 for JSI parts by occupation. Ward's cluster analysis method suggested a seven-cluster solution against the seven occupational groups used as external classification criteria, but occupational overlap did occur within clusters. The 268 JSI variables were reduced to 38 scales and examined by factor analysis for structural properties. Seven factors were identified with loadings above .40 and used in further evaluation. Analysis of variance found significant differences in scores among occupational groups, clusters and JSI parts. Multiple comparison tests showed significant interaction effects among occupations and clusters by JSI parts and by JSI factors.

Results suggested that the JSI displayed acceptable internal reliability and showed discriminating ability to differentiate occupational groups. The statistically significant differences in ratings among groups and clusters were attributable to the structural properties of the inventory and provided evidence for construct validity.

The JSI could have utility for managers in behavioral description interviewing to enhance selection and placement decisions. Additionally, individuals could use the JSI to analyze job specifications for strengthening career decisions. Future use could involve

the definition of important worker specifications in occupations to enhance mobility for workers and transportability of skills for employers.

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CHAPTER ONE

INTRODUCTION

This study developed and tested a new job analysis instrument called the Job Specifications Inventory. It was derived from a clinical-type behavioral consistency method used to assess motivated behavior. The inventory was designed to identify worker specifications rated important for effective performance in specific jobs and occupations. Additionally, the Job Specifications Inventory was developed to serve as a parallel procedure to the behavioral consistency method for measuring person-job fit within an interactionist framework.

Person-job fit has been a major employment problem for individuals and organizations. It refers to the degree of congruence between an individual's attributes, such as knowledge, skills, abilities, motives and other factors, and a job's characteristics, such as knowledge and skill requirements or situational variables that affect performance.[1] An interactionist perspective addresses the problem of person-job fit by viewing work performance as a function of both individual differences and job characteristics.[2] The behavioral consistency method assesses individual differences within parameters thought to represent intrinsic motivation, while the Job Specifications Inventory was designed to define job characteristics in commensurate terms. If person-job fit could be defined and measured from an intrinsic motivation perspective,

employment outcomes such as productivity and quality of work life could be enhanced. As a first step toward the long-term goal of measuring and improving person-job fit, this study evaluated the reliability and accuracy of the Job Specifications Inventory in describing job characteristics and in differentiating occupations.

This study emerged from a broad context of public policy, organizational and individual issues related to employment. The central public policy issue has been the ongoing conflict between economic efficiency and social equity. Until passage of the Civil Rights Act of 1964, ability tests were used widely to screen and select applicants for jobs in both the public and private sectors. Ability tests have job-related criterion validity and have been used to predict differential abilities of applicants in performing jobs. Job performance affects organizational productivity, efficiency, costs and competitiveness. Unfortunately, general ability testing has had adverse impact on some minority groups, resulting in claims of unfair employment discrimination.[3] Consequently, ability testing declined among employers because of the expense of validating tests as predictors of job-related performance and because of concerns about adverse impact and the legality of selection procedures. Recently, psychologists have speculated that the decline in wide-spread ability testing during the past twenty five years has contributed to lowering organizational and national productivity.[4] In response, the federal government has urged employers to devise alternative selection procedures that are valid but protect minorities from adverse impact.[5] However, despite advances in validity research and pressures to improve productivity, the public policy debate on ability testing has continued with no clear resolution in sight.[6] Within this context, the

development of the Job Specifications Inventory has sought to reflect the importance of effective performance, fairness and legal requirements.

Employment problems have become more complex because of the changing job and labor markets. The job market has changed from a production to a service/information economy, and its increasingly complex jobs require higher levels of education and technical competence. Highly educated workers expect fulfilling careers and high quality work lives, and typically place more demands on employers for meaningful work. The number of entry-level workers with requisite qualifications is growing slower than anticipated long-term demands. Employers could have difficulty in recruiting and retaining qualified workers in coming years.

Further, the labor force has become increasingly divided along minority and skill lines, especially in urban areas, because of shifts in populations and jobs. Four million new immigrants could join the labor force by the year 2000, with most settling in urban areas.[7] A high percentage of immigrants lack the skills required for jobs in the new economy. For example, 57 percent of the immigrants settling in Los Angeles from the late 1970s to the late 1980s had less than a grade school education.[8] Afro-American men and Hispanics represent an increasing share of new entrants to the labor market, but the jobs they have held traditionally are declining.[9] Jobs in the least skilled classes are disappearing while high-skill occupations are growing.[10]

Employers have been caught in the middle of these demographic changes, legal requirements and competitive pressures. They have had to recruit, select and retain workers from an increasingly diverse, minority and shifting labor force that has skill and

educational deficiencies. Employers have tried to remain competitive through increased productivity by hiring skilled and educated workers, while simultaneously insuring that their employment practices do not discriminate unfairly against protected groups.

Fortunately, alternatives to ability testing for making employment decisions have emerged in the past decade. The methods examine the performance capabilities of workers and show promise for enhancing person-job fit. These methods were derived from the behavioral consistency principle which assumes that the best predictor of future performance is past performance. This principle is well established in the psychological literature and has guided the seminal work done by the U.S. Department of Labor on the behavioral consistency method of examining professional level job applicants.[11] The development of behavioral consistency methods has been timely because of the inter-related public policy, economic and social issues that have made person-job fit problems increasingly important. These issues are discussed below.

An Overview of the Problem

Problems of person-job (P-J) fit have been central issues in both vocational psychology and industrial psychology since the early twentieth century. Vocational psychologists have studied problems of career choice, work adjustment, and job satisfaction at the level of the individual,[12] while industrial psychologists have focused on organizational issues such as employee selection, placement, and work performance.[13] Poor P-J fit has been linked to work dissatisfaction and stress-related mental and physical health problems for individuals.[14] It has also been associated with organizational problems

of productivity, absenteeism, turnover, health costs, lower quality decisions, and missed opportunities.[15] These problems have received considerable attention in recent years as public and private organizations have struggled to become more efficient and effective.

Technical, professional and managerial workers have been viewed as key resources for organizational survival and success in the information age;[16] however, organizations could have difficulty in recruiting such careerists because of projected labor shortages in the mid-to-late 1990s. Further, employers could find it difficult to retain these workers after they are hired because of their high expectations for job satisfaction and meaningful work.[17] When such dynamics are coupled with the legal requirements for valid and nondiscriminatory hiring practices, P-J fit and selection issues take on new importance for human resource management.

To address the problem of P-J fit, this study developed and tested a job analysis inventory based on a taxonomy derived from a clinical-type behavioral consistency method. The taxonomy was extracted from achievements reported by a large, diverse clientele as reflecting effective and satisfying performance. Because they were satisfying to the individual, the achievements were thought to tap intrinsically motivated behavior. Accordingly, this study attempted to contribute to research on intrinsic motivation by extending the use of the assessment method into job analysis.

The upcoming section examines the broad issues associated with P-J fit and outlines the importance of these issues for individuals, organizations and the nation. Additionally, P-J fit is placed in a larger social and economic context and is linked with several trends having impact on work and workers.

Public Policy Issues and Trends

In the 1970s, the controversial government report, Work in America, brought attention to quality of work life issues and low productivity. The report linked work-related problems to declines in physical and mental health, family stability, community participation, and balanced sociopolitical attitudes, as well as to increases in aggression, delinquency and substance abuse. Urban areas were particularly affected by these social issues as production industries declined and better paying jobs were lost. Further, the institution of work itself was cited as the number one health problem in the nation. However, the study also claimed that work satisfaction was the best predictor of longevity. The report emphasized that the quality of work life associated with P-J fit enhanced or diminished the quality of life for individuals and society, and contributed to organizational productivity and effectiveness.[18] A major problem was defining and measuring such fit.

Matteson and Ivancevich identified poor fit between a person and the work environment as a critical factor in work stress levels. In particular, job design, role conflict, role ambiguity, work overload and lack of performance feedback caused work stress. Dysfunctional work stress contributed to 1) increases in accidents, absenteeism, turnover, physical and psychological ailments, and health care costs, and 2) decreases in the quantity and quality of production, quality of decision making, creativity, and interpersonal competence. According to Matteson and Ivancevich, the National Science Foundation estimated that work-related stress costs society over $100 billion annually and its costs are increasing.[19]

From an employer's perspective, the consequences of work-related problems have been costly. Low morale, absenteeism, negative emotions, interpersonal conflicts, assistance programs, and diminished productivity have reduced efficiency and added expenses. Ultimately, these costs are passed to tax payers and consumers through increased prices, social costs and lost national productivity.

In recent years, international competition has challenged the United States with its comparatively lower levels of productivity and quality goods. In response, human resource issues have gained importance. National media have reported that workers' skills and knowledge levels required for jobs in the information age are falling behind demand.[20] Investment in human capital has not kept pace with our need for skilled labor. Given workforce changes, the problem will likely worsen in the years ahead.

Workforce issues could be summarized as follows:

1. The growth of high technology centers, mainly near urban areas, will require the recruitment of professional workers. Competition for educated talent among employers will increase later this decade.

2. The increased diversification of workers will require revised human resource management practices and an appreciation for individual differences.

3. The combination of more highly educated and more undereducated workers will require employers to invest in human resource development and in accurate selection and placement practices.

4. The decline of union membership and the rise of professional standards that dictate performance will require less prescribed, rule-bound management with new

emphases on negotiation of work assignments. Assigning tasks for appropriate fit and effective performance will gain importance.

5. The increased use of technology will alter work design and organizational structure.

6. The migration of jobs to services and smaller firms will represent a fundamental restructuring of the economy. Small firms typically locate in or near urban areas in order to have access to resources, labor and markets.

7. Pressure for high productivity due to international competition will affect most organizations and their employees.[21]

In Workforce 2000, the Hudson Institute reported two key trends. First, the workforce is becoming more female, older, and more disadvantaged, and is growing more slowly. Second, new service jobs will require higher skill levels, resulting in higher unemployment among the least skilled and higher employment among the more educated. A postsecondary education will be required for most new jobs.

Improving productivity in service organizations and industries has been a major problem compared to manufacturing. In recent decades, economic growth has been sustained, in part, by the growing numbers of new entrants into the labor force and by deficit spending. However, with fewer young people and fewer women entering the labor force and with concern over the federal deficit, economic growth will be tied more closely to increases in productivity. The shortage of skilled workers willing to work for low wages, coupled with new technologies, may provide incentives for productivity improvement in services. These challenges may also foster public policy changes to

improve efficiency, e.g., deregulation and privatization of services.[22] However, development and effective management of human resources will be key factors in productivity improvement since ". . .almost all economic value in market economies is ultimately created by human labor."[23]

Worker Issues and Trends

Incongruence between the values of the new generation of young professionals and traditional jobs and management practice has received considerable attention. The new professionals have been described as not appreciating the interdependent nature of organizations and as wanting interesting and satisfying jobs that provide opportunities to use their skills. They perceive their job satisfaction and success as dependent upon the nature of their work.[24] Additionally, the new professionals have a high degree of self-confidence in their abilities to perform successfully and prefer that pay raises be based on individual performance, not group performance.

The new professionals also have high expectations for career success and hard work but an unwillingness to subordinate personal or family priorities. In short, they expect both career success and a fulfilling personal life. LaMarre and Hopkins offered this advice: "If management works with the college-educated employee, acknowledging individual differences in work style and needs, personal life responsibilities and objectives, and the need for meaningful work, this employee will repay the company many times over through hard work and commitment."[25]

A new work psychology has emerged among young professionals. In discussing

the new work psychology, Cascio described one important factor as, ". . .the insistence that jobs become less depersonalized."[26] Being recognized as an individual was rated as the most important aspect of work, while autonomy was identified as the single most important determinant of job satisfaction across income levels.

Von Glinow described how psychological factors interact with organizational performance. She argued that professional employees will play a crucial role in helping the United States regain international competitiveness in high technology markets. Employers obviously cannot afford to alienate these workers, but it has been happening. First, the number of challenging jobs has not kept pace with the increasing education level of the population. Many highly educated employees do not feel challenged in their work. Second, employees threaten traditional management practices by demanding greater participation in decisions that affect their jobs and careers. Employees now expect greater psychological and social entitlements from organizational life because financial rewards have lost ground due to slow economic growth, international competition and cost containment practices.[27]

Recent articles have described the psychological profile of young people between 18 to 29 years old. Called "baby busters," "twentysomethings," or "Generation X," they are the second largest group of young adults in U.S. history after the World War II "baby boom" generation.[28] Focus group research has identified several characteristics of Generation X college members.[29] First, they crave stimulation and variety. This group wants short-term work assignments that demonstrate their skills. Second, they want regular, personal contact with supervisors who show interest in them and offer

constructive feedback on their performance. Third, Generation X members prefer specific, concrete information that instructs them how to do something right immediately. Ambiguity confounds them. Fourth, this group desires to learn leading-edge technologies, techniques and systems that develop skills and expertise. Fifth, this group seeks jobs that gain peer approval and eliminate boredom. Finally, Generation X members want to keep their options open and to avoid commitments. As suggested, they are different than preceding generations who now run most organizations.

Regardless of generational differences, professional employees bring special challenges to the work place. As knowledge workers, they value occupational authority over managerial authority. Their hopes, values, expectations, and fears shape organizational cultures. They hold high expectations about organizational satisfactions and rewards, but they place a higher stake in their own career development than in the success of their organizations. These careerists are loyal to themselves and their professions, not to their employers. Their attitudes have been reinforced in recent years by organizational downsizing, mergers, acquisitions, and short-term profit strategies that undermine job security.[30]

Management solutions are crucial to the survival and success of organizations, yet, managers seem uncertain how to approach the new careerists. The United States never has faced the problems of employee motivation that it now confronts.[31] The new careerists resist organizational controls, yet they want to control both the means and ends of doing their jobs. Their autonomy expectations clash with management's expectations about the proper role of employees. These conflicting expectations, the dramatic changes

in the workforce, and the discontinuities in the larger business environment make effective human resource management of knowledge workers a crucial task for managers. Von Glinow suggested that job design, which emphasizes the "work itself," is an important motivator for professionals and may aid retention more than participation in decision making.[32]

The policy and worker issues described above have not gone unnoticed. Two broad responses have emerged. The first, human capital theory, created an economic perspective on the strategic importance of human resources in the new economy. The second, the quality of work life movement, reflected organizational responses to the interaction of the worker with the job to improve productivity and job satisfaction.

Responses to Problems of Person-Job Fit

Human capital theory responded to the concerns of national productivity, organizational effectiveness and management of people in the work place. The theory represented a paradigm shift from viewing people as costs to viewing them as capital resources that must be acquired, developed, deployed, and managed strategically. Human capital theory claimed that ". . .educated, healthy, trained and spirited people are the ultimate source of economic growth, {and} are the wellspring of productivity."[33] Unfortunately, managers historically have ignored the long term value of human investment. However, the projected scarcity of skilled workers will require that management thinking and practices adjust to changes in the broader business environment and to the expectations and values of the new careerists. The human capital perspective

advocates investment in workers as capital resources who must be developed and managed like other capital resources. In particular, employee work motivation is seen as a key economic resource that must be harnessed to productivity. Carnival argued the following point:

> . . .the key difference in productivity among firms and nations cannot be attributed to the quantity of resource inputs but to some measurable qualitative human "factor x." Research shows that productivity differences between workers in the same plants with the same pay and equipment can vary by a factor of four, and differences between plants with identical equipment, labor and pay can vary by 50%. According to available research, the variation in "X" efficiency is rooted in motivational and cultural differences.[34]

The quality of work life (QWL) movement addressed both employee fulfillment and organizational effectiveness. During the 1960s, QWL reflected the civil rights and social responsibility issues by focusing on ". . .the growing concern of a generally affluent society for the health, safety and satisfaction of workers."[35] During the late 1970s, international competition focused attention on management practices abroad that resulted in higher quality and lower cost goods. Consequently, QWL issues and their effects on productivity gained new attention. This second phase of QWL embraced employee satisfaction, productivity and environmental issues such as foreign competition.

Huse and Cummings defined quality of work life as a way of thinking about people, work and organizations that considers both workers' welfare and organizational effectiveness. QWL interventions may include participation in decision-making, work design, reward systems and work environment improvements. The assumption has been that QWL interventions lead to higher organizational productivity and higher employee work satisfaction. These outcomes may be accomplished through improved

communication and coordination in the work place, improved employee motivation and performance, and improved capabilities of employees that affect performance. Within the QWL context, more accurate P-J fit should enhance performance, motivation, satisfaction and quality of work life.[36]

Perspectives on Person Job Fit

The central thesis of this study was that the quality of the relationships between people and jobs has a major influence on productivity and work satisfaction. Several researchers have supported this view.

Hackman and Oldham argued that management should support good P-J fit to foster high organizational productivity and personal satisfaction; however, management may be unable to improve productivity and satisfaction if fit is faulty. "For this reason, we believe it is advantageous to address person-job relationships first, rather than later, if improved productivity and quality of work life are among the goals of an organization."[37]

Hackman and Oldham believed that the P-J relationship is critical in understanding both organizational productivity and the quality of a person's work experiences and that improving P-J fit is important. They asked " . . . how organizations can be designed, staffed, and managed so that employees are simultaneously utilized and satisfied to the fullest extent possible, with neither the goals of the organization nor the personal needs of the employee dominating the other. In other words, how can we achieve a 'fit' between persons and their jobs that fosters both high work productivity

and a high quality organizational experience for the people who do the work?"[38]

According to Brousseau, two dominant strategies have evolved for matching people and jobs. First, the selection strategy identifies the most qualified individuals from a pool of candidates based on assessment of characteristics thought to contribute to effective performance. The characteristics are derived from job analysis and reflect the role of aptitudes and abilities in P-J fit interaction. Second, the job design strategy tries to design jobs to fit employees and focuses on the role of personal needs or motives as determinants of person-job fit.[39] These strategies have been seen as conflicting. Job design advocates criticized the selection strategy as maintaining the status quo because the process of job analysis, testing, and candidate selection views the job as the given. Consequently, poorly designed jobs are perpetuated since emphasis is placed on identification of people to do the jobs. Furthermore, the potential for P-J misfit increases since emphasis is on ability to perform the job, not on motivation to do the job. It is easier to find minimally qualified candidates for jobs that would be undermotivating than for jobs that provide optimal challenge. "Consequently, the tendency to view jobs as fixed, combined with a tendency to select individuals who score highest on tests of required skills and ability, often results in mismatches where individuals are overqualified for, and undermotivated for, the jobs to which they are assigned."[40]

Conversely, selection advocates argued that the job design strategy ignored the role of individual differences in P-J fit. For example, if jobs were enriched to provide more complexity and motivating potential, the capabilities of individuals could be overextended. However, recent work by job design theorists[41] and by motivation

researchers[42] emphasized interactionist models that viewed performance as a function of both job characteristics and individual differences. These models have supported Lewin's early proposition that behavior is a function of both the person and the environment, or B = f (P, E).[43] In referring to Lewin's formula, Atkinson said that the key to understanding performance is the "comma" or the interaction between a person and a given environment. Accordingly, he recommended that research be conducted from an interactionist perspective.[44]

Brousseau argued that the selection and job design approaches are complementary. He thought that dysfunctional job-person matches could be reduced 1) if candidate assessment included skills, abilities and motives, and 2) if the selection approach included finding the right job for a particular person instead of focusing only on finding the right person for a given job. Brousseau recommended that jobs be described in terms of the personal qualities of people and people be described in terms of the types of jobs that would provide an appropriate fit.[45] However, most methods of analyzing job characteristics have not taken such an interactionist approach.

Others have supported the importance of person and situational determinants of behavior and the value of taking an interactionist perspective. Joyce, Slocum and Von Glinow[46] argued that both performance and satisfaction could be improved by creating and maintaining fit between a worker's personality and the performance environment. The problem, however, has been the unclear nature and meaning of fit. Accordingly, operationally defining interaction or fit has been difficult.

Harrison suggested that there are two kinds of P-J fit: 1) the extent to which a

person's skills and abilities match the demands and requirements of a job; and 2) the extent to which the job environment meets the individual's needs.[47] Congruence between these dimensions could be used to define the degree of P-J fit. Stress would be defined by lack of fit. Further, Harrison recommended that P-J fit research should: a) differentiate the dimensions used to measure fit; and b) measure fit at the level of the individual, not the group.

Problems of enhancing P-J fit, especially in selection, have been particularly complicated with high technology, professional and managerial employees. Their jobs are less prescribed, use higher level skills, and afford more discretion in performance. The personality of the incumbent often shapes the job significantly. Accordingly, accurately analyzing and describing professional-level jobs has been difficult. Additionally, assessing the personality characteristics of professional, technical and managerial workers has posed special problems. As Hough reported, these workers resist typical psychological inventories that use signs or predispositions of behavior to estimate performance.[48] Instead of using "signs" of performance, Hough found that professional workers prefer to have their performance record evaluated and to have employment decisions based on their accomplishments.

The behavioral consistency method has been developed and used by the Department of Labor to assess work-related skills of professional employees.[49] The new procedure taps different candidate characteristics than older methods and offers several advantages: content validity; lower long term costs; higher interrater reliability; fairness for minorities and women; and conceptual support from psychological research.[50]

Traditional selection variables such as experience and education could continue to be used with behavioral consistency methods. Additionally, they could be incorporated with established personnel systems, making them a cost-effective option.

The behavioral consistency method was designed for examination of individuals, not groups; therefore, it is suitable for use in small enterprises that historically have not had the resources nor numbers of employees to justify development and validation of selection procedures. This application is important since small enterprises comprise a significant and growing segment of the economy and are the driving force in new job creation.[51] Additionally, unlike large organizations that can absorb marginal performers due to a wider dispersion and redundancy of skills, small enterprises typically depend on the effective performance of a few key individuals. Effective or ineffective performance of key individuals is often the critical difference in organizational success and survival.

Summary of the Issues

The quality of P-J fit has been implicated in employment outcomes for employers, individuals and society. P-J misfit has been linked to lower productivity, higher work stress, higher health costs, and higher human resource management costs. Good P-J fit contributes to higher productivity for the employer and higher work satisfaction for the employee. Traditional management practices are viewed as inappropriate for the new careerists who bring high expectations for satisfaction and autonomy to the work place. A fundamental change from an industrial to a service/information economy will require more highly educated workers, but their

numbers may not keep pace with anticipated long-term demand. Future recruitment and retention of such workers will be more difficult for employers because of the changing demographics of the labor market. Given the new careerists' expectations for a high quality work life, employers should pay closer attention to P-J fit issues in the selection process.

Legal considerations have compounded the problems further. Traditional ability tests used in employee selection and placement have job-related validity but also have adverse impact on some minority groups. Consequently, ability testing has declined, leading to the suggestion that reduced selection accuracy has contributed to a decline in national productivity. The federal government advised employers to develop alternative and valid selection procedures that avoid adverse impact.

The U.S. Department of Labor devised a method for analyzing job requirements and candidate qualifications based on behavioral dimensions. The behavioral consistency method improved upon traditional approaches and has been acceptable to professional workers. However, more research is needed to develop the method for wider application.

This chapter framed the problem of P-J fit with a multidisciplinary perspective. Next, Chapter Two provides a review of the literature on behavioral consistency methods, person-job fit, the clinical assessment procedure, intrinsic motivation and job analysis. Chapter Three presents a discussion of inventory development, testing procedures, research questions, and statistical methods. Chapter Four reports the results of this study according to statistical procedures and research questions. Chapter Five

reviews the research, offers conclusions, identifies limitations, discusses implications for theory and practice, and explores future research possibilities. Supporting material and information are provided in four appendices. Appendix A contains a sample cover letter and the Job Specifications Inventory. Organizations that participated in this study are listed in Appendix B, while the occupational profiles generated by the inventory are illustrated in Appendix C. Finally, supplemental statistical tables are organized in Appendix D.

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CHAPTER TWO

REVIEW OF THE LITERATURE

The central thesis of this study was that the degree of fit or congruence between persons and jobs has significant consequences for individuals, employing organizations, and society. Several inter-related economic, demographic, legal, and psychological issues have suggested that person-job fit has become increasingly important in human resource management; however, defining and measuring person-job fit have been problems. A method to characterize persons and jobs in commensurate or interchageable terms has been needed. This study adapted a taxonomy derived from a behavioral consistency method used in assessing motivated behavior to develop and test a commensurate job analysis inventory for use in addressing the problem of person-job fit.

Behavioral consistency methods have been developed to improve the reliability and validity of employment decisions. Behavioral consistency methods (BCMs) enhance person-job (P-J) fit by matching the skill requirements of jobs with the demonstrated skills of applicants. BCMs are especially appropriate for educated workers who prefer to be evaluated on accomplishments rather than on psychological indicators. A limitation with most BCMs, however, has been the narrow range of performance dimensions they address. Situational and motivational factors have not been included. One clinical-type BCM captures broad performance dimensions thought to represent intrinsic motivation

and has potential for measuring P-J fit. This study developed and tested a job analysis inventory based on this clinical-type BCM to identify important worker specifications associated with effective performance.

This chapter explores the problem of P-J fit from several perspectives. First, literature on the principle of behavioral consistency is reviewed. Second, BCMs are placed in an interactionist perspective through a review of relevant P-J and person-environment congruence literature. This perspective is important for evaluating the strengths and limitations of BCMs and for identifying measurement issues. Third, the clinical-type BCM used to assess individual behavioral is described. Next, the theory of self-determination and intrinsic motivation is offered as a conceptual framework for the BCM. Finally, job analysis literature is reviewed to guide development of the job analysis inventory. Key points from each section are summarized.

Behavioral Consistency Methods

In a classic article, Wernimont and Campbell proposed that the concept of behavioral consistency deserved considerably more attention in predicting job performance and in validating tests.[1] They observed that tests based on the traditional validity model used signs of predispositions of behavior instead of samples of characteristic behavior. That is, psychological inventories typically have measured constructs as traits thought to be predispositions of behavior, not samples of behavior. They argued that meaningful samples of behavior are better predictors of performance than are signs of predispositions.[2] They also suggested that predictor and criterion

measures be as similar as possible to strengthen the relationship between the test situation and the performance domain.

Wernimont and Campbell proposed a behavioral consistency model with three elements. First, job analysis defined job performance dimensions from behavioral incidents scaled for effective and ineffective performance. Second, applicant experience and education were assessed to examine relevant behaviors, their intensity and their similarity with the job in question. Third, if relevant behaviors were lacking, job related work samples or simulations were developed to assess candidates. This option allowed young, inexperienced applicants to compete with more experienced persons. In contrast, the conventional selection model emphasized predictor and criterion measures of job performance that resulted in "signs" of predispositions taking precedence over "samples" of behavior.[3]

Wernimont and Campbell recommended that selection research should emphasize individuals and intraindividual consistency of behavior.[4] Individual and situational variables should be placed in subgroups for longitudinal research on performance consistency. Wernimont and Campbell said that the behavior consistency model demands specification of contextual or situational variables that influence performance. "It is extremely important to have some knowledge of the stimulus conditions under which the job behavior is emitted such that a more precise comparison to the predictor behavior sample can be made. Because of present difficulties in specifying the stimulus conditions in an organization, this may be the weakest link in the entire procedure."[5]

Wernimont and Campbell held that BCMs had advantages over the traditional

selection approach. First, faking and response biases were reduced because the focus was on samples of behavior, not on self-reports of interests, beliefs or attitudes. Second, test discrimination was reduced in two areas: a) lack of relevance in test items not being job related; and b) unfairness of content that typically reflects middle class concepts and information, thus discounting the true abilities of disadvantaged applicants. Third, invasion of privacy was reduced since the link between candidate assessment and job behavior was more direct and obvious.[6] Wernimont and Campbell believed that a focus on the measurement of behavior gave a higher return on investment than the traditional selection approach and aided the understanding of job performance.[7]

In 1979, Schmidt, Caplan, Bemis, Decuir, Dunn, and Antone at the U. S. Civil Service Commission reported the first application of the behavioral consistency principle.[8] They described a BCM for examining white collar occupations that improved reliability over existing unassembled selection testing. Unassembled examining meant that candidates did not have to be assembled in groups to be tested. Unfortunately, few studies on unassembled examining existed then. The literature showed that reliability was not a problem for mechanical or formula-oriented ratings of experience and education used by public personnel systems. Interrater and intrarater reliabilities were adequate. However, validity was a problem, in that, traditional measures of education and experience did not correlate highly with job performance. These findings were tied to the assumption that ". . .education and experience were the primary, if not the sole, causes of the traits, abilities, and behaviors leading to superior job performance."[9]

Schmidt and his colleagues articulated a new set of assumptions and principles in

developing the behavioral consistency approach to unassembled examining. Since the work of Schmidt et al. was foundational for this study, it was reviewed in some length.

Schmidt et al. traced the validity problem with traditional ratings of education and experience (E & E) to two assumptions. First, the amount and quality of education and experience are indirect indicators of knowledge, skills, abilities and other characteristics (KSAOs) and are correlated with KSAOs since they are causes of KSAOs. Second, KSAOs are correlated with job performance.[10] Quality refers to the quality of opportunities E & E provide to develop KSAOs and not to the quality of the applicant's performance. For some, E & E may be only passive exposure, making traditional E & E ratings credentialistic, not validity oriented.[11] Schmidt et al. noted that traditional E & E rating methods have high reliability but low validity ratings.

The BCM developed by Schmidt et al. was based on the psychological principle that ". . .the best predictor of future behaviors of a given kind is a measure of past behaviors of a similar measure."[12] The principle assumed that an individual's major behavioral patterns are quite stable after a given chronological age and that the important behavior of most people does not change significantly over time.

> Past behaviors (not past exposures) are the best predictors of future behaviors, and the more similar the past behaviors are to future behaviors, the better they should be as predictors. To the extent that the principles of this model are met, the reliability coefficient becomes a validity coefficient. Operational validity becomes the consistency or stability of behavior over time. The goal under this concept is to rank order applicants on the kinds of achievement behaviors that are required for (and define) superior performance on the job.[13]

Schmidt et al. emphasized the rating of achievements over passive E & E exposures, but also recognized that traditional E & E variables need not be ignored if

they show evidence of achievement. Applicant achievements do not need to be accomplished on a job or in an occupational setting if the achievements have job relevance.[14]

To operationalize the BCM, Schmidt et al. proposed four ancillary principles. First, since most job analytic methods address classification and compensation issues, equal emphasis was given to all KSAOs, even if differences in KSAOs correlated with differences in performance. Applicants were rated as having the same degree of competence on job tasks. Therefore, the first principle stated that applicants should be evaluated on behavioral dimensions that differentiate between superior and minimally acceptable performance.

The second principle stated that maximally differentiating behavior dimensions could be rated accurately by people who have known and observed superior and marginal performers. Subject matter experts (SMEs) such as supervisors, coworkers and subordinates could recall both superior and poor performing employees they had known to differentiate performance levels on behavioral dimensions.

Third, as a practical consideration, information on applicant achievements had to come from applicants themselves since no one knows the applicants like they know themselves. Schmidt et al. reported that people are usually honest when reporting specific, concrete facts, events and achievements; however, they asked applicants for the names of persons who could verify their achievements to insure honesty.

Two reporting problems were addressed. Since individual differences in self-confidence could cause some applicants to over or under value their achievements,

carefully written instructions were provided. Regarding differences in recall of information, Schmidt et al. felt that the ". . .ability to remember and detail past achievements may be indicative of involvement in the job or profession and may be an indirect indicant of motivation and ability."[15]

The fourth principle stated that achievements could be scaled reliably on job relevance by SMEs and that personnel specialists could use scaled achievements to evaluate candidates reliably. Applicant assessment was based solely on achievements in five to seven domains and avoided applicant self-ratings.

Traditional selection tests use a criterion-related validity strategy that relates a construct such as cognitive ability to job performance criteria. The content validity strategy relates selection criteria to job content in the performance domain. BCMs employ a content validity strategy where selection criteria are based on job content in the performance domain. KSAOs are not unidimensional psychological traits. They define the most critical performance domains from applicant achievements as samples of performance required on the job. Such content validity is in accord with the federal government's uniform guidelines on employee selection.

Compared to more traditional rating methods, Schmidt et al. thought that BCMs measured a different but possibly correlated behavioral dimension. Although more expensive initially to set up, BCMs have greater utility due to their higher validity. Higher utility gives more accurate decisions that enhance performance, thus offsetting implementation costs.

In research with federal budget analysts, Schmidt et al. confirmed that the BCM

was different from credentialistic methods of applicant ratings and that it measured a dimension uncorrelated with E & E ratings. They concluded that the BCM has these advantages: 1) it is based upon sound psychological principles, not unexamined assumptions that education and experience are causes of superior performance; 2) it has reliability, which is a prerequisite to validity.[16]

Schmidt and his colleagues laid the foundation for the behavioral consistency method and later showed that it had the highest validity (.49) of the various methods used to rate training and experience.[17] Others followed their lead.

Hough developed a selection and promotion method for federal government attorneys based on the behavioral consistency principle.[18] Her work responded to the resistance professionals showed toward traditional psychological testing and to their strongly held preference that one's record, accomplishments and achievements should be the basis for selection and promotion decisions. She developed the accomplishment record method of selecting and promoting professionals as an alternative to traditional psychological testing.

The accomplishment record method (ARM) was based on five propositions:

1. Past behavior is the best indicator of future behavior;

2. Samples of past behavior are preferable to signs of behavior;

3. Biodata are samples of past behavior and are the best indicator of future behavior;

4. Critical incident job analysis generates job dimensions that can differentiate performance levels critical for job success;

5. Behavioral job analysis produces job dimensions that applicants can use to describe behavior and accomplishments;

6. Qualitative data can be evaluated and scored reliably.[19]

Hough followed a five-step procedure to develop the ARM. First, she used the critical incident method to generate examples of effective and ineffective job performance to identify critical performance dimensions defined through job analysis. Second, she developed the ARM. The inventory asked attorneys to describe major achievements that reflected their knowledge, skills and ability for each performance dimension by giving a general statement describing the accomplishment. Achievements included a detailed description of activities, time period, recognitions, and name of a person who could verify them.

The third step involved administration of the predictor battery which included the ARM, other biodata items (grades, honors, LSAT scores, education quality, etc.), interest and opinion inventories, and the Self Description Inventory which measures personality factors such as initiative, self-assurance, decision-making abilities, and supervisory qualities. A total of 67% or 329 attorneys completed the predictor battery.

Next, Hough developed the ARM rating scales and principles. First, she evaluated dimensionality by classifying a random sample of 800 accomplishments into performance dimensions. Second, Hough calculated reliability estimates of expert ratings of accomplishments to evaluate the level of achievement demonstrated. Three external attorneys rated 60 accomplishments on a six-point scale (lowest to highest) regarding level of demonstrated achievement. Reliability estimates on the seven dimensions ranged

from .54 to .86; this was high enough to warrant development of scales and principles for rating 2,635 accomplishments. Third, for each dimension, 60 accomplishments were rank ordered according to mean expert ratings. Next, rating principles were induced by assessing the themes underlying the low-to-high rated achievements. Summaries of the themes or principles were written for each dimension as rating guidelines. Fifth, Hough defined benchmarks from means and standard deviations of the experts' ratings. The final step involved rating the accomplishment record for 307 attorneys. This step was conducted by three graduate students who worked independently.

Hough reported several findings:

1. Criterion ratings: The mean reliability estimates were .70 on the behaviorally anchored rating scale across dimensions and .83 on the task rating scales.

2. Accomplishment Record Inventory ratings: Reliability estimates of the ARM inventory rating of the dimensions ranged from .75 to .85, with a median reliability of .79, an overall evaluation reliability of .82, and an arithmetic mean reliability of .85.

3. Relationship to experience: The ARM favored more experienced attorneys. ARM dimensions were related strongly to government service levels from .19 to .32, and to tenure in grade with a .08 correlation.

4. The ARM correlated .25 with job performance.

5. The ARM inventory was equally predictive and fair for minorities, nonminorities, men and women.

6. The ARM inventory showed essentially no relationship with grades, honors,

aptitude tests, quality of education, verbal skills and activities, school ratings and other activities and leadership positions. Higher but nonsignificant correlations were found with self-ratings such as hard work, success, and Self-Description Inventory factors.

The AR inventory appeared unrelated to traditional criterion-related measures such as biodata, aptitude and knowledge tests, and self-description variables. Overall correlations were .21 with grades, .17 with honors, .22 with school quality, .21 with aptitude and knowledge tests, .09 with self-perception variables, and .06 with prior experience variables.

Hough concluded that the ". . .AR inventory is a new type of biodata/maximum performance/self report instrument that appears to tap a component of an individual's history that is not measured by typical biodata inventories. . .[and] also appears to tap aspects of an individual's prior achievements not measured by more typical maximum performance tests."[20] It also correlated with self-perceptions of hard work, success, self-assurance and tenure in a profession. The AR method reflected differences in occupational accomplishments over time. It would be viewed as fair in selection and promotion decisions because it had more face validity than either aptitude tests or traditional biodata inventories. Hough thought that it would have utility in selection, promotion, performance appraisal and career counseling applications and would be more acceptable to professionals than psychological testing.

Hough's application of the behavioral consistency principle was complex and time consuming. It required many subjects and extensive development. She showed, however, the principle's value as an assessment strategy that taps job-relevant

performance dimensions not strongly reflected by more traditional experience and education evaluations or by aptitude or psychological testing. Despite numerous variables incorporated into the study, Hough did not address situational or other P-J fit dimensions. Furthermore, Hough's ambitious study raised questions about the applicability of the BCM in small organizations with few positions and incumbents.

In another attempt to operationalize the behavioral consistency principle, Schmitt and Ostroff developed a selection test based on a content-oriented strategy for inexperienced applicants.[21] Although content validity was emphasized in EEOC guidelines, they observed that little guidance appeared in the professional literature on procedures for identifying job content and its applications for employee selection. They argued that job content tests could only be used for experienced applicants, not for entry-level positions.

Schmitt and Ostroff developed a BCM with three main components. First, job analysis involved a) developing task statements that represented activities and tasks required to perform the job; b) identifying KSAOs by experienced subject matter experts; and c) rating job tasks in terms of time requirements, difficulty level and criticality to organization; and d) rating KSAOs in terms of necessity for new workers, criticality to job, and ability to differentiate levels of performance. Interrater reliability was acceptable. KSAOs rated as necessary for new workers and as critical for the organization were considered important selection criteria.

Second, development of selection tests incorporated tasks rated as most important and as representing actual job behaviors. Important tasks provided the content for

evaluating KSAOs. Applicant evaluation involved an oral directions/typing test, a situational interview, and a telephone call simulation. Finally, eight experienced job incumbents assessed each exam on a scale of "essential" to "not necessary" in judging skills related to various aspects of the job.

Schmitt and Ostroff believed that the behavioral consistency principle was applied in this project since preemployment samples were consistent with relevant job behaviors identified through systematic job analysis. The tests concentrated only on behaviors new workers needed and were designed so inexperienced workers could respond. Exam components matched actual job tasks as much as possible. Additionally, since the tests were based on and matched with important aspects of job performance identified in the job analysis, their procedure had content validity in most major task dimensions.

Their approach to selection test development had a major advantage by providing a realistic job preview with face validity. Since applicants favor measures with face validity, Schmitt and Ostroff viewed their BCM as fairer and more appropriate than other testing procedures. However, two problems were identified. Emergencies were not handled well by applicants and the use of cut off scores did not optimize either the validity or utility of a selection test.[22]

Schmitt and Ostroff demonstrated the feasibility and benefits of using a BCM in selection testing. Like other BCMs, their selection tests focused on the skill dimensions of behavior only; situational variables were not incorporated.

Recently, Janz, Hellervik and Gilmore applied the principle of behavioral consistency to improve the accuracy of employment interviews.[23] Behavior description

(BD) interviewing improved on traditional selection interviews in five ways: 1) by structuring the interviews to improve accuracy and validity; 2) by defining job requirements to improve interview decision quality; 3) by basing questions on behavioral analysis of effective and ineffective performance; 4) by incorporating note taking to improve retention of applicant information; and 5) by assessing applicants on job-related dimensions following a review of interview notes. These improvements were designed to provide interviewers with high quality applicant information.

Janz, Hellervik and Gilmore refined the behavioral consistency principle by considering both situational and time dimensions. They stated: "The best predictor of future behavior/performance is past behavior/performance in similar circumstances."[24] Additionally, they proposed two corollaries: "Corollary 1. The more recent the past behavior, the greater its predictive power. Corollary 2. The more longstanding the behavior, the greater its predictive power." [25]

They offered the following rationale for these refinements:

> The phrase "in similar circumstances" has powerful implications for interviewers. First, it directs us toward circumstances in the future into which we intend to place the candidate. This calls for some form of careful job analysis. Second, it directs us toward the circumstances in the past that are as similar as possible to those into which we wish to put the person in the future. . . .[N]o two events are ever exactly alike. Therefore, it is impossible to find totally similar and perfectly congruent circumstances. The best we can hope for is a set of circumstances in the person's past that are highly similar to those into which we wish to put the person in the future. . . .There are certain points in a person's life when prediction is more difficult because a gap in similarity between past circumstances and future circumstances is much wider than normal. However, the width of the gap does not invalidate the principle - it just makes prediction harder. . . .Corollary 1 neither denies nor overvalues behavior from earlier stages of a person's career or life, but it does encourage the interviewer to focus most heavily on the most recent past

> behavior in similar circumstances. Corollary 2 encourages the interviewer to seek more than one sample of past behavior in similar circumstances. It does not permit overreaction to a single example in either a positive or negative direction.[26]

Janz, Hellervik and Gilmore cautioned interviewers to consider several criteria. First, differentiate between screening and selection decisions by assessing the relevance of specific kinds of candidate information. Second, do not confuse technical knowledge with credentials. Evaluating technical expertise appropriately is very difficult. Third, avoid the "experience equals excellence" fallacy that assumes that a candidate who has done something has done it well. [27] Effective performance should be evaluated. Fourth, be cautious by remembering that self-evaluative information is filtered through the individual's perceptions.

They viewed BD information as close as possible to the actual behavior that occurred since BD questions generated close approximations of performance in a given situation. "It is almost as though the interviewer is watching that person perform in the work place. Consequently, the responses were relatively raw and unfiltered. Since they were raw data, they permitted the interviewer to perform the analysis independent of what the person thinks of himself or herself in that situation."[28]

Janz, Hellervik and Gilmore claimed that superlative adjectives, which indicate greatest extent or degree, are the keys to effective BD questions. They stimulate recall of specific events which made it easier for the candidate to respond. Superlative adjective questions have a freeing effect on candidates and encourage them to respond candidly.[29] Accordingly, the authors believed that BD information was less likely to be distorted or misinterpreted than other types of candidate information. The tradeoff was

that BD interviewing required more training and longer interviews.

BD interviewing was developed from a behavioral job analysis that identified effective versus ineffective job performance based upon an examination of critical job incidents. The critical incident technique was developed by Flanagan in 1954 as a method for describing performance. It asked raters to generate samples of behavioral responses to critical work incidents; these samples were rated on a scale representing various levels of performance effectiveness by individuals familiar with the job. Ratings were used as benchmarks for evaluating job performance. The critical incident technique (CIT) yielded data, not opinions. "All the forces in play can be described, even if they are not understood by the person who is describing the incident."[30] It allowed incidents to be obtained from several sources--supervisors, customers, etc. CIT allowed formation of behavior description questions for candidates with related job experience. This approach enabled interviewers to assess maximum versus typical performance requirements of job dimensions and to pattern interview questions accordingly. The authors viewed behavior description interviewing as a cost-effective, reliable and valid method for improving the accuracy of interviews.

As suggested above, BCMs had problems. Most were complex, time-consuming and expensive to develop and use. They considered a limited number of P-J fit factors, and required applicants to write different biographical essays describing one or two achievements per skill area for each job sought. Such disincentives may have obscured the long-term benefits and utilities of the approach for managers and applicants.

In related research, Ash focused on applicant completion rates and content validity

issues.[31] He contrasted traditional point methods and BCMs in evaluating training and experience. In the former, applicants were assigned points mechanistically for differing amounts of training, education and experience to determine if they met minimum qualifications for a position. The latter approach rank-ordered applicants on achievement behaviors required for superior job performance.[32] The key distinction was that point methods measured past exposures to content of experiences, while BCMs measured the past behaviors of applicants in job-related achievements.

Ash argued that BCMs were incomplete since scoring methods tended not to include stimulus conditions and an applicant's responses to them. In a sense, the concept of behavioral consistency was violated since point-to-point comparisons were seldom made. Different standards were used to measure performance in behavioral samples and performance on the job. Since performance appraisal procedures might not have been reliably tapping actual job performance, criterion measures were often unreliable. Additionally, since BCMs typically required behavior samples based on written achievements supplied by applicants, an applicant's memory, writing ability and job-related achievement behaviors became a part of the testing and evaluation of job-related performance. This confounding of criteria could have resulted in unwarranted discrimination for jobs not requiring such writing and recall abilities. Furthermore, the representativeness of the achievements selected as behavioral samples might have been suspect since applicants present themselves in the most advantageous way possible.

Ash held that BCMs may generate adequate content validity if applicant achievements are evaluated by the same standards used to evaluate performance in job

content areas. Unfortunately, BCMs typically do not incorporate true point-to-point comparisons. For example, achievements were usually evaluated with behaviorally anchored rating scales but such methods were seldom used to evaluate performance in the job content domain. Ash pointed out that different standards were used to evaluate performance in the content sample and in the content domain. Thus, content validity was violated and a construct of performance quality was introduced into the selection process.

Ash also raised issues about standardization of testing (task as stimulus conditions) for applicants. Was it necessary, desirable or even possible with BCMs? "In this analysis, applicant performance can be considered the job related achievements or behaviors exhibited in the past, in response to the situations and environments. As such, applicant performance is a function of the interaction between individual applicant characteristics such as ability and motivation, and the respective situations and environments."[33] Ash suggested that measurement in BCMs was more of an issue than was discussed in the literature.

Ash argued that a content validation strategy was not sufficient for employee selection that should be based on predictive validity. However, criterion-related validity research was not usually feasible in most work settings due to few employees in a given job classification. Ash suggested that, if BCMs could be shown to have adequate criterion-related validity in settings with large numbers of employees, then the method's validity could be generalized to other settings. He admitted, however, that validation of the procedure itself was controversial.

Ash identified the high refusal rate by many applicants to complete behavioral

consistency applications as a serious problem. Some applicants were put off by having to generate several behavioral examples for each job dimension. The resulting low yield added difficulty in evaluating the validity of BCMs. Accordingly, Ash recommended that criterion-related validity of BCMs be pursued, even if contrived conditions had to be created. Additionally, applied research was needed to discover how to obtain completed biodata samples from applicants.

More recently, Ash addressed the low completion rates for BCM application supplements that arbitrarily screen out large numbers of applicants.[34] He developed an alternative method, called the Activity/Achievement Indicator (A/AI), that asked applicants to choose their typical achievement level (high, medium, low) for a given KSAO statement. Ash argued that this approach measured typical applicant behavior as opposed to peak performance, used applicant self-assessments, and was independent of writing ability.[35] His procedure generated achievement examples and asked applicants to self-evaluate their performance level on specified skill dimensions.

Ash found that his A/AI method required as much effort to develop as a typical BCM and showed a high correlation ($r = .58$) with BCM results. It showed promise as an alternative to the BCM which was unpopoular with applicants. Ash recognized that to reduce distortion additional items were needed for each dimension, thus increasing the development costs of the A/AI. He recommended using multiple raters to improve operational reliability of the method.

Comparing the A/AI with the BCM, Ash found a lack of both convergent validity and discriminant validity, raising a question about what was being measured by each

procedure. Applicant self-ratings could have contaminated his results; it should not have been difficult for applicants to figure out the most preferred response for a performance dimension and to give an elevated self-rating.

In sum, behavioral consistency methods (BCMs) offer a viable means to improve selection and placement decisions. BCMs, however, have several problems that detract from their utility: resistance by applicants toward completing behavioral inventories for each job; writing ability of applicants as a confounding variable; high development and implementation cost; focus on a narrow range of P-J fit factors, usually limited to skills; lack of point-to-point comparisons that violate the behavioral consistency principle; and accurate measurement of both person and job dimensions.

The next section summarizes the relevant points about behavioral consistency methods that guided this study.

Behavioral Consistency Summary Points:

The summary of the behavioral consistency literature is presented below.

1. Traditional psychological assessment uses "signs" or psychological predispositions of behavior to predict performance. Professionals tend to object to "signs" as indicators of their capability to perform effectively.

2. "Samples" of behavior are better predictors of future performance than "signs" and are acceptable to professional workers as a basis for assessment.

3. Predictor and criterion measures should be similar.

4. A method is needed to assess young, inexperienced workers that is also fair

for women and minorities.

5. More emphasis should be given to the assessment of individuals and of intraindividual consistency of behavior.

6. Environmental or situational variables that influence performance should be defined to understand stimulus conditions for individuals.

7. BCMs demand specification of job or environmental variables but such specification is a weak link in existing BCMs.

8. After a given age, usually at physical maturity, the major behavioral patterns of persons are stable and do not change significantly over time.

9. BCMs can be used by employers to supplement traditional applicant assessment methods.

10. Achievements or critical behavioral incidents do not have to be accomplished on a job to have job relevance.

11. Applicants should be rated on behavior that differentiates superior from minimally acceptable performance.

12. Behavior can be rated accurately by subject matter experts (SMEs) who have observed superior and marginal performers.

13. Jobs can be evaluated by SMEs who are familiar with the job and its requirements.

14. Applicants must supply achievement data since they are the most knowledgeable about their achievement incidents.

15. Applicants should follow carefully written instructions and/or systematic

procedures in supplying achievement data.

16. Applicants' writing ability may act as a moderator variable that can influence assessment results.

17. Achievements can be rated or scaled reliably by SMEs.

18. Applicant self-ratings of their own behavior should be avoided due to possible biasing and distortion.

19. Applicant self-reports of actual behavior tend to be reliable and can be used as raw data.

20. A content validity strategy is appropriate for BCMs.

21. BCM development is time consuming, expensive, and complex, and usually requires many subjects.

22. BCMs can be reliable.

23. Samples of past behavior can be used to establish reliable indicators of future behavior.

24. Critical incident job analysis can identify critical performance data.

25. Achievement incidents should be used to evaluate the behavior of individuals, not the performance dimensions of jobs (which is the typical approach).

26. BCMs correlate with job performance, experience, and tenure.

27. BCMs are unrelated to traditional experience and education ratings of applicants that tap passive exposures without assessing quality of effort.

28. Typical BCMs seem unsuitable for use in smaller organizations that have fewer individuals and jobs required to develop and validate selection procedures.

29. The BCM literature provides little guidance on identifying and evaluating job content while acknowledging that both person and job variables should be considered.

30. Subject matter experts can be used to identify and evaluate job knowledge, skills, abilities, and other factors (KSAOs).

31. The use of superlative adjectives stimulates recall and aids ease of response for subjects.

32. Behavioral descriptions yield close approximations of actual performance.

33. Existing BCM scoring methods are incomplete since stimulus conditions are not included.

34. If different standards are used to rate the content sample (P) and content domain (J), then the content validity strategy is violated. Point-to-point comparisons of the person and the job are recommended.

35. Applicant completion rates and reactions to biographical reporting requirements are problems with most BCMs.

36. The use of multiple raters increases reliability, although single raters can produce reliable results with BCMs.

The next section provides a selective review of literature on P-J fit to create a more thorough framework for understanding behavioral consistency methods.

Interactionist Perspectives on Person-Job Fit

BCMs were designed to improve the prediction of work performance by defining the skills needed to perform specific job tasks. BCMs evaluate performance domains not

covered by traditional assessment of experience and education. However, BCMs address only the skill-task relationship in P-J fit; other dimensions of fit, such as motivational, situational and relationship factors, are not incorporated into measurement schemes. Accordingly, it seemed appropriate to review literature on P-J fit to identify behavioral dimensions that could strengthen the behavioral consistency approach.

The literature on person-job (P-J) fit dealt with interaction at several levels: component job characteristics; person-situation interaction; organizational or social climate; and occupational characteristics. It also included different P-J dimensions--task variety, autonomy, skill requirements, meaningfulness of work, type of supervision, work values, organizational rules and policies, and physical features of the work environment. Only literature that focused on the individual and the immediate job was included in this review. Most congruence or fit literature referred to person-environment fit, congruence or correspondence, while some literature referred to person-situation interaction. Since this review focused on the person and the individual job, the terms, person-job fit or P-J fit, were used to maintain consistency whenever possible.

Osipow placed P-J fit at the heart of vocational psychology and career development, and identified measurement issues as main problems in P-J fit theory.[36] He asked: "How do we assess people? How do we measure the environment? Having measured individuals and assessed their environments, how do we compare the two regarding the degree and quality of fit? More precisely, which personal attributes do we assess. . .and which environmental aspects are of importance?"[37] Osipow argued that measures of person and environment have not been adequate nor do we know how to

quantify the degree of P-J fit once both have been measured.[38] Additionally, he suggested that the purposes for enhancing P-J fit, such as needs satisfaction, performance capability and job choice, should be factored into P-J fit research. He speculated that ". . .an improvement of the 'breakthrough' variety in methods of environmental assessment and the quantification of the person-environment fit" was needed to improve the utility of P-J theory and applications.[39]

In reviewing the history of P-J fit research, Walsh observed that research focused on the physical, social, climate, and organizational culture (norms, roles, and rules) aspects of the work environment.[40] He suggested that future research should investigate the relationship between the perceived and actual environment. However, Vondracek held a different view. He said that there were different ways to conceptualize P-J congruence and that the controversy over which was more important, the person (P) or the job environment (J), was unlikely to be resolved until P and J were understood in similar ways.[41] He suggested that an interpretive and process-oriented model of behavior was needed to understand the dynamic interaction between P and J.

Holland's theory of vocational choice provided a major contribution in P-J fit research and in career counseling.[42] In speculating about P-J fit and future research directions, Holland said that job satisfaction was more predictable than job effectiveness or achievement, perhaps because it was more reliably measured than performance outcomes. He observed that ". . .estimates of congruence which use more information (scale scores or profile shape) are more successful than simple categorizations of personal and environmental characteristics."[43] Holland recommended that new research should:

1) use any theory of congruence; 2) identify major moderator variables where possible, e.g., sex, education level, occupational status, socioeconomic status; 3) give environmental assessment as much attention as personal assessment; 4) use the most potent person and environment variables available; 5) use more recent techniques for estimating congruence; and 6) go beyond subdisciplines to strengthen research designs.[44]

Schneider argued that existing views of people were simplistic and reductionistic, and that more comprehensive and expansive models of performance were needed.[45] He wanted a richer way to describe individual behavior with research in natural settings. Research in laboratory settings reflected the dominance of situations over traits. In lab research, the random assignment of subjects to treatments ignored the selection into and out of situations that occurs in natural settings. Because people self-select, Schneider believed that P-J fit research should emphasize person variables and that environments should be measured in psychologically derived dimensions. Like Holland, he concluded that environments were functions of the people behaving in them.

Hackman and Oldham's job characteristics theory[46]provided a way to analyze the fit between job characteristics and the abilities and needs of employees. Recently, Kulik, Oldham and Hackman examined work design, aspects of P-J fit, and research issues.[47] They distinguished between two types of fit: 1) the fit between the person's values and needs and the opportunities provided by the environment; and 2) the fit between the demands of the environment and the abilities of the person to meet those demands.[48] Additionally, Kulik, Oldham and Hackman observed that objective measures of P-J fit were lacking and that most research in job characteristics theory addressed subjective

aspects of P-J fit, such as job satisfaction, internal motivation and growth needs. However, employee work effectiveness and the level of employee skill and knowledge were not assessed. Similarly, the matching of individual abilities and skills to the job environment had not been researched systematically. They explained that work design research was unable to address these issues because of several problems:

1. Research focused narrowly on job characteristics outcome variables while neglecting to consider broader implications of P-J fit and misfit;

2. Methods of measuring and improving P-J fit were flawed and incomplete, but clinical methods might be useful;

3. Standards that individuals used to assess and react to their jobs were not well understood;

4. Models of P-J fit should be elaborated to include interactions between a person's needs and abilities that influence reactions to work environments;

5. Existing models of P-J fit were static; longitudinal studies of P-J relationships were needed.[49]

Several researchers investigated the role of fit in an individual's adjustment to an environment. Caplan postulated a theory of fit that focused on adjustment in organizations.[50] His theory suggested three requirements: 1) assess characteristics of the person and job along commensurate dimensions so that the conceptual relevance of one to the other is explicit, making it possible to operationally define goodness of fit as the discrepancy between P and J; 2) distinguish between objective and subjective measures of fit and its components that define the accuracy of perception as a discrepancy between

objective and subjective fit; and 3) distinguish between fit defined in terms of abilities-environment demands and needs-environment supplies. Abilities-demands fit asks whether the person has the abilities that fit the demands of the work, while needs-supplies fit addresses whether the environment supplies the characteristics that meet the needs of the person.

Caplan argued that failing to establish commensurate measures may set up a statistically conservative test of the roles of both P and J, which may fail to provide an accurate evaluation of P-J interaction. For example, to use a general personality instrument to assess P and a specific job analytic or environmental instrument from another source or theory to measure J ". . .is conceptually disrespectful of the taxonomic structures implied by each theory in dictating how the other construct should be measured."[51] Caplan defined subjective fit as perceived by the individual employee, while objective fit was free from bias. The problem of objective measurement has been a key issue in P-J fit theory.

Regarding needs-supplies and abilities-demands fit, Caplan said that it was important to distinguish between the two types of P-J fit when predicting the performance and retention of employees. Focusing on one or the other might misrepresent the exchange process that provides the basis of the psychological contract between the employee and the employer. Distinguishing between these two types of fit might allow the generation of hypotheses about differential effects of one over the other.[52]

Caplan identified several methodological problems in P-J fit theory. First, objective measurement of the person's abilities, skills and resources was a hurdle.

Second, subjective measures of P and J also were lacking. Third, P and J measurement should not contaminate each other. Finally, a taxonomy of theory-based dimensions of P and J was needed.

Dawis and Lofquist made a major contribution to P-J fit literature and their work is reviewed extensively here. Their theory of work adjustment dealt with work behavior from an interactionist perspective.[53] They described people and work environments in similar terms and saw them as being in continual interaction. The idea of correspondence between the person and the environment implied that the P-J relationship was mutually responsive. Correspondence was defined as the person satisfying the requirements of the environment and the environment satisfying the requirements of the individual.[54] They saw each P-J relationship as idiosyncratic and work adjustment as the dynamic, continuous process by which the person seeks to achieve and maintain correspondence with the work environment.[55]

This theory identified several outcomes of work adjustment. Tenure depends on correspondence and reflects stability in correspondence between the person and the environment. Tenure is the most basic indicator of correspondence. Satisfactoriness and satisfaction indicate the degree of success a person achieves in maintaining correspondence with the work environment. Satisfactoriness is an external indicator of correspondence derived from sources external to the individual and refers to how well the person satisfies the demands of the environment. Satisfaction is an internal indicator from the person on how well the environment fulfills his or her requirements.[56] Satisfactoriness and satisfaction can be used as criterion measures to predict work

adjustment based on an assessment of work personality in relationship to the work environment.[57] The Minnesota Satisfactoriness Scales measure the satisfactoriness of the employee in fulfilling work requirements, while the Minnesota Satisfaction Questionnaire shows employee satisfaction with the work environment.[58]

Dawis and Lofquist based their theory of work adjustment on a stimulus-response paradigm. The individual reacts to and acts on the environment. Recurring response sequences become skills as they are modified and refined. The person develops many skills whose common elements can be clustered into ability dimensions.[59] Over time, the person develops norms for evaluating the satisfaction levels of stimulus conditions. Eventually, the person establishes stimulus-condition requirements for satisfying responses. These requirements evolve into reinforcement needs at particular levels of strength.[60] "A need, then, can be defined as an individual's requirement for a reinforcer at a given level of strength. The set of needs of an individual can be described as a required pattern of reinforcers at particular levels of strength."[61] Psychological needs can be measured by questionnaires or direct observation, are stable when repeated measures show little change, and are believed to stabilize at physical maturity. Like skills, needs are numerous and may be defined along common dimensions called values. "Value dimensions are to needs what ability dimensions are to skills. Skills and needs are observable; abilities and values are inferred from factor structures resulting from the common elements of skills and needs, respectively. It is more manageable to describe an individual's personality in terms of abilities and values than at the conceptual level of skills and needs."[62]

Abilities, values and their interrelationships make up personality structure which is thought to stabilize along with abilities and values at physical maturity. Personality structure, however, does not describe the person in action or the personality style of responding. Only prolonged observation of the personality in action can describe style.[63]

Measurement of abilities necessary to define work personality structure has been a problem. A single work skill may be related to several ability dimensions and individuals may literally have a repertoire of several hundred functional job-specific and adaptive skills.

The work environment provides the stimulus conditions in which work behavior occurs and should be considered to understand work adjustment. Work environments typically are described by the employer's economic and task point of view.[64] Position descriptions do not show how the work environment fulfills the worker's needs and expectations; however, defining the work environment in terms of work personality characteristics would aid the understanding of work adjustment and P-J fit. Although difficult, it would be useful if job stimulus conditions could be defined. According to Dawis and Lofquist, stimulus conditions could be described along two dimensions. Cues signal the worker what responses are appropriate and when to respond; cues are associated with skills and skillfulness since they trigger appropriate response sequences. Skillfulness is associated with how quickly a person recognizes appropriate cues associated with particular reinforcers. Reinforcers refer to stimulus conditions associated with needs (requirements for stimulus conditions derived from prior experiences) and are manifest as preferences for particular stimulus conditions. Effective reinforcers are

responsive to the individual's needs.[65]

> "This description of work environments in terms of the ability requirements and reinforcer patterns, which may be called the work environment structure, parallels the description of the work personality structure of individuals. . . .Work environment structure may be described in terms of two sets of dimensions, ability requirements and reinforcer factors, which correspond to the work personality structure dimensions of abilities and values. . . .The work environment can be described in work personality terms by using the same dimensions to measure the characteristics of individuals employed in a particular work environment. The goal is to establish from these data the distinctive ability requirements and reinforcer pattern for a work environment, typically at the level of the job within a work organization or the occupation across work organizations. We identify those characteristic abilities and values that differentiate individuals in a specific job or occupation from those in other jobs or occupations. Multivariate techniques, such as multiple regression, multiple hurdles, and multiple discriminant function, are available to make this differentiation."[66]

Since psychometrically adequate measures are not yet available to develop full work environment descriptions, Dawis and Lofquist recommended that clinical judgments be used. Essentially, three clinical judgment methods are available. The observation method requires trained job analysts, supervisors or incumbents to study P-J interaction in terms of observable work behaviors and work tasks. The estimation method obtains descriptions of the work environment through ratings provided by SMEs on instruments developed to target appropriate environmental variables. The inference method uses data to infer corresponding characteristics of the work environment.[67]

Dawis and Lofquist developed instruments to measure employee satisfactoriness and employee satisfaction, but also recommended that other variables be linked with work adjustment outcomes such as absenteeism, turnover, intention to leave a position and tenure in a job. Regarding measurement, self-reported life experience measures have shown more promise for instrument development than hypothetical work situation

questionnaires or self-description checklists.[68] These measures assume that work personalities develop from response and reinforcement histories that are reflected in biographical data. Dawis and Lofquist reported research that correlates vocational needs with biographical data for both sexes.[69] They also reported that need-reinforcer correspondence correlated .37 with satisfaction for a group of 233 men and women.

Dawis and Lofquist viewed work adjustment theory as having relevance for employee selection, placement, training, development, motivation, and morale, and in job analysis and job design. These theorists claimed that correspondence was the central issue in personnel selection and placement, but argued that ability-task matching was incomplete since need satisfaction aspects of correspondence had not been addressed.[70] Failure to consider satisfaction variables reduces the predictive power of selection strategies. Accordingly, they recommended that ability selection strategies should be based on groups of satisfied workers and incorporate need satisfaction measures.[71]

Dawis and Lofquist noted that the most accurate predictions of performance capability in specific jobs used measures of job-specific skills. Such methods, however, were cumbersome and costly. As a result, more general ability dimensions typically were used to measure applicants.

Employee motivation has been associated with the employee seeking to achieve and maintain correspondence with the work environment by fulfilling task requirements for satisfactoriness and by obtaining preferred reinforcements for satisfaction.[72] Satisfactory and satisfied workers will maintain performance, since motivation to maintain correspondence is continuous.

Job analysis provides foundational information for most personnel decisions. Traditional job analysis has focused on task requirements, skill requirements, and working conditions. According to Dawis and Lofquist, job analysis should also generate information for understanding and predicting employee satisfaction and work adjustment.[73] Such analysis would include data on the reinforcers for a job that are congruent with the system used to describe employee reinforcer preferences.

Dawis and Lofquist observed that the study of individual behavior was isolated from natural life settings and that more studies of behavior in naturalistic settings were needed. Additionally, stimulus-response interactions and individual differences should be considered.[74] Since all behavior takes place in an environment, Dawis and Lofquist recommended that environmental differences should be studied along with individual differences. They argued that research should study . . .

> "both the individual and the environment functioning as integrated systems in an interactive adjustment process. The dimensions. . .are viewed not as separate or discrete dimensions but as combinations or patterns. The particular combination or pattern for each set of dimensions in the set should be considered by itself. The patterns provide a better representation of reality because they reflect the underlying interconnectedness of single dimensions and better represent the integration of the individual and the overall organization of the environment in real life."[75]

In addition, Dawis and Lofquist recommended that research should study the whole person functioning in natural habitats. They viewed the work environment as a natural setting and work as the major organizing behavior for most persons.[76]

Regarding motivation, Dawis and Lofquist stated the following:

> In understanding motivation, the general principle that individuals behave in ways designed to achieve and maintain correspondence with their

> environments seems to underlie much of voluntary or self-directed behavior. The correspondence to be achieved and maintained cannot be described in terms limited to either the individual or the environment without regard for the other. It must be described in terms of the fit between the two. The theory of work adjustment specifies the significant descriptors of individuals and the environments in stimulus-response terms that help to determine the goodness of fit. . . .[T]he central constructs in motivation within this theoretical framework are correspondence and reinforcement. Because the satisfaction of individuals is predictable from reinforcement correspondence, measured satisfaction can be viewed as both an outcome and an index of satisfaction.[77]

Person-Job Fit and Work Stress:

Work stress has been linked to P-J fit. As noted in the introduction, Harrison identified two kinds of P-J fit: 1) the extent to which a person's skills and abilities match job requirements; and 2) the extent to which the job environment meets the individual's needs. He defined job stress as the extent to which a job does not meet the person's motives and as the extent to which the person's abilities fall below job requirements.[78] Job stress can manifest itself as several types of strain--job dissatisfaction, anxiety, insomnia, restlessness, high blood pressure and elevated cholesterol.[79] Over time, such stress might lead to mental and physical illness. Conversely, good P-J fit could lead to positive health outcomes such as a sense of competence, self-worth, and efficacy.[80]

Harrison believed that P-J misfit could lead to three types of stress responses: 1) psychological responses such as job dissatisfaction, depression, low self-esteem and unsolved problems; 2) physiological responses such as high blood pressure and changes in blood chemistry; 3) behavioral responses such as smoking, overeating, stuttering and visits to doctors.[81] Although Harrison held that poor P-J fit caused strain, he observed that the nature of the link was unclear. He proposed that the amount of strain would be

proportional to the degree of P-J misfit and that stress should increase as P-J fit dimensions reflected increased insufficiency of supplies for motives.[82] The problem was in measuring and operationalzing the degree of P-J fit as a score. The most common method was to calculate the difference between the P and J scores. Harrison observed that P and J measures tended to be positively correlated with one another due to the processes of job selection and socialization.[83] Fit improves over time as the individual is socialized into the work environment and develops skills to do the job.[84] Harrison observed, however, that little work has been done to describe job supplies that fulfill the motives of the individual.[85] Measures of job supply dimensions should be developed and used by both individuals and employers during the hiring process.

Harrison argued that only individualized treatment of workers, not general group programs, would reduce job stress.[86] As true costs of job stress become known, the benefits of individualized interventions might be worth the costs. Harrison wanted dimensions used to measure P-J fit to be differentiated and understood; however, a major problem was identifying relevant P-J dimensions.[87]

More recently, Matteson and Ivancevich similarly argued that the key to controlling job-related stress was to improve the P-J relationship. As noted in Chapter One, dysfunctional work-related stress is expensive, costing over $100 billion annually.[88] Recent developments in the study of stress have focused on individual differences, environmental factors, and the relationship between the person and the environment. Stress is viewed as part of the complex and dynamic system of P-J transactions.[89] Matteson and Ivancevich observed that stress management interventions that focused on

either the person or the environment were less effective than those that attempted to improve P-J interaction.[90]

One type of work-related stress is burnout. It can be defined as ". . .a psychological process, brought about by unrelieved work stress, that results in emotional exhaustion, depersonalization, and feelings of decreased accomplishment."[91] Job performance tends to be the most important outcome of burnout since it is associated with prolonged stress and decreased job involvement. Additionally, withdrawal behavior such as absenteeism and turnover becomes manifest, along with a deterioration in physical health and family life.[92] Matteson and Ivancevich evaluated methods of diagnosing stress and prescribed several stress-reduction interventions. Similar to other P-J fit theorists, they emphasized the importance of understanding P-J interaction.

Person-Job Fit Summary Points:

Behavioral consistency methods offer a promising alternative to traditional assessment of applicants' experience and education. BCMs delve into the quality of applicants' performance while traditional ratings of experience and education may over-rate applicants' passive exposures and, by that, introduce error into prediction. However, BCMs have several problems that limit their utility. Specifically, environmental factors are not considered commensurately with applicant factors, which limits content validity. Additionally, BCMs require large numbers of persons to generate behavioral job dimensions and are, therefore, expensive, time consuming and complex, rendering them unsuitable for most smaller organizations.

BCMs seek to improve selection decisions and the prediction of job performance by matching applicant competencies with critical job requirements. In this study, BCMs were placed in a P-J fit context to identify possible solutions for existing problems. Relevant points from the congruence literature are summarized below.

1. Measurement issues are at the heart of testing P-J fit. Unfortunately, existing measures appear inadequate and measurement of P-J fit eludes us.

2. Satisfaction and performance should be factored into P-J fit research.

3. Future research should explore the relationships between a) the perceived and the actual environment and b) subjective and objective fit.

4. The person and the job should be conceptualized in similar ways. Existing measures of P-J fit are lacking in this regard.

5. Scale scores and profile measures should be used in research instead of simple categorizations.

6. Rich descriptions of persons are needed and P-J fit research should be based on person variables.

7. Environment should be measured with psychologically derived variables.

8. Future research should be conducted in natural settings.

9. Existing ways of matching a person's skills to the environment have not been based on systematic research.

10. Commensurate measures of P and J are needed.

11. Goodness of P-J fit may be defined as person-job discrepancy.

12. A taxonomy of P-J fit dimensions is needed.

13. Each P-J relationship is idiosyncratic.

14. Job satisfaction and worker satisfactoriness can be used as criterion measures of P-J fit.

15. It is more difficult to describe P-J fit in actual skill-need elements than in inferred ability-value dimensions.

16. The work environment should be defined by skill-ability requirements and by job reinforcer patterns.

17. The work environment can be defined in work personality terms by using the behavioral patterns of persons to measure ability and reinforcer patterns in a job.

18. Clinical judgments provide a viable method to estimate P behavioral patterns and a viable estimation method to rate J based on P variables.

19. Need satisfaction aspects of fit should be addressed to increase the predictive power of selection strategies.

20. Skill-ability selection should be based on satisfied workers and should include a satisfaction measure.

21. Accurate prediction of performance is based on job-specific skills.

22. Job analysis should aid the understanding and predicting of job satisfaction.

23. Behavior should be studied at the level of the whole person in natural settings.

24. Both P and J should be studied as integrated systems in mutual interaction and fit should be described by P and J in relation to one another.

25. Measured job satisfaction can be viewed as outcome of P-J fit.

26. Measured stress/strain can be viewed as an outcome of P-J fit.

27. The degree of stress/strain is proportional to the degree of P-J fit.

28. P-J fit should be operationally defined as a score.

29. Measures of job supplies that fulfill motives of individuals are lacking and need to be developed.

30. Improving P-J fit is the key to controlling job stress.

These thirty points about P-J fit provided an interactionist framework to guide this study. The next section describes a clinical-type behavioral consistency method used to assess an individual's satisfying and effective performance. Its resulting behavioral pattern is thought to represent intrinsic motivation. The assessment procedure provided an innovative way to analyze jobs with commensurate terms.

Assessment of the Person

Miller developed a clinical-type behavioral consistency method for assessing a person's reported effective and satisfying performance based on a study of behavioral incidents in natural settings. Miller called his procedure the "System for Identifying Motivated Abilities" (SIMA) and named the resulting behavioral description a "Motivated Abilities Pattern" or MAP. Both are described below.[93]

Miller used an autobiographical inventory of an individual's achievements to start the process. The inventory guides the individual through a progressive data generation process that includes: 1) listing twenty achievement experiences from any aspect of the person's life that meet two criteria: a) the individual believes that he/she performed

effectively in the incident, and b) the individual enjoyed what he or she did; 2) identifying the seven or eight most significant achievements; 3) writing an elaboration of the top achievements that describes how the individual became involved, what the individual actually did and how he/she did it, and what was particularly satisfying about the achievement.

Next, trained interviewers use a structured 45 to 90 minute interview to guide the individual through a detailed elaboration of top achievements according to specific procedures. The purpose of the interview is to generate sufficient, detailed, behavioral data that meet the satisfaction and effectiveness criteria. Interviewing avoids contaminating the raw data because of a subject's distortion or poor writing ability. The interview is recorded and transcribed. A trained analyst content analyzes each achievement incident, identifies recurring behavioral and situational factors, organizes the factors into element categories, then writes a report that describes the behavior pattern. The report may include an optional discussion of work implications and responses to questions about job fit. The interviewer helps the client understand the implications of the report in several possible applications--career planning, job choice, placement, performance problem diagnosis, promotion decisions, outplacement counseling, team building, or strategic human resource planning.

The report describes an average of 18 to 24 specific behavioral elements in five behavioral dimensions:

1) eight to twelve skills and ability clusters the subject is motivated to use, enjoys using, and is competent in using;

2) five to eight generic subject matter or content elements the client is motivated to use;

3) five to eight circumstances or situational factors that are present in the achievements and seem to serve as stimulus conditions for evoking the behavioral responses;

4) one or two primary operating relationships with others and with authority;

5) one primary motivational focus, theme, result, thrust or direction recurring in all achievements.[94]

Depending on the level of detail required, a typical report will contain 18-30 pages of both specific and general information, although a one or two page outline clearly summarizes the findings.

Miller began his study and documentation of achievement experiences in 1958. Based on experiences with thousands of individuals and their achievement data, he assembled a taxonomy of approximately 268 variables defined with normal dictionary definitions. The taxonomy was derived from content analyses of over 160,000 actual behavioral incidents reported primarily by, but not limited to, professionals, managers and executives. Over 20,000 men and women participated in the assessment process both here and abroad. Subjects represented hundreds of occupations, large and small corporations, varied industries and government agencies, education, and religious organizations. In addition to managers and professionals, subjects' backgrounds were varied and included full-time homemakers, high school and college students, retirees, scientists, displaced workers, and the unemployed.[97] The extensive coverage of

performance gives strong evidence for the content validity of the taxonomy.

Miller made several observations about the motivated abilities pattern. First, motivated behavior has been identified and described with every person when procedures were followed. Second, discernable systematic differences have not been seen in the content or structure of behavior among men, women, minorities, foreign nationals, or individuals with different socioeconomic or educational backgrounds. Third, the pattern is a dynamic system of behavior that functions holistically. Additionally, Miller characterized motivated behavior as:

1) Stable - Once the pattern emerges, it remains consistent through life. It shows behavioral consistency.

2) Irresistible - The pattern seeks opportunities for continual expression.

3) Work Controlling - The pattern literally controls how an individual perceives and performs a job. It appears to tap a person's subjective perceptions of fit.

4) Insatiable - The behavior does not become satisfied in a final way.

5) Leading - The pattern leads the individual into satisfying activities and work. It may be interpreted as providing a sense of personal agency to the individual.

6) Explanatory - The pattern can be used to explain and understand performance in specific situations. It shows face validity with clients.

7) Not Psychological - The pattern does not account for causes of behavior, nor does explain the underlying emotional, mental or attitudinal predispositions of a person. It deals with demonstrated behavior, not why such behavior occurred.[98]

Recently, Miller reported the results of reliability and validity studies on SIMA

conducted by Crites for a large high technology manufacturing firm.[99] Interscorer agreement for three analysts who independently evaluated achievement biodata averaged 90% but varied by behavioral elements (abilities = 87%; content = 91%; context/situational elements = 98%; relationship = 84%; and motivational focus = 86%). Crites contended that analysts' scores were essentially interchangeable and that SIMA procedures were highly objective.[100] A second study on test-retest agreement over six years for the same fifteen subjects (who provided different biodata protocols for the retest) showed the following cumulative percentages: 67% differed by 0-1 points; 83% differed by 0-2 points; and 90% differed by 0-3 points. Crites concluded that these retest agreement scores support a high degree of stability for SIMA.[101]

Crites also designed a content validity study using scores from three independent judges rating total quality management system (TQMS) leadership factors and SIMA reports, and found an 81% interjudge agreement.[102] In applying hierarchical factor analysis to TQMS leadership profiles, Crites discovered complex but consistent empirical relationships that may aid definition and interpretation of the SIMA model.[103] Using TQMS leadership criteria, Crites did an exploratory study of construct validity using executive nominations of subordinates on TQMS criteria together with SIMA assessment. The study investigated the extent to which SIMA measures TQMS criteria. Nonsignificant differences were found between leader and nonleader profiles, but significant differences were observed among TQMS criteria on SIMA profile factors. Although sample size limited the study, Crites observed that systematic differences were captured by SIMA on leader and nonleader dimensions.[104]

In an exploratory predictive validity study, Crites evaluated the ability of SIMA to predict supervisor criterion ratings of 36 subjects one year later. Chi-square analysis showed statistically significant agreement ($p < .01$) at 60% between predictor and criterion ratings. Agreement estimates were higher at 71% for abilities ($p < .001$) and 78% for job content ($p < .0001$). Crites concluded that the proportion of agreement was extremely high between supervisors' criterion ratings and an analyst's SIMA predictor ratings.[105] Additionally, Crites assessed client evaluations of SIMA and found highly favorable ratings.[106]

Although sample sizes were small, the preliminary research on SIMA supported its efficacy. Interrater and test-retest agreements showed that the procedure has substantial reliability in the hands of trained users. Initial validity evaluations implied that SIMA has assessment accuracy and identifies systematic differences in behavior.

Person Assessment Method Summary Points:

The summary points associated with Miller's behavioral assessment procedure are presented below.

1. SIMA is a behavioral consistency method (BCM).

2. Behavioral patterns can be rated reliably by trained analysts using SIMA procedures.

3. SIMA is more extensive in range of behavior covered than other BCMs and, therefore, may account for greater variance in predicting performance and in measuring fit.

4. Although SIMA yields nominal level data, measurement schemes could be designed to yield interval level data to measure persons, jobs and P-J fit.

5. SIMA uses a taxonomy of 268 behavioral terms that could be used to rate job dimensions.

6. SIMA could allow commensurate measurement and point-to-point comparison of persons and jobs.

7. SIMA is supported conceptually by the behavioral consistency principle, work adjustment theory, and self-determination theory (presented below).

8. Since the SIMA taxonomy is derived from satisfying behavior, it could be used to define the reinforcer pattern and supplies (work adjustment theory) and optimal challenge (self-determination theory) of jobs.

9. SIMA biographical forms and interviews use superlative adjectives to focus subjects' attention and to aid recall of critical behavioral incidents.

Depending on the criteria specified, a BCM can produce data from different domains. Most BCMs tap "can do" skills since criteria for guiding the generation of critical incidents are derived from job analysis. On the other hand, Miller's BCM uses criteria of effective performance and personal satisfaction for generating critical incidents. These criteria appear to tap "will do" skills and other motivational factors. This distinction is important for placing Miller's method in a theoretical framework.

Miller's clinical assessment method is supported by two competing theories. The theory of work adjustment, formulated by Dawis and Lofquist, is anchored in a stimulus-

response, mechanistic paradigm of human behavior. It was described above in the section on P-J fit. The theory of self-determination and intrinsic motivation, conceptualized by Deci and Ryan, fits within an organismic paradigm. It assumes that the person operates from personal agency and self determination, not solely in learned response to environmental stimuli. Self-determination theory is presented below.

Self-Determination and Intrinsic Motivation Theory

Deci and Ryan formulated a theory that integrates traditional mechanistic theories with recent research on intrinsic motivation and self-determined behavior. The concepts and citations presented below are all taken from Deci and Ryan's book, Intrinsic Motivation and Self-Determination in Human Behavior.[107]

Deci and Ryan explained that the study of motivation is concerned with the activation of energy and direction of behavior. Energy in motivation theory pertains to innate needs and to those acquired through interaction with the environment. Direction refers to the structures and processes that give meaning to internal and external stimuli for directing behavior toward satisfaction of needs. All motivation theories are based on assumptions about people and their behavior that fall along a mechanistic-organismic continuum.

> "Mechanistic theories tend to view the human organism as passive, that is, as being pushed around by the interaction of physiological drives and environmental stimuli, whereas organismic theories tend to view the organism as active, that is, as being volitional and initiating behaviors. According to the latter perspective, organisms have intrinsic needs and physiological drives . . . [which] provide energy for the organism to act on . . . the environment and to manage aspects of their drives and emotions. The active-organism view treats stimuli not as causes of behavior, but as affordances or

opportunities that the organism can utilize in satisfying its needs."[108]

Organismic models, like self-determination theory, give primacy to the structure of human experience and to the psychological meaning of stimuli.

Intrinsic motivation and self-determination are key concepts. Deci and Ryan offered the following explanation of the first concept:

> Intrinsic motivation is based in the innate, organismic needs for competence and self-determination. It energizes a wide variety of behaviors and psychological processes for which the primary rewards are the experiences of affectance and autonomy. Intrinsic needs differ from primary drives in that they are not based in tissue deficits and they do not operate cyclically, that is, breaking in on awareness, pushing to be satisfied and then when satisfied, receding into quiescence. Like drives, however, intrinsic needs are innate to the human organism and function as an important energizer of behavior.[109]

Intrinsic needs for competence and self-determination motivate behavior toward continuing cycles of seeking and conquering optimal challenges that requires people to stretch their abilities when trying something new. Optimal challenges are situations free from the intrusions of drives and emotions, require the use of creativity and resourcefulness, are suited to competencies, and are neither too easy nor too difficult.[110] A challenge stretches one's abilities by trying something new; it is conceptualized as an incongruity between one's internal structures and aspects of the external world. Thus, to seek an optimal challenge is to seek an optimal incongruity. People seek incongruities to reduce them and to incorporate the discrepant elements into their existing structures. Behavior motivated by the needs for competence and self-determination involves an ongoing process of seeking and reducing optimal incongruities.[111] For optimal challenges to increase perceived competence, they should not be trivial or simple to the person and

they must exist within a context of self-determination where the person is free to engage in a challenging activity.[112] For a situation to be challenging, optimal match must exist between a person's internal structures and the demands of the environment.[113] People self-regulate behavior by seeking or creating optimum challenges from the range of options available.[114] When free to do so, people select optimal matches between their competencies and the demands of the environment. When people experience optimal matches, they experience a sense of flow; however, when the challenge is too demanding, they experience anxiety or tension. When the situation is not demanding enough, they experience boredom.[115]

Two types of emotions play an integral role in intrinsic motivation. Emotion of interest directs people toward activities that appeal to them. Emotions of enjoyment and excitement are associated with the experiences of competence and autonomy. "When people are intrinsically motivated, they experience interest and enjoyment, they feel competent and self-determining, they perceive the locus of causality for their behavior to be internal, and in some instances they experience flow. The antithesis of interest and flow is pressure and tension."[116]

Deci and Ryan formulated an operational definition for inferring intrinsic motivation that has three dimensions: 1) Free choice--when a person engages in an activity without reward or control; 2) Quality of performance or outcome--when creativity and spontaneity are present; 3) Questionnaire measures--to determine interest, enjoyment, perceived competence and/or self-determination levels.

The second key concept, self-determination, refers to the individual's need and

capacity to choose and to have those choices be determinates of action, not external forces or pressures. Self-determination leads the person to engage in interesting behaviors that foster competence and flexible accommodation with the environment and that foster development of intrinsic motivation. When self-determined, a person acts out of choices that are based on an awareness of organismic needs and on a flexible interpretation of the environment. The environment can either support or thwart self-determination, depending on the opportunities it provides for self-expression. Self-determination can be defined by questionnaire or behavioral measures that examine behavioral persistence without extrinsic rewards, pressure, tension, and anxiety.

Deci and Ryan incorporated three minitheories into their metatheory of self-determination. Cognitive evaluation theory deals with the effects of external, intrapersonal and interpersonal factors on intrinsic motivation, motivational processes, and the initiation and regulation of behavior. Organismic integration theory focuses on the development of both intrinsic and extrinsic motivation and how interests and curiosity become channelled and differentiated as innate capacities interact with the environment. Finally, causality orientations theory attempts to describe one role of individual differences in the initiation and regulation of behavior.

Cognitive evaluation theory is the most highly refined of the three minitheories and deals with the factors that undermine intrinsic motivation. Research began with this question: "If a person is involved in an intrinsically interested activity and begins to receive an extrinsic reward for doing it, what will happen to his or her intrinsic motivation for the activity?"[117] Research investigated the effects on intrinsic motivation

of monetary rewards, avoidance of punishment, awards, tokens, foods, toys, prizes, surveillance, deadlines, evaluation, goal imposition, competition, and perceived competence. The theory holds that the interpretation of initiating or regulatory events has important implications for the person's experience of self-determination and competence.

Deci and Ryan articulated four propositions to present cognitive evaluation theory. Proposition I is linked to intrinsic needs to be self-determining and focuses on perceived locus of causality.

> I. "External events relevant to the initiation or regulation of behavior will affect a person's intrinsic motivation to the extent that they influence the perceived locus of causality for that behavior. Events that promote a more external perceived locus of causality will undermine intrinsic motivation, whereas those that promote a more internal perceived locus of causality will enhance intrinsic motivation."[118]

Perceived locus of causality is a cognitive construct representing the degree of self-determined behavior. External events are thought to stifle creativity, diminish cognitive flexibility, decrease self-esteem, and increase negative emotions. Central to this proposition is the concept of perceived locus of control. Deci and Ryan proposed that an ". . .internal perceived locus of causality exists when a behavior is experienced to be initiated or regulated by an informational event, whether the event occurs inside or outside the person. On the other hand, an external perceived locus of causality exists when behavior is seen as being initiated or regulated by a controlling event, whether that event occurs inside or outside the person."[119] Psychological processes interpret self-determined from non-self-determined behavior.

The second proposition addresses intrinsic needs to be competent and to master

challenges as well as the effects of challenge and feedback on perceived competence.

> II. "External events will affect a person's intrinsic motivation for an optimally challenging activity to the extent that they influence the person's perceived competence, within the context of some self-determination. Events that promote greater perceived competence will enhance intrinsic motivation, whereas those that diminish perceived competence will decrease intrinsic motivation." [120]

Perceived competence is associated with successful task completion or positive feedback when behavior has some self-determination; however, perceived incompetence seems linked with unmasterable activities.

The third proposition deals with the relative salience of informational, controlling or amotivating aspects of events associated with the initiation and regulation of behavior.

> III. "Events relevant to the initiation and regulation of behavior have three potential aspects, each with a functional significance. The informational aspect facilitates an internal perceived locus of causality and perceived competence, thus enhancing intrinsic motivation. The controlling aspect facilitates an external perceived locus of causality, thus undermining intrinsic motivation and promoting extrinsic compliance or defiance. The amotivational aspect facilitates perceived incompetence, thus undermining intrinsic motivation and promoting amotivation. The relative salience of these three aspects to a person determines the functional significance of the event."[121]

Deci and Ryan concluded that: choice and positive feedback tend to be informational; rewards, deadlines and surveillance seem to be controlling; and negative feedback tends to be amotivating.

The fourth proposition deals with the psychological meaning of events for the individual and not their objective characteristics.

> IV. "Intrapersonal events differ in their qualitative aspects and, like external events, can have varied functional significance. Internally informational events facilitate self-determined functioning and maintain or enhance intrinsic motivation. Internally controlling events are experienced as

> pressure toward specific outcomes and undermine intrinsic motivation. Internally amotivating events make salient one's incompetence and also undermine intrinsic motivation."[122]

The second minitheory outlines a preliminary form of organismic integration theory of human development. Development is the differentiation and integration of structures that transform capabilities toward increasing elaboration, flexibility and unity. Elaboration of structures is the mastery or competence regarding the external boundary of objects and the internal boundary of emotions and drives. The energy source for integration is intrinsic motivation. Competence and unity result from structural development.

Since organismic integration theory is not as highly formulated as the previous one, Deci and Ryan did not present this theory as a set of propositions. Nonetheless, they provided historical and empirical support for their ideas. Deci and Ryan defined organismic integration as a process of development through which people distinguish specific elements of their internal and external environments and then integrate those elements with their existing structures, thereby elaborating and refining the structures.[123] They said that development emerged or was evoked by interactions with the environment.

The idea of activity refers to the organism's acting on its environment by exploring, testing, doing, etc., so that its capacities are developed and its internal structures become more refined and elaborate. Deci and Ryan believed that the nature of structures is to function and, through functioning, structures transform themselves. Intrinsic motivation serves an energizer role in the organismic integration process. However, development just does not happen because structures function; through

developing its capacities and structures, the organism satisfies its needs. Development is motivated but its rate and extent is affected by individual differences.

In distinguishing between intrinsic and extrinsic motivation, Deci and Ryan portrayed intrinsic motivation as a need to be competent and self-determining and as the primary energizer of development. However, behavior as input to development can be motivated either intrinsically (inherently interesting) or extrinsically (instrumental for adapting to the environment). The prerequisites for self-determined functioning are the syntheses of various elements into a unified superordinate structure that fosters a coherent sense of identity or self.

In discussing internalization and the environment, Deci and Ryan defined the concept of optimal challenge as the most appropriate match or fit between the person's competencies and the demands of the environment. For the individual to integrate the regulations of the environment, he or she must have developed capacities and structures for competently handling external demands.

The third minitheory addresses personality influences on motivation. Causality orientations theory deals with enduring orientations to causality related to specific classes of behavior and psychological processes. Three classes of behavior have been identified (self-determined, control-determined, and amotivational) which are facilitated by three classes of initiating and regulatory events (informational, controlling, and amotivating). Self-determined behaviors are thought to be initiated and regulated by choices reflecting an awareness of organismic needs and integrated goals. Such behaviors seem to reflect greater creativity, cognitive flexibility, and perceived competence, along with an internal

perceived locus of causality. Control-determined behaviors are initiated and regulated by controls in the environment or in the person. They are determined by external or internal controls or demands, not by choices and personal goals. Finally, amctivating behaviors are initiated and regulated by forces completely beyond a person's intentional control. Since these behaviors are not intentional, they are not intrinsically or extrinsically motivated. The person feels unable to effect desired results over uncontrollable or unpredictable environmental or personal forces.

Related to these behaviors are three classes of initiating or regulatory events that are thought to influence two perceptual dimensions: autonomy versus control and effectance-enhancing versus effectance-diminishing. Informational events support autonomy, provide effectance-enhancing feedback, and foster self-determined behavior. Controlling events pressure individuals toward defined outcomes and promote control-determined behavior. Amotivating events represent situations where the individual cannot competently achieve results or outcomes, which fosters amotivational behavior.

The role of individual perception is critical and represents a shift from a stimulus-organism-response (S-O-R) model to an organism-stimulus-organism-response (O-S-O-R) model of interaction. This model begins with people's needs and orientations. "In other words, people can be seen as selecting and interpreting stimuli in accordance with their needs and orientations. Stimuli are not seen as impinging on the person so much as they are seen as affordances that the person can attend to and interpret. The person selectively attends to stimuli, interprets stimuli more on the basis of his or her personality than on the subtleties of the stimuli, and projects characteristics onto the stimuli. In a

sense, the person actively constructs stimuli rather than passively receives them."[124]

Assuming that people use stimulus events for their own purposes according to their own needs and orientations, Deci and Ryan defined three causality orientations:

1. The autonomy orientation refers to internally initiated and regulated events and external events that are informational, resulting in a perceived internal locus of causality.

2. The control orientation describes behaviors initiated by the person that are external to his/her integrated sense of self and environmental events interpreted as controlling. This orientation leads to a perceived external locus of causality.

3. The impersonal orientation refers to the perception that events are unmasterable and leads to amotivation at internal or external boundaries.[125]

Deci and Ryan linked causality orientation with adult development, self-actualization, ego development, self-consciousness, self-derogation and self-esteem. They believed that ". . .characteristics of the organism as well as characteristics of initiating and regulatory events play an important determination role in motivationally relevant human functioning."[126]

More recently Deci, Connell and Ryan investigated self-determination in an organizational setting.[127] They tested whether the interpersonal work climate and managers' behavior in supporting subordinates' self-determination have an impact over time on various aspects of the subordinates' satisfaction with work. The researchers trained managers to promote self-determination by providing noncontrolling feedback, by supporting autonomy and by acknowledging subordinates' perspectives. Managers

supported self-determination by maximizing opportunities for subordinates to take initiative, by providing positive feedback with a minimum of controlling language, by treating poor performance as a problem to be solved, and by recognizing the needs and feelings of subordinates.[128] Because of the intervention, Deci, Connell and Ryan found improvements over time with: trust in the corporation; quality of supervision; supportive environment; feeling nonpressured; and satisfaction with quality of feedback, opportunity for inputs, security, pay and benefits, and work atmosphere.[129] The researchers concluded: "Workers whose managers supported self-determination tended to feel good and to be positive about most things, whereas those whose managers were controlling tended to feel bad and to be negative about most things."[130] They said that support for self-determination may influence workers' attitudes when job security and pay are not threatened, but that a poor organizational climate may undermine self-determination.

Deci, Connell and Ryan argued that supporting self-determination has positive effects on workers, but further research is needed on: 1) the extent to which individuals contribute to their own self-determination through their interpretation and behavior; 2) the extent to which managers' work contexts affect their ability to support subordinates' self-determination; and 3) the extent to which the experience of self-determination translates into improved work performance.[131]

This research suggested that the workers' relationship with two levels of the work environment effects self-determination and, presumably, intrinsic motivation. Organizational issues like job security and pay may undermine or support self-determination. Also, work unit issues on the nature of the relationship with the

immediate supervisor may affect the experience of self-determination. These are important relationships to understand within the context of P-J fit; however, more research is needed on the relationship between the individual and the job to provide a more thorough understanding of P-J interaction.

Deci and Ryan incorporated a vast amount of research into their emerging theory and introduced several central concepts and three minitheories as the foundation of self-determination theory. Their preliminary research on effects of perceived environmental variables on intrinsic motivation and self-determination may provide insight for strengthening intrinsic motivation in the work place. However, more research is needed on all three organizational levels--organizational, work unit and individual. Assuming that Miller's BCM provides a means to understand intrinsic motivation, a commensurate job analysis method is needed to provide a framework for understanding P-J fit. To guide the development of the job analysis inventory, the next section selectively reviews literature on job analysis to provide parameters for converting Miller's taxonomy into worker specifications.

Job Analysis

In a seminal work on job analysis, McCormick said that the primary purposes of jobs were to produce goods and services through people; therefore, it made sense to focus on two related objectives--sufficient use of human talent and the maintenance or enhancement of human welfare. "Because of the importance of both these objectives, human work comprises a legitimate area of systematic study and analysis in its own right;

the hope is that such inquiry might produce information of practical utility in achieving these two objectives."[132] Job analysis refers to the study of the functional effectiveness of human work.

According to Page and VanDeVoort, businesses now recognize that their survival and success depends upon effective use of their human resources, especially given the highly specialized and highly differentiated work now being performed in most modern organizations. Job analysis provides information for better-informed management decisions that allow people to be treated as strategic resources. Page and VanDeVoort emphasized that the purpose of job analysis " . . . is to provide an objective description of the job, not the person performing the job."[133] They viewed job analysis as a systematic process for obtaining, documenting, and analyzing information about job content, job requirements, and job context.[134]

In Staffing Organizations, Schneider and Schmitt broadly combined job and organizational analysis. In terms of staffing, their analysis identified the types of people an organization needs to be effective.[135] The three major functions of job/organizational analysis are: 1) to identify human behavior required for adequate job performance; 2) to identify the rewards of the job itself for workers; 3) to consider the impact of organizational factors on performance.[136] Jobs exist within an organization and are explicit statements about appropriate means for accomplishing goals. However, poorly defined organizational goals and jobs could have serious implications for job satisfaction, employee motivation, supervision, and organizational effectiveness.[137] Schneider and Schmitt believed that job analysis provides a vehicle for correcting such deficiencies, and

that both job requirements and worker rewards should be an integral part of job analysis.

Broadly speaking, job analysis can focus on two main functions: 1) the development of work methods such as equipment design, facilities and work environments [referred to as human factors engineering]; and 2) human resource management such as selection, training, compensation and appraisal.[138] According to McCormick, a major aspect of human resource management is matching people to jobs in terms of abilities, skills, knowledge and other factors.[139] In terms of human welfare, optimum employment would provide positive satisfaction for the individual. McCormick believed that job analysis can contribute relevant data for improving work functions and human welfare.

Job analysis is an evolving practice that reflects changing needs and requirements. McCormick defined job analysis simply as the process of obtaining information about jobs.[140] Bemis, Belenky and Soder defined job analysis as a ". . .systematic procedure for gathering, documenting, and analyzing information about three basic aspects of a job: job content, job requirements and job context in which the job is performed."[141] Job content refers to activities, such as duties, tasks, steps and/or motions, while job requirements refer to the knowledge, skills, abilities and other factors (KSAOs) required to perform the content of a job in a particular situation. Context refers to a job's purpose, work guidelines, accountability level, consequences for error, degree of supervision needed, and physical demands. Bemis, Belensky and Soder also said that the purpose of job analysis is to provide an objective description of the job and not of the person who performs the job.

Ghorpade defined job analysis as ". . .a managerial activity, performed within organizations, and directed at gathering, analyzing and synthesizing information about jobs. . .that serves as the foundation for organizational planning and design, human resource management, and other managerial functions."[142] He provided four reasons for conducting job analysis. First, it provides for an efficient allocation of resources to perform the work of the organization. Second, since jobs are created consciously, they need to be analyzed periodically and perhaps redesigned to insure that they are fulfilling their purposes. Third, since jobs are usually designed by nonincumbents, job analysis provides a way to correct poorly designed jobs. Finally, job analysis provides a vehicle for aligning jobs with organizational change.[143]

As the name implies, job analysis is an analytical procedure that studies the interrelationships among job components and that determines how the job fits into the larger organization.[144] Data for job analysis can be obtained from a variety of sources--written documents, observation of incumbents performing work, individual interviews, group meetings, work activity logs, questionnaires and work samples where job analysts actually perform the job.[145]

Ghorpade offered several propositions that summarize job analysis:

1. Jobs are subunits of organizations.

2. Job analysis consists of sets of activities that are directed at uncovering information about jobs that can be used in a variety of management functions.

3. Purpose determines the type of job analysis performed.

4. There are no standard ways of gathering and analyzing job data. Job

analysis methods are determined by the type of data gathered which reflect the original purpose for conducting the analysis.[146]

Although the job is the unit of analysis, job analysis can also focus on the KSAOs of workers to arrive at an understanding of a job. Job oriented approaches deal directly with the job, while worker oriented methods focus on the worker. Critical incident techniques and behavioral consistency methods are considered worker oriented.[147]

Cascio[148] described job analysis broadly as analyzing any work related information used to define a job and to decide employee behavior requirements. Defining a job's task requirements leads to the development of a job description that is used to figure out the KSAOs required to perform the job. Job descriptions tend to be sterile behaviorally and do not reflect the dynamic nature of the jobs, especially in management.[149] Job specifications reflect the KSAOs required to perform a job and determine the personal characteristics used in screening, selecting and placing job applicants.[150] Cascio stated:

> Job descriptions are valid to the extent that they represent accurately job content, environment and conditions of employment. Job specifications are valid to the extent that persons possessing the personal characteristics believed necessary for successful job performance in fact do perform more effectively on their jobs than persons lacking such personal characteristics Unfortunately, little information exists on the validity of job descriptions and job specifications.[151]

Since traditional validation of job specification criteria requiring large numbers of subjects is not practical for most organizations, Cascio suggested that an indirect validation strategy might be more appropriate. Indirect validity permits the extension of validity from one situation to another based on job analysis that identifies common elements among jobs.[152] He identified four types of job characteristics that could use this

approach: 1) general job attributes; 2) ratings of traits required for successful job performance; 3) job-oriented elements that describe what is accomplished by the employee; and 4) worker-oriented elements that describe what the worker does to accomplish results.[153] Since narrative job descriptions are not quantified easily for use in indirect validity studies, Cascio suggested that task checklists that measure frequency, importance or time spent show promise for grouping similar jobs through factor analysis or cluster analysis techniques.[154]

Job analysis using critical incidents reflects both static and dynamic job dimensions by describing especially good or especially poor performance.[155] This approach involves collecting performance anecdotes that describe the context, what was done, the perceived consequences of the behavior, and whether the consequences were within the control of the employee. Incidents are classified by job dimensions and formatted into checklists. The advantage of the critical incident approach is its focus on job behaviors; however, it is time consuming and does not reflect average performance.[156]

According to Cascio, job analysis legally can focus on either task or behavioral requirements as long as critical from noncritical job requirements are differentiated. Critical job requirements are defined as: 1) learned prior to hire; 2) define effective from ineffective performers; and 3) can be reasonably expected from job applicants.[157] Behavioral job analysis has utility for development of job families and career ladders, self-development programs, and research in transportability or inability. Cascio said that job analysis is difficult and that management jobs must be understood better.

Grouping jobs together for purposes of validation and human resource management practices can be handled in two ways: 1) define differences among jobs through multivariate analysis of variance methods; 2) define similarities among jobs through cluster analysis.[158] Job analysis yields two products--a job description and worker or job specifications. A job description focuses on an entire job as the unit of analysis. It describes what, why, how, and where of the job, but does not include worker qualifications.[159]

A typical job description includes five elements: 1) the mission as reflected in the title; 2) results of the job in terms of products or services; 3) objectives that specify the amount of results expected in a given time; 4) duties that refer to assigned work tasks; and 5) responsibilities that reflect the results of which the worker is held accountable.[160] Job descriptions differentiate jobs from each other and are used for deriving other information, as a source document, and for basic job-related research. They serve as a foundation for deriving worker specifications, performance criteria, job families and compensable factors.[161]

Ghorpade noted that little consistency existed with the organization or terminology used in job descriptions. Likewise, job factors were described at different levels of specificity, depending on the purpose and the amount of time and effort invested in the development of the job description.[162]

Since job descriptions can be used as the basis for administrative action, they must meet tests of effectiveness in terms of reliability, validity and accuracy.[163] However, as Ghorpade said, it is difficult to evaluate entire job descriptions since they consist of

multiple factors and of different types of factors. Therefore, job descriptions should be verified factor by factor.

Reliability in job descriptions refers to consistency of outcomes and involves two conditions. Stability refers to ". . .the extent to which the instrument yields the same results over repeated applications"[164] and is shown if the reader's understanding of the job description's contents remains stable over repeated readings. Equivalence is defined by ". . .the extent to which the instrument yields similar results over multiple applications at the same time and is determined ". . .if multiple readers gain the same understanding at one reading."[165] In this context, reliability becomes a communication problem to insure that the job description conveys what it intended to convey.

Validity refers to the value of a job description as an instrument for action. The more closely the description reflects the actual job situation, the higher its validity.[166] Accuracy refers to the extent to which the job description reflects the true value of described job values. Quantitative and objective factors are easier to verify than subjective factors that may require the use of multiple raters with different characteristics to increase correlations.[167]

Understanding the purposes and issues of using job descriptions is important for using these instruments appropriately. Job descriptions serve a vital link in human resource management and, if they are faulty or weak, other steps may be also.

The second major outcome of job analysis is worker or job specifications that identify the KSAOs necessary for effective job performance. Specifications show the type and amount of worker characteristics thought to be essential for job performance.[168]

Specifications may be divided into two broad sets of characteristics. First, aptitudes and abilities refer to the basic capabilities for performing jobs. Aptitudes can be defined as a potential or capacity for doing or learning something mental or physical, while ability means a readiness to perform developed through experience and/or training.[169] Second, personality and related characteristics provide insight into the level of aptitudes and abilities and a person's willingness to use them. Measures of personality and other characteristics help explain how a level of proficiency was developed and help predict future use of aptitudes and abilities.[170]

According to Ghorpade, a significant amount of effort has gone into developing procedures for deriving worker specifications, but standard procedures have not evolved. The variety of methods in use can be classified as job oriented or worker oriented. The derivation of worker specifications is an inferential process with both approaches and relies on subject matter experts (SMEs) for making the inferences. However, significant differences exist between the approaches in terms of the techniques used, the actions required by SMEs and where the process begins.[171] The job-oriented approach begins with an explicit job description so that work demands can be compared against lists of KSAOs by SMEs. The worker-oriented approach uses an inventory of work-related behaviors, critical incidents or KSAOs that are compared by SMEs against other instruments, superior workers or the job description to derive worker specifications. Job descriptions are used for verification, not as the starting point of the analysis.[172]

Procedures for deriving worker specifications may vary by the scope of factors covered, level of detail, and form of the specifications. However, it is important to

distinguish between basic and special competencies. Basic competencies pertain to the KSAOs required to perform a job adequately or minimally, while special competencies refer to the KSAOs needed for superior job performance.[173] Basic competencies should be held by most incumbents at the journey level of their jobs and refer to the KSAOs that workers get through education and experience. Basic competencies may include legal or regulatory requirements,[174]are normally identified from task statements and are generally considered the minimum requirements necessary to perform the job satisfactorily.[175] On the other hand, special competencies are associated with superior job performance. To identify special competencies, Bemis, Belensky and Soder recommended remembering the five most effective and the five least effective employees in a given job and identifying the differences between the two groups. They further recommended identifying those factors that made the best employees superior performers. Special competencies should be related to specific tasks, stated clearly and correctly, and rated in terms important for superior performance.[176]

Ghorpade offered several criteria for determining worker characteristics: 1) link specifications with specific tasks, context or other job factors; 2) differentiate characteristics in terms important to job performance; 3) use sensitive measures of characteristics that distinguish superior, average and unacceptable performance; 4) consider the marketplace and the availability of certain characteristics.[177] Since the derivation of worker specifications relies on human judgment, Ghorpade recommended using five criteria for selecting SMEs: 1) job experience at the job; 2) human resource expertise; 3) freedom from bias; 4) minorities to add fairness; 5) comprehension levels.[178]

The process of deriving worker specifications must be thoroughly documented in terms of procedures and decision rules used. Ghorpade recommended documenting these areas: 1) the job factors used to generate worker specifications and the procedures and rules followed in choosing the factors; 2) the human characteristics used for deriving the specifications and the procedures and rules used in selecting specifications; 3) characteristics of SMEs; and 4) key statistical results.[179]

Legal Perspectives Related to Job Analysis:

Federal laws and regulations prohibit discrimination against protected classes on non-job-related factors. Employment tests should measure the requisite KSAOs for performance in a given job and not measure the person in the abstract.[180] Adequate job analysis is required to prove the job-relatedness of employment criteria and to show that a person is not assessed in the abstract. If adverse impact results from an employment decision, an employer must establish that selection criteria are bonafide occupational qualifications for a job and have a demonstrable relationship to job performance.[181]

Job analysis provides information for determining the job relevance of employment criteria. Its uses include: 1) defending a selection procedure as content valid; 2) defending a selection procedure as having criterion-related validity; 3) proving job comparability when using validity studies with multiple employers; 4) developing performance appraisal systems; and 5) designing the content of training programs when used as job requirements for selection or promotion.[182]

Judicial concerns regarding job analysis have focused on five areas. First, job

analysis showing evidence of similarity among jobs is necessary when employment tests are generalized or transported to a setting they were not designed originally to cover.[183] Second, employers must be extremely cautious when using cut off scores or ranking procedures to reduce large candidate pools to a manageable size. Test procedures must closely approximate the job and be based on strong evidence of validity derived from job analysis.[184] Third, employers should reduce the "inferential leap" between predicted job performance and assessment of worker characteristics by showing the relevance between work performance and measures of behaviors and/or qualifications. Job analysis that 1) emphasizes observable work behaviors and the use of multiple sources of data and 2) that reduces the inferential leap between tests and job performance has a higher probability of surviving a court challenge.[185] Fourth, criteria used in employment decisions must have relevance to the job and must represent critical work behaviors for successful job performance. Job analysis should provide a detailed list of critical work behaviors and their relative importance for job performance.[186] Finally, employers who use validated tests that result in adverse impact should seek alternative assessment strategies with equal validity and less adverse impact. Job analysis information can be used to suggest alternative assessment methods to achieve legal compliance.[187]

Bemis, Belenky, and Soder argued that adequate job analysis is essential in proving that a test or employment procedure is job related, but also acknowledged that there is no authoritative set of principles for job analysis practices. No job analysis procedure has full professional and legal approval.[188] The context determines the purpose for the job analysis, the relevance of methods and procedures, consistency of application,

and appropriate use of the information.

Now that background information and legal issues have been reviewed, the discussion turns to relevant research issues in job analysis.

Research Issues in Job Analysis:

Research has been conducted on the source of job analysis ratings. Jones, Main, Butler and Johnson studied whether narrative descriptions might be converted into standard job analysis ratings that describe key characteristics of various jobs and represent the similarities and differences among those jobs.[189] The researchers used the Position Analysis Questionnaire (PAQ) with raters unfamiliar with the 1,100 positions in 121 job categories. Jones et al. found that job analysis ratings derived from narrative job descriptions appeared closely linked to measures of required worker abilities found in the PAQ validation research; these ratings were sufficiently sensitive to the similarities and differences among the jobs to produce conceptually meaningful job clusters.[190] They argued that the use of narrative job descriptions reduces costs and intrusiveness of job analysis and provides useful information for understanding P-J fit. Their research supported the use of narrative job descriptions as sources for ratings.

Pearlman and Schmidt studied the effects of alternative job grouping methods on the validity of selection procedures. They noted that utility of job families for use in selection depends on two criteria: 1) The job analysis should sort job groups into discriminative categories that show substantial validity differences across groups; 2) The procedure should create homogeneous job groupings with reduced validity variability

within groups rather than across groups.[191] Pearlman and Schmidt investigated the differences among and within job families grouped by four types of job analysis information: 1) molecular work content that focused on specific job tasks; 2) worker-oriented job content and information processing requirements; 3) human attribute requirements or KSAOs; 4) broad content or activity structure such as sales, clerical, mechanical repair, etc. These types of information vary in their costs and difficulty to obtain, with task analysis being the most expensive and time-consuming and with broad content classifications being more simple and inexpensive.[192]

Pearlman and Schmidt found that differences in tasks, behaviors, abilities or KSAOs are not sufficiently large to yield significant moderating effects. They discovered little variability in mean validities across families and only small gains in validity homogeneity within job groupings based on the four grouping systems.[193] Pearlman and Schmidt concluded that test validities are generalizable for individual jobs and job families and for heterogeneous jobs spanning the occupational structure.[194] They noted that simple, rational methods of grouping jobs based on general content structure may be as useful as more complex and expensive methods of job analysis.

Fleishman outlined four systems for linking job tasks to worker specifications. He argued that existing taxonomies are either too general or too specific for generalizing from the effects on one task to another. He believed a system of classification is needed to improve generalizations and predictions about how tasks affect performance. Such a classification taxonomy would have use in job analysis, job design, selection, training, performance measurement and development of information systems and databases.[195] He

used three criteria for classifying human task performance: task dimensions, behavior or response requirements, and inferred processes.[196]

Fleishman identified four primary bases for task classification:

1. behavior description approach classifies human tasks in terms of observed, overt behaviors to dimensionalize specific behaviors into broader classes;

2. behavior requirements approach infers processes required to achieve certain levels of performance in tasks. The worker is assumed to possess a repertoire of functions that become manifest between stimulus events and responses;

3. ability requirements' approach assumes that tasks requiring the same abilities can be placed in the same category;

4. task characteristics' approach is based on a definition of a task as a set of conditions that elicits performance, is imposed on the worker, and has objective existence.[197]

Fleishman recommended that descriptions be defined as accurately as possible, quantified if possible, and applied reliably. He noted that the abilities requirements approach is the most developed and is most relevant to issues of content and construct validation.[198] This approach is useful for classifying, grouping and indexing jobs in terms of common ability requirements.

Naughton and Outcalt developed an occupational taxonomy based on job characteristics theory to focus on the intrinsic motivation potential of a job.[199] They observed that critics of stimulus-response theories argued that individuals may behave not to satisfy needs or reduce drives, but to increase or intensify needs that are self-

rewarding or intrinsically motivating. Naughton and Outcalt believed that job stimulation has important implications for P-J fit and work adjustment. Their research focused on the work's potential for engaging the intrinsic motivation of workers.[200] Using Hackman and Oldham's five job characteristics (autonomy, task variety, identity, significance and feedback), they developed a taxonomy of occupational profiles based on individuals' job descriptions as the unit of analysis. They performed cluster analysis on two broad samples using the five job characteristics.

Naughton and Outcalt found that job categories appeared to be related to organizational size, prestige and job satisfaction based on between-cluster analysis. Within-cluster analyses were nonsignificant. Since traditional occupational groups can vary both within and between one another in terms of job characteristics, they believed it is important to distinguish between work environments and occupational differences in job characteristics.[201] They recommended using the job characteristics taxonomy with other environmental assessment to enhance P-J fit and concluded that homogeneous job groups can be derived from individual descriptions of job characteristics.

Several studies addressed the effects of rater characteristics on job analysis outcomes. Silverman, Wexley and Johnson focused on the effects of job incumbent characteristics on structured job analysis instruments. They observed that both low and high job performers responded in similar fashion and could be used as raters.[202] More educated job incumbents gave more consistent job analysis ratings across time, and their ratings also correlated more highly with job analysts' ratings. However, no significant relationship was found between incumbents' job experience and rating consistency or

agreement with job analysts' ratings.[203] Within this line of research, Silverman, Wexley and Johnson further investigated whether incumbent age and job experience affected responses to a task-oriented questionnaire used to analyze three clerical job families. They found that older, younger, experienced and inexperienced incumbents did not differ significantly in ratings of clerical work activities. Their results were consistent across three job families and six rating scales. They concluded that ". . .all incumbents regardless of age or tenure can be used in obtaining certain kinds of job analysis information."[204]

Conley and Sackett used three methods to investigate the relationship between incumbent performance level and job analysis information:[205] ratings on task scales; KSA scales; and the Fleishman scale of cognitive abilities. They thought that performance level influenced the perception of job analysis data. High and low performance groups generated and rated both task and KSA lists, then completed the Fleishman Scale. Factor analysis defined the scores, then discriminant analysis was used to find group differences. Conley and Sackett found ". . .no difference in the quality of job-analysis data of high or low performers either when (a) the type of method used varied or (b) incumbents actually generated the various types of inventories. . . .[T]he performance level of the incumbent selected to give job-analysis information appears to make little difference in the results obtained."[206] However, they noted that their job analysts were trained and that training may make a difference in results.

Green and Stutzman experimented with methods of selecting respondents for accurately rating job analysis task questionnaires.[207] They developed two general

methods: 1) identifying respondents knowledgeable about the job based on their background, peer ratings, performance ratings and organizational information; and 2) selecting respondents based on a comparison of their ratings and the total population's mean ratings based on a carelessness index designed to assess a tendency to rate irrelevant tasks. Their intent was to provide practitioners and researchers with criteria for selecting job analysis respondents. Based on a large number of statistical analyses, Green and Stutzman defined four general postulates for selecting job analysts:

1. Different selection measures yield different job analysis respondents.

2. Respondents are not equally accurate and can be screened with a carelessness index.

3. Sometimes, more than three respondents are needed to obtain reliable results.

4. The selection of job analysis respondents assumes greater importance when the job is ill-defined and unstable.[208]

Green and Stutzman concluded that more research was needed to clarify the relationship between the purposes of job analysis and the selection of respondents. However, they acknowledged that such research was difficult to conduct and that no criteria were available against which to measure selection measures.[209]

Schmitt and Cohen investigated responses to a job task inventory by different groups of incumbents according to sex, race, experience level and job experience.[210] They used 411 middle managers in three occupational groups to complete a job task questionnaire using time spent and difficulty rating scales. They noted that use of job

incumbents in job analysis is widespread but there is little evidence on whether incumbent characteristics influence job rating responses. Schmitt and Cohen tested for mean differences in task ratings across different groups and assessed if there were subgroup differences at various levels of total involvement in the job.[211] They found that:

1. Women reported less frequent participation in tasks that involved financial or budgetary tasks and involved talking to people outside the organization.

2. Tenure did not affect task evaluations.

3. The largest differences occurred among occupational subgroups--technology, business administration, or control functions in terms of time spent and task difficulty. These findings tended to reflect job functions.

4. Time spent or difficulty ratings of minorities varied more as a function of their involvement in the total set of functions than did majority incumbents. The researchers believed that minorities who do well get increasing responsibility for a wider variety of tasks because of their status and low numbers.

Schmitt and Cohen found that job level of respondents did not affect evaluation of tasks but occupational differences were important. Differences in sex, race and tenure on task difficulty were due to direct involvement in a task, not perceived difficulty. They suggested that job analysts examine the responses of different subgroups.

Another set of studies dealt with the amount and source sophistication of information used in job analysis ratings. Two studies investigated the common knowledge effects of job analysis ratings given by expert and naive raters on the Position Analysis Questionnaire (PAQ). Cornelius, Denisi and Blencoe challenged earlier

research that suggested that college students with only job title information produced ratings that correlated highly with job expert ratings. One explanation for this finding was that the PAQ measures only trivial or common knowledge about jobs.[212] The researchers challenged this explanation based on the method by which convergent validities were calculated. The previous study analyzed 25 state government jobs using five different types of raters: incumbents, supervisors, job analysts, college students given only job titles, and college students given job titles and job specifications, and concluded that the type of rater used makes little practical difference. Cornelius, Denisi and Blencoe initially found high intercorrelation between expert and naive raters; however, when "does not apply" (DNA) items were removed from the data analysis, correlations dropped from the 70s to 90s, to the 40s range. The researchers concluded that the PAQ may not be appropriate for all jobs, especially some professional, technical, and managerial jobs, and that the shared stereotype explanation is not supported when data are adjusted for DNA items on the PAQ. They argued that the PAQ does provide useful information beyond job stereotypes.[213]

More recently, Denisi, Cornelius and Blencoe investigated the possibility that the number of PAQ items rated DNA can be seen as an index of the appropriateness of the PAQ for analyzing a particular job.[214] Additionally, they hypothesized that significant differences exist between expert and naive raters. Their results suggested that naive raters cannot provide equivalent ratings and that it may not be appropriate to use the PAQ when high numbers of DNA items are checked by raters. They recommended that a contingency approach to job analysis be used by which the analysis method is matched

to the job and the individual differences of raters are considered.[215]

Friedman and Harvey investigated how the amount of job description information effects the accuracy of PAQ ratings.[216] The need for such research was based on the high cost of obtaining job analysis information and on recent interest in reducing costs by reducing the amount of job analysis information. They found that naive raters provided with extensive job description information and training were unable to generate PAQ ratings that correlated highly with ratings of job experts.[217] Convergent validity was highest for naive raters with the most extensive job descriptive information. Friedman and Harvey concluded that accurate, extensive and readily available job information does make a difference in PAQ ratings.

Butler and Harvey compared holistic versus decomposed ratings of PAQ work dimensions. Following previous attempts to reduce the costs and intrusiveness of the PAQ by limiting the amount of information provided to analysts (with negative results), this study attempted to simplify the rating task itself. Previous research on strategies for evaluating worker requirements and intrinsic job motivation found that holistic judgments were as effective as making several decomposed judgments of job dimensions than combining them for a total rating.[218] Unfortunately, such holistic ratings did not yield the multiattribute profile required for many human resource functions. The goal was to reduce the number of PAQ ratings for each job while producing full profile dimensions. Butler and Harvey rated each PAQ job dimension holistically, then compared their ratings with more traditional decomposed ratings. They found ". . .a near total inability of raters, regardless of their past PAQ experience, to make accurate and reliable holistic

dimension ratings."[219] Butler and Harvey speculated that raters were overloaded with information when attempting to make holistic judgments. They suggested that other job analysis techniques similarly will not benefit from holistic ratings and that additional research is needed on the information processing aspects of the job analysis process.[220]

This ends the review of selected job analysis literature. The next section presents parameters for developing the job analysis inventory.

Job Analysis Summary Points:

Consistent with other topics reviewed in this chapter, job analysis literature is summarized to guide the development and test of the job analysis inventory. The main points are listed below.

1. There are no standard ways of analyzing jobs. Purpose determines job analysis method.
2. Standard procedures for identifying worker specifications have not evolved.
3. It is important to distinguish between basic and special competencies.
4. Use multiple criteria in selecting SMEs.
5. Thoroughly document procedures to identify worker specifications.
6. Narrative job descriptions can be used for ratings.
7. To strengthen the utility of job families for use in selection, sort job groups into discriminative categories that show validity differences across groups and reduced variability within groups.
8. Simple, rational methods of grouping jobs based on general content

structure may be as useful as more complex methods.

9. Use cluster analysis on job families to identify subgroups, then conduct between group analyses.

10. Homogeneous job groups can be derived from individual descriptions of job characteristics.

11. All incumbents despite age, tenure or performance level can be used in obtaining job analysis data.

12. Examine the responses of different rater subgroups for systematic differences.

13. Use "Does Not Apply" or DNA ratings to determine the appropriateness of a job analysis instrument for a given job or given set of raters.

14. Available, accurate and extensive job information affects ratings.

15. Holistic ratings of jobs may overload the information processing capabilities of raters.

Summary

The literature on behavioral consistency and person-job fit showed that measurement is a major problem. New research could address measurement issues by: 1) using commensurate P-J measures and point-to-point P-J comparisons; 2) basing measurement of jobs on dimensions of behavior; 3) incorporating satisfaction and performance variables as dependent variables of P-J fit; 4) using holistic measures of persons in natural settings; and 5) operationalizing P-J fit as a score.

Miller's BCM provides an extensive assessment of individual behavior. His taxonomy of 268 behavioral elements in five dimensions, derived from content analysis of behavioral incidents, provided the content and structure for the development of the commensurate job analysis inventory. Using commensurate person and job elements could lead to developing parallel measures that would permit defining P-J fit as a score. Such a score would represent the goodness of fit or the degree of P-J correspondence and could be inferred to represent the quality of the P-J relationship. A P-J fit score could be tested as a predictor variable on a variety of indicators, such as satisfaction, satisfactoriness, stress, work performance, intention to quit, absenteeism, and/or medical symptoms. However, before a P-J fit score could be derived, the job analysis procedure had to be developed and tested to prove its reliability and measurement accuracy.

The next chapter presents the research methodology for the development and test of the job analysis inventory.

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CHAPTER THREE

METHODOLOGY

This study developed and tested a new job analysis instrument, named the Job Specifications Inventory (JSI). The JSI was derived from a taxonomy of behavioral variables that were identified by a clinical-type behavioral consistency method used to assess motivated behavior. The JSI was designed to have subject matter experts (SMEs) rate the importance of specific job requirements associated with effective performance. The broader intention was to enhance person-job fit by creating a methodology for analyzing jobs in terms that were commensurate with the assessment of persons.

Problems of person-job (P-J) fit are complex and encompass a broad range of public policy, economic, social and individual issues. P-J fit has been addressed in personnel psychology, vocational psychology and human resource management. As suggested by the literature reviewed in Chapter Two, problems of P-J fit are multidisciplinary. Accordingly, this study took a multidisciplinary approach by linking theory and research on behavioral consistency, person-environment congruence, intrinsic motivation, and job analysis to guide the development and test of the JSI.

The ensuing sections cover inventory development, administration procedures, testing requirements, inventory testing, research questions, and data collection and analysis.

Inventory Development

The Job Specifications Inventory (JSI) was derived from two sources, The Truth About You by Miller and Mattson[1] and "The SIMA Guide" which is a workbook used in group assessment workshops.[2] Both sources described the common behavioral variables identified in subjects' achievements. The variables were listed as specific, numbered job specifications in the JSI. A seven-point Likert-type rating scale was used to produce importance estimates on each variable for effective job performance, ranging from very low (1) importance to very high (7) importance. The importance scale followed recommendations made by Fogli.[3] Such a scale permitted nominal level data to be converted to ordinal level data and to be calculated as interval level data. A "does not apply" or DNA rating option was incorporated to allow elimination of nonrelevant items from the job profiling. The JSI is presented in Appendix A.

JSI development occurred in two stages. First, a preliminary draft of the instrument was administered to six professionals in two job classes to obtain a completion time estimate and an evaluation of instrument design and readability. The investigator conducted debriefing interviews with the respondents to evaluate JSI ease of use. An experienced researcher with survey design expertise also evaluated the JSI during the first stage and later before the second pilot test. Opinions from both sources were incorporated into a second version.

Second, the inventory was submitted to an institutional human subjects committee for evaluation and approval for use. Their comments helped to shape the inventory further. Additionally, the JSI was evaluated by an experienced job analyst/classification

specialist. All feedback was used to finalize the pilot version.

Converse and Presser recommended that an instrument be pretested with 25 to 75 respondents, depending upon the methodology, and that space be provided on the instrument to encouraged raters to comment.[4] During development, the JSI was administered to over 90 respondents in two pilot tests. Respondents in both pilot tests were asked to write comments directly on the JSI about instructions, item clarity and/or procedures.

Respondents

Several researchers recommended using "subject matter experts" (SMEs) such as job incumbents, supervisors, peers, colleagues, subordinates, or others who were familiar with a position to rate job characteristics and job specifications.[5] The JSI categorized raters as incumbent, supervisor, coworker/colleague, or subordinate. Typically, SMEs included the first three types of raters; however, because of the higher coefficient alpha reliability estimate given by incumbents in the second pilot test, incumbents were targeted as primary raters.

All raters, except resident assistants, had at least one year's experience in the targeted job or in observing incumbents perform the targeted job. For resident assistants, one-half year's experience seemed reasonable since turnover is very high in these positions (approximately 50% annually) and incumbents participate in a structured selection and training program before starting their duties.

Sampling Procedures

Given the nature and design of this study, a nonprobability sampling procedure was used to select SMEs for each targeted job. A quota for each occupational group was used until a sufficient number of cases was obtained.

Certified public accountants (CPAs) were drawn from local offices of large national CPA firms and from larger regional CPA firms. Secretaries were surveyed from a university, newspaper, elementary schools and several other organizations. Civil engineers were obtained from federal, state and municipal agencies. Instrumental musicians were solicited from regional symphony orchestras and military bands. Elementary school teachers were contacted through local public and local private schools. Insurance sales agents were recruited from field offices of large, national insurance companies through contact with the general agent. Personnel managers were solicited directly by mail as identified through local, state and regional professional associations and computer databases.

Administration Procedures

Support to administer the JSI was solicited from executives and managers of organizations that had targeted jobs. A proposal outlining the purposes of the research and offering a summary of the results was presented to targeted organizations. For organizations that agreed to participate in the study, a follow-up telephone call and/or personal meeting with each organization representative provided administration procedures and details. The JSI was administered to incumbents as subject matter

experts (SMEs) in the targeted jobs. Except for personnel managers, the inventory was distributed through and returned to organization managers or their designated site coordinators.

SMEs received a cover letter (Appendix A) from the researcher that attempted to develop respondent interest and that gave instructions for completing and returning the inventory. In some cases, managers wrote a letter or memorandum to each potential respondent as an endorsement of the research. The JSI was distributed through group meetings, interoffice mail or individual solicitation. SMEs were asked to complete the JSI within two to three weeks and to return it to either their site coordinator or the researcher. SMEs were instructed to refer to a position description, if available.

In the case of personnel managers, solicitation to participate in the study was through direct mail. Personnel managers were identified in membership directories of professional associations and in computer databases representing specific industries. A personalized cover letter with the JSI was sent to personnel managers across a broad range of organizations.

Pilot Tests

Two JSI pilot tests were conducted to evaluate administration procedures, to develop an internal reliability estimate, and to establish sample size requirements for the field test. The pilot tests used two job classes at an urban, state university with at least 50 SMEs each. Permission was obtained to administer the JSI to all resident assistants and their supervisors. Resident assistants are paraprofessionals in student services who

live in campus residence halls to provide supervision, programming and advising for students. Resident assistants participate in a competitive selection process and a standardized training program. Permission was also obtained to administer the JSI to all office service specialists and their supervisors at the same institution. Office service specialists perform a variety of clerical and information processing tasks.

The pilot tests were administered sequentially to permit staged development and refinement of the inventory based on respondent feedback and evaluation of administration procedures. Both groups of SMEs were asked to identify confusing or poorly written items and to comment directly on the JSI. Both groups were asked for their work telephone numbers so the researcher could contact them for elaboration on any comments. After the first pilot test, a debriefing meeting was held with resident assistant SMEs to obtain first hand impressions of the JSI.

Reliability of the JSI was estimated by Cronbach's coefficient alpha. Nunnally recommended using coefficient alpha routinely in developing any new measurement instrument.[6] Coefficient alpha is used to estimate the reliability of an instrument when alternate forms and retest methods are impractical and when cognitive or affective scales are used with raters.[7] The statistic represents the expected correlation of one test with an alternate form containing the same number of items when the two tests purport to measure the same phenomenon.[8] It can be viewed as the expected correlation between an actual test and a hypothetical alternate form. Coefficient alpha determines reliability based on internal consistency.[9] Nunnally claimed that reliability estimated from internal consistency approximates the reliability obtained from alternate forms which is the

preferred method for assessing reliability.

Mayer pointed out that coefficient alpha was essentially the same as split half reliability since randomly chosen split halves and alpha will tend to converge as the number of test items increases. He argued that coefficient alpha has an advantage over split half methods, in that, it yields a single reliability coefficient for a given test equal to the average of all possible split half correlations.[10]

Carmines and Zeller argued that coefficient alpha provides a lower estimate of reliability for an unweighted scale of items and that it equals reliability of parallel items. "Thus, the reliability of a scale can never be lower than alpha even if the other items depart substantially from being parallel measurements. In other words, in most situations, alpha provides a conservative estimate of a measure's reliability."[11] They recommended using an alpha value of .80 as a cutoff for acceptable reliability.

Coefficient alpha was calculated with the SAS computer program. A high coefficient alpha within jobs would show a high level of agreement about the items. Coefficient alpha was first calculated with resident assistant SMEs. JSI items were inspected for large standard deviations and revised if necessary. After revisions, the second version of the JSI was administered to office services specialist SMEs to verify earlier results and to test revisions.

The first pilot test was administered to 48 resident assistants and seven supervisors at group staff meetings. A cover letter attached to the inventory stressed the importance of the research and requested that the completed JSI be returned to supervisors within two weeks. A total of 46 usable inventories was returned. Cronbach's coefficient alpha

and standard error estimates were calculated. As presented in Table 1, the first pilot test had a .984 coefficient alpha and a standard error of .163.

The second pilot test was administered through interoffice mail to 56 office service specialists and 37 supervisors. A personalized cover letter was attached to each JSI with an addressed return envelope. A total of 49 usable JSIs was returned by 25 incumbents and 22 supervisors, yielding a combined coefficient alpha estimate of .978 and a standard error of the mean of .117. Separate scores were generated for each SME group, with incumbents achieving a coefficient alpha score of .983 compared to .966 for supervisors. Results for the second pilot test are summarized in Table 2.

Sample size for the field test was estimated by calculating the standard error of the mean to derive a target number of jobs. Standard error and sample size estimates were calculated with SAS.

Sample Size Estimation

A guideline was needed to estimate an appropriate sample size per group. Sample size required for a 95% confidence level for each occupation in the field test was estimated from standard error of the mean scores calculated during pilot testing. Sample size was estimated with the following formula:

$$n = \left[\!\left[\frac{z\ \sigma}{Em} \right]\!\right]^2$$

where $z = 1.96$

σ = standard deviation of the item scores

Em = standard error of the mean.[12]

Table 1

Cronbach's Coefficient Alpha and Standard Error of the Mean Scores for Pilot Test One of the Job Specifications Inventory (JSI)

N = 46 Resident Assistants and Supervisors

JSI Part	Coefficient Alpha	Standard Error
Skills	.966	.142
Content	.960	.174
Context	.929	.144
Relationships	.793	.129
Work Focus	.929	.142
Total JSI	.984	.163

Resident assistants showed a standard deviation of .883 and a standard error of the mean of .163, yielding a projected sample size of 113 respondents per occupation. Office services specialists were analyzed from three perspectives. Incumbents showed a higher coefficient alpha (.983) than supervisors (.966), suggesting a more reliable response to the JSI. Based on incumbents' scores (σ = .906; Em =.234), sample size was estimated at 58 per occupation. Supervisor scores (σ = .542; Em = .124) yielded a sample requirement of 73 cases per occupation. When incumbent and supervisor scores were combined (σ = .704; Em = .117), the sample size estimate rose to 140 observations, suggesting that incumbents gave more reliable results than supervisors.

Based on the above estimates, a conservative strategy was adopted to target 140 incumbents per occupation. Convenience sampling was used to gather observations since

Table 2

Cronbach's Coefficient Alpha and Standard Error of the Mean Scores for Pilot Test Two of the Job Specifications Inventory (JSI) for Office Service Specialists

N = 25 Incumbents (Incumb.)
22 Supervisors
47 Combined Scores (Comb.)

	Coefficient Alpha			Standard Error		
JSI Parts	Incumb.	Supv.	Comb.	Incumb.	Supv.	Comb.
Skills	.971	.966	.967	.256	.181	.148
Content	.927	.901	.916	.186	.134	.110
Context	.958	.942	.951	.246	.135	.128
Relationships	.853	.813	.844	.250	.226	.168
Work Focus	.919	.911	.978	.256	.232	.170
Total JSI	.983	.966	.978	.234	.124	.117

this study did not involve experimental hypotheses. As Anderberg noted, since cluster analysis was not usually used to test hypotheses, randomization was not important.[13]

Testing Requirements

Cascio recommended using cluster analysis and discriminant analysis as job analysis testing procedures.[14] Cluster analysis determines if naturally occurring groups exist in a set of data, while discriminant analysis tests the strength of the differences between and among groups.

Cluster analysis is a logical procedure for objectively grouping together entities

based on their similarities and differences. It was derived from Tyron's work in the 1930s which showed that the general properties of objects can be discovered by an objective clustering of their variables without suggesting causative underlying dynamics.[3] It grew from factor analysis to oppose the assumption of underlying causative factors. "The purpose of cluster analysis is to place objects into groups or clusters suggested by the data, not defined a priori, such that objects in a given cluster tend to be similar to each other, and objects in different cluster tend to be dissimilar."[16]

Also known as segmentation analysis and taxonomy analysis, cluster analysis refers to many methods that calculate distances among and between variables.[17] The distance calculation, based on Euclidean geometry, attempts to find clusters of variables or objects that show small within group variation but large between group variation. Differences between the resulting clusters can be understood by comparing the mean values on the input variables.[18]

Kachigan noted two key problems in using cluster analysis: 1) obtaining a measure of interobject similarity; and 2) specifying procedures for forming the clusters based on similarity measures.[19] Dozens of techniques are available, but selecting a particular one depends upon objectives that may include: finding a true typology; model fitting; prediction based on groups; hypothesis testing; data exploration; hypothesis generating; or data reduction.[20]

Similar to most job analysis research, this study used multiple a priori defined jobs in the sample. Prediction of group membership was the primary cluster analysis objective.

Everitt identified five major cluster analysis techniques:

1. hierarchical techniques that classify variables into groups to form a tree;

2. optimization-partitioning techniques that identify mutually exclusive clusters by optimizing a clustering criterion to form a partition of variables;

3. density or mode seeking techniques that form clusters by searching for regions containing relatively dense concentrations of variables;

4. clumping techniques that overlap variables into classes or clumps;

5. other methods that do not clearly fall within the above categories.[21]

Hierarchical, partitioning and density techniques can be used for job analysis. However, cluster analysis is complex and a closer inspection of cluster characteristics was appropriate before selecting a particular method.

Aldenderfer and Blashfield said that there was no standard definition of a cluster, but that clusters have definable properties.[22] Density refers to the relative thickness in the grouping of data points in a given space compared to other regions that have fewer or no data points. "Variance is the degree of dispersion of the points in this space from the center of the cluster."[23] However, since clusters do not necessarily represent multivariate normal populations, variance can be viewed as describing the relative closeness of data points to one another in the measurement space. Clusters are described as tight when data points are near the centroid and loose when dispersed from the centroid.[24] Dimension refers to the cluster's size or radius when the cluster forms hyperspheres or round shapes. "Separation is the degree to which clusters overlap or lie apart in the space."[25]

Everitt defined clusters as continuous regions of space containing a relatively high density of points separated from other clusters by regions of space containing a relatively low density of data points.[26] Accordingly, clusters may be characterized as having internal cohesion and external isolation. Clusters can take many shapes and may overlap.

Milligan and Cooper observed that there is no widely accepted statistical procedure for cluster analysis. No single cluster analysis procedure is optimal and many methods are available in routinely used statistical packages. All clustering techniques provide solutions whatever the actual structure present in the data. Therefore, determining the actual number of clusters could be a problem.[27] Recent research on the validity of various clustering methods generally showed that Ward's method gave significantly better recovery of data among the hierarchical methods, while the K-means procedure yielded the best performance among partitioning methods.[28]

Milligan and Cooper recommended using an external criterion not used in the clustering process to help validate cluster groups.[29] The external criterion can be either a variable or a partition of elements into groups. Partitions must be specified a priori or derived from clustering a separate data set. When variables are used, standard parametric statistics like analysis of variance may be used to test for significant differences.[30]

Unlike factor analysis which may require ten times as many subjects as variables,[31] cluster analysis requires no predetermined sample size. Since the JSI produced a mean score for each item, reducing the standard error of the mean was important. For random samples with normal distributions, a minimum of 30 subjects or

cases was recommended for approximating population characteristics.[32] However, due to the nature of this research, convenience sampling was used to obtain observations from different populations of jobs; therefore, assumptions about population normalcy were not made. Accordingly, the sample size for each job category was set above 30 to approximate population characteristics of the job family. Sample size was estimated by calculating the standard error of the mean of JSI pilot test data.

JSI clustering ability was assessed by discriminant analysis which evaluates group differences based on an index that separates groups.[33] Discriminant analysis is a procedure for identifying the boundaries between groups of objects. Boundaries are defined in terms of variables that discriminate the objects into their respective groups.[34] Weights are derived so that score variation between groups is as large as possible while score variation within groups is a small as possible so that the between-group and within-group variation ratio is maximized.[35] In discriminant analysis, group membership is the dependent variable. A statistically significant discriminant function implies that there is meaningful differentiation among groups on discriminant scores.[36] If the discriminant function is statistically significant, the interpretation can proceed.

Klecka observed that certain differentiating variables are used to discriminate between groups and that these variables must be measured at the interval or ratio level of measurement so that means and variances can be calculated.[37] There is no limit on the total number of discriminating variables that can be used providing that the total number of cases exceeds the number of variables by two.

Besides cluster and discriminant analyses, descriptive statistics were calculated for

each job. Job profiles were compiled from the importance ratings of 268 variables.

Field Test

The goal of the field test was to assess the ability of the JSI to accurately identify and differentiate job groups from a large data set. An assessment strategy was needed to accomplish this goal.

As noted above, Milligan and Cooper recommended the use of external and internal criteria to help validate cluster solutions. External criteria are variables not incorporated into the actual cluster analysis but used to confirm the accuracy of cluster results. Internal criteria are statistics that estimate the strength of the cluster solutions.

Holland's theory of vocational choice is a well researched and respected model for classifying people and jobs and was used as one external criterion.[38] Holland showed that both people and jobs can be classified as one of six types:

1. Realistic (R) are technical, skilled and labor occupations involving concrete and practical activity that uses machines, tools, and materials.

2. Investigative (I) are scientific occupations involving analytical or intellectual activity used in problem solving, trouble shooting, or the creation of new knowledge.

3. Artistic (A) are creative occupations in the arts such as music, writing, sculpture, performance, or other unstructured and intellectual activity.

4. Social (S) are occupations that involve working with people in a helpful or facilitative way.

5. Enterprising (E) are occupations that involve working with people in a

supervisory or persuasive way to achieve organizational goals.

6. Conventional (C) are office or clerical occupations that involve working with things, numbers or machines to meet the predictable needs of an organization.[39]

Holland believed that behavior is determined by an interaction between personality and environment. The relationship among and between types of people and work environments can be ordered according to a hexagonal model that shows that the distances between types are inversely proportional to the theoretical relationship between them.[40] Relationships are defined and organized by a single geometric model with an RIASEC sequence of types.

Holland's model has received considerable support. Factor analytic studies of Holland's theory with the classification model used in the U.S. Department of Labor's Dictionary of Occupational Titles and with McCormick's Position Analysis Questionnaire showed that the model taps objective, situational data about jobs, including occupational demands, work activities, work tasks, general training requirements, and rewards.[41] Such research provided the foundation for classifying occupations according to Holland's RIASEC codes. The most comprehensive Holland occupational classification reference available was the Dictionary of Holland Occupational Codes by Gottfredson, Holland and Ogawa, which cross referenced the RIASEC codes with over 12,000 occupations.[42] The purpose of this classification was to organize occupations into homogeneous groups. Evidence of the usefulness of this classification system seemed extensive and positive.[43]

Six job families were selected for job analysis based on their Holland codes:

1. accountant - RCS;

2. civil engineer - ISR;
3. personnel manager - AES;
4. elementary school teacher - SEC;
5. insurance sales agent - ESR;
6. secretary - CSE.

These jobs represented six different primary codes and should have provided a fair test of the JSI.

Holland's model provided a theoretical and empirical basis for helping to confirm job clusters. Holland's work was based on assessment of people, not jobs. His job classification scheme is a theory of personality based on interests and preferences decided by scores on interest inventories. Interests tap an affective domain. In contrast, Miller's taxonomy is idiographic by being derived clinically from individual behavior. Differences in the type and source of data generated by each model could have posed a problem in interpreting cluster results. Therefore, a second external criterion was used.

The American College Testing Program (ACT) developed an occupational classification system (OCS) based on U.S. Department of Labor (DOL) data for 12,099 occupations. The ACT model was based on DOL job analyses conducted for the fourth edition of the Dictionary of Occupational Titles (DOT). Over 75,000 on-site job analyses from diverse businesses provided the information for the DOT. For jobs that were unable to be observed, professional and trade associations provided the needed information. Job analyses followed standardized and well-documented procedures and rating scales outlined in the DOL Handbook for Analyzing Jobs; they included worker

and supervisor interviews. DOL job analyses focused on work tasks and the behaviors required for performing the tasks.[44]

DOT ratings assessed data, people and thing tasks. Prediger refined this task rating model by deriving idea work tasks from a careful analysis of data tasks.[45] Prediger suggested that "data, ideas, people and thing work tasks form poles of two foundational dimensions of interests and work - data vs. ideas, and things vs. people."[46] He translated 100 DOL work task categories into combinations of data-idea and people-thing ratings for all 12,099 occupations. He also rated worker activity preferences (interests) and worker functions (level of task importance).[47] Prediger combined the four work task summary scores to form two bipolar dimensions--data/ideas and things/people.[48] His bipolar model allowed each of the 12,099 occupations and the 559 DOT occupational groups to be scored and then plotted on an axis that mapped their positions.

Prediger defined work tasks as follows:

Data (facts, records, numbers, systematic procedures) involve impersonal processes such as recording, verifying, transmitting, and organizing facts or information representing goods and services.

Ideas (abstractions, theories, knowledge, insights, and new ways of expressing something with words, equations or music) involve intrapersonal processes such as creating, discovering, interpreting, and synthesizing abstractions or implementing applications of abstractions.

People (no alternative terms) involve interpersonal processes such as helping,

informing, serving, persuading, entertaining, motivating, directing or, producing a change in human behavior.

Things (machines, mechanisms, materials, tools, physical and biological processes) involve nonpersonal processes such as producing, transporting, servicing and repairing.[49]

"Occupations having high involvement with data (e.g., accounting, air traffic control, office management) tend to have low involvement with ideas. Conversely, occupations having high involvement with ideas (e.g., creative writing, social psychology, biological research) tend to have low involvement with data. Similarly, occupations with high people involvement tend to have low things involvement, and vice versa."[50]

Prediger used the data/ideas and people/things model to identify 23 job families that were relatively homogeneous vis-a-vis the nature of work and work settings.[51] The ACT job families were cross indexed to the Occupational Outlook Handbook (DOL 1980), the Guide for Occupational Exploration (DOL 1979), and Holland's typology.[52]

Prediger developed a World-of-Work map based on the ACT-OCS research. The ACT World-of-Work map suggested that four of the targeted jobs in this study--insurance sales agent, personnel manager, secretary and accountant--belong to job families that are plotted near each other. To strengthen external validation, an additional occupation was included in the JSI field test. Musician covered the creative/performing arts job family and was located on the World-of-Work map at a maximum distance from accountant. This additional occupation contributed to a more rigorous field test.

Research Questions

The primary research question this study addressed was whether the JSI was reliable and accurate in analyzing jobs. To test this question, several operations were required. First, the reliability of the JSI was estimated. Second, the ability of the JSI to identify a priori defined jobs from a large dataset was tested. Third, the strength of the JSI job groupings was assessed. Additionally, the JSI's ability in profiling important job elements was qualitatively evaluated for use in human resource applications.

Related research questions are listed below along with testing strategies.

1. The JSI displays internal reliability.

This question was investigated during the pilot tests by examining coefficient alpha estimates for two job groups. During the field test, coefficient alpha was also calculated for seven job groups.

2. The JSI accurately identifies similarities among seven a priori defined jobs in a large data set at the level of five job element categories and the total job.

Ward's cluster analysis method was calculated from the dataset to test for a seven-group solution for six sets of data: skills, content, context, relations, focus, and total job. Each cluster solution was evaluated against the frequency and percentage of the a priori defined occupational groups.

3. The JSI accurately differentiates between and among cluster solutions.

This research question was tested with discriminant analysis to indicate the strength of differentiation in the cluster solutions. If the JSI showed differentiating ability, post hoc analysis would be used to test the JSI further.

The next set of research questions pertain to discriminant analysis results.

4. The pairs of job groups with the strongest degrees of differentiation according to Holland's model are: accountant and elementary teacher; personnel manager and secretary; insurance agent and civil engineer.

5. The pairs of job groups with the strongest degree of differentiation according to ACT's occupational classification system are: accountant and instrumental musician; and insurance agent and civil engineer.

6. The job groups with the weakest degree of differentiation according to ACT's occupational classification system are insurance agent, personnel manager and secretary.

The final research question was qualitative and required subjective interpretation.

7. The JSI identifies important job specifications that can be used to a) describe a job profile that has face validity and b) has utility for human resource applications based on behavioral consistency methods.

Descriptive statistics were calculated to identify the comparative importance of elements by estimating JSI item means, standard deviations, and frequencies. The profile was evaluated qualitatively for its utility for human resource applications by using highly rated items to create job profiles.

Data Collection and Analysis

The steps for conducting the pilot tests included the following:

1. administered the JSI to resident assistant SMEs;

2. collected and organized data;

3. using SAS, calculated means, standard deviations, standard error of the mean, frequencies and coefficient alpha;

4. estimated sample size required for the field test;

5. evaluated and revised JSI items;

6. administered the JSI to office service specialist SMEs;

7. collected and organized data;

8. using SAS, calculated item means, standard deviations, standard error of the means, frequency tables, coefficient alphas and sample sizes estimates.

The field test followed similar logic and included these specific steps:

1. targeted seven job samples and administered the JSI;

2. collected and organized data;

3. using SAS, calculated means, standard deviations, standard errors, frequency tables, and coefficient alphas on each targeted job;

4. using SAS, performed cluster analyses using Ward's method on the total data set on six JSI levels--skills, content, situation, relations, results and total job;

5. conducted discriminant analyses on the obtained cluster solutions from Ward's method to test the strength of the groupings;

7. evaluated discriminant analysis results according to Holland's model and ACT's occupational classification system.

8. evaluated JSI structure through factor analysis;

9. analyzed sources of variance across occupations, clusters, JSI parts and JSI

factors;

10. inspected JSI occupational profiles for face validity.

Possible Problems and Limitations

Several possible problems and limitations were acknowledged. First, the JSI might not have shown acceptable reliability. To minimize this possibility, reliability was tested in two stages during pilot testing to provide an opportunity to analyze items and make revisions if necessary. This two-stage approach provided a reasonable safeguard.

Another issue could have been cluster overlap. Many occupations have similar tasks, share generic characteristics and overlap in significant ways. Since only white collar jobs were included in this study, restriction in range of scores could have occurred, producing undifferentiated cluster results. To minimize this possibility, two external criteria were used to select occupations based on their differences. Holland's occupational codes and the ACT occupational classification system were used to provide balanced coverage of the occupational spectrum.

Next, job incumbents could over estimate the importance of specifications. Self-assessment ratings of personal abilities tend to be inflated. Similarly, if jobs were viewed as psychological extensions of personality, job analysis ratings by incumbents could suffer from distortion effects. If adequate numbers were available, comparison of incumbent and supervisor ratings could address this issue. Unfortunately, this was not possible since the field test targeted incumbents. However, internal reliability estimates from the pilot tests suggested that incumbents were more reliable in rating job

specifications than supervisors.

Finally, random sampling of organizations, jobs and SMEs was not feasible. Convenience sampling was used to solicit SMEs for each targeted job. This strategy is not unusual in occupational research. While randomization assumptions were not met in this study, sample sizes beyond the minimum number of thirty observations per group supported normalcy assumptions. Additionally, the seven occupations probably approximated a normal multivariate population since they represented different regions in Holland's and ACT's classification systems.

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CHAPTER FOUR

RESULTS

This chapter presents the results of the field test of the Job Specifications Inventory. First, data collection procedures and respondent characteristics are reviewed, and then the results of statistical tests are examined. A discussion of research questions concludes the chapter.

Data Collection Procedures

Data collection procedures varied by occupation and by the participating organization's requirements. In all cases, a cover letter (shown in Appendix A with the inventory) accompanied each instrument. The letter described the purpose of the research, gave instructions and encouraged participation. For personnel managers and for members of the Naval Civil Engineering Corps, a one-shot direct mail strategy was used; otherwise, site coordinators in each organization distributed and collected the instruments. Data collection spanned ten months, from November 1991 to September 1992. Targeted respondents were job incumbents. A list of participating organizations is presented in Appendix B.

Respondents

Elementary teachers were surveyed with the approval of their school principals. Either the principal or a designee served as site coordinator in distributing and collecting the instruments. Both public and private schools participated. A formal proposal outlining the research was submitted to the participating public school district to gain approval to access the teachers.

Secretaries were surveyed in two ways. University secretaries were contacted directly through campus mail; all others were asked to complete the JSI by the participating organizations' site coordinators.

Personnel managers were contacted directly by mail with a JSI packet that included a stamped return envelope. Multiple directories and computer databases were used to identify prospective respondents. Over 880 personnel managers were contacted nationwide, with most in the middle Atlantic and southern regions. They represented a wide range of industries and work settings, including high technology, higher education, hospitals, hotels, insurance, manufacturing, publishing, retail and wholesale, large restaurants, and food processors.

Instrumental musicians were surveyed by site coordinators in one symphony orchestra and three military bands. Similarly, insurance sales agents were contacted by site coordinators, usually the general agent, in regional offices of national organizations.

Certified public accountants at the staff level were given the JSI by site coordinators in regional offices of large national firms and in larger local firms. To enhance participation, this group was surveyed partially before the fall tax season and

partially after tax season in the late spring.

Civil engineers received the JSI through direct mail and site coordinators. Approximately 160 JSIs were mailed to civil engineers worldwide in the Navy Civil Engineer Corps; all other civil engineers received the JSI from site coordinators.

Return Rates and Respondent Information

A total of 614 usable JSIs was collected for analysis by occupation as follows: 57 accountants (9.2% return rate); 76 civil engineers (35% return rate); 49 insurance agents (23.3% return rate); 87 musicians (38% return rate); 133 personnel managers (15.1% return rate); 59 secretaries (28% return rate); and 153 elementary teachers (34% return rate). Respondents took an average of 23 to 31 minutes to complete the JSI, and were 36.7 years old. They held their current jobs for 5 years and 8 months and were equally divided between males and females. Their relationships to the targeted jobs included 80% incumbents, 8% supervisors, 5% former incumbents, 2.5% subordinates, and 1.8% knowledgeable colleagues.

On average, raters had 15.9 years of formal education and reported the following educational attainment levels: 11% high school graduates; 2% trade school graduates; 6% junior or community college graduates; 55% college or university graduates; 23% with graduate degrees; and 2% with professional degrees. The ethnic composition of the respondents was 87% caucasian, 8.5% Afro-American, 1.5% Hispanic, 1.3% Asian or Pacific Islander, and 1.6% in other groups.

When asked to rate the relative importance of the component parts of the JSI by

assigning portions adding to 100%, the respondents gave the following estimates: Part One: Skills = 29.3%; Part Two: Job Content = 16.0%; Part Three: Job Context = 13.1%; Part Four: Relationship = 22.4%; and Part Five: Work Focus = 22.2%.

The highest rated JSI variables for the seven occupational groups were summarized as job specification profiles and are presented in Appendix C.

Statistical Analyses

The results of the study are organized by type of analysis. Discussions of procedures and results are presented for reliability evaluation, cluster analysis, discriminant analysis, factor analysis, and analysis of variance. Supplemental statistical tables are located in Appendix D.

Reliability Evaluation:

In addition to the reliability estimates obtained for two pilot tests, Cronbach's coefficient alpha was calculated for the seven occupations in the field test using the SAS computer program. All 614 usable JSIs were included in these tabulations. Frequencies, means, and standard deviations were calculated for 268 JSI variables. Cronbach's coefficient alpha was calculated for the entire JSI and for each part of the JSI by occupation.

The JSI attained acceptable reliability estimates across all seven occupations, ranging from .965 to .985 for the total instrument. The secretary group recorded the lowest coefficient at .965, followed by personnel managers at .972. The five other

occupational groups scored above .98. JSI Parts One, Two and Three (variables 1 to 232) attained coefficient scores above .91. Scores fell for Part Four, the relationship variables, ranging from .72 to .87, and for Part Five, work focus variables, from .87 to .93. Results are summarized in Table 3.

As noted in Chapter Three, Cronbach's alpha is closely related to reliability estimates based on the split-half method and is used when such methods are not feasible. Carmines and Zeller said that Cronbach's alpha is a conservative estimate of an instrument's reliability in most situations.[1] They suggested that a .80 reliability estimate is an acceptable value for most instruments. Given this guideline, it was reasonable to conclude that the JSI displayed acceptable reliability for its intended purpose. However, caution is advised when using Part Four of the JSI since its reliability estimates generally hovered in the .80 range, with the civil engineer group ($r = .72$) dropping below the recommended value.

Cluster Analysis:

Ward's minimum variance method was applied to the entire data set of 614 observations at six levels of analysis using the SAS system.[2] Ward's method was applied first to the JSI's 268 variables, followed by the five component parts of the JSI. A total of 451 JSIs was included in the cluster analysis because Ward's method only uses complete observations. Inventories with missing data were excluded. The pseudo t fusion coefficient indicated the most likely cluster solution by showing significant jumps in the fusion coefficient score as a sign of cluster formation. The solution number before

Table 3

Cronbach's Coefficient Alpha Scores (Raw/Standardized) for Seven Occupations on the Job Specifications Inventory and its Component Parts

JSI Parts (Variables)	CE (76)	MUS (87)	TCH (153)	CPA (57)	ISA (49)	PM (135)	SEC (59)
1. Skills	.956	.956	.949	.959	.961	.946	.959
(1-83)	.958	.957	.951	.957	.962	.950	.958
2. Content	.956	.945	.956	.932	.943	.916	.923
(84-145)	.957	.944	.956	.939	.950	.910	NA
3. Context	.950	.961	.961	.952	.967	.924	.917
(146-232)	.953	.962	.962	.953	.958	.926	.917
4. Relationship	.721	.831	.814	.838	.863	.806	.879
(233-245)	.720	.832	.804	.828	.849	.801	.873
5. Focus	.903	.919	.891	.899	.894	.877	.936
(246-269)	.902	.922	.898	.889	.988	.880	.935
6. Total JSI	.984	.985	.983	.982	.985	.972	.965
(1-268)	.984	.985	.983	.982	.986	.973	NA

Note: Occupational abbreviations are as follows: CE = civil engineer; MUS = instrumental musician; TCH = elementary teacher; CPA = certified public accountant; IA = insurance sales agent; PM = personnel manager; SEC = secretary. Parenthesized numbers below occupational abbreviations refer to sample size.

a significant jump tended to be the optional cluster solution. Table 4 presents the cluster analysis results with summary statistics for 268 JSI variables for the last 25 cluster solutions. The pseudo t coefficient gave a clear indication that seven clusters was the optimal solution.

Table 4

Cluster Analysis Summary for Ward's Method Based on 268 JSI Variables

No. of Clusters	New Cluster	Semipartial R-Squared	R-Squared	Expected R-Squared	Pseudo F	Pseudo t
25	53	.0041	.3949	.3874	11.59	3.47
24	13	.0042	.3907	.3832	11.90	1.74
23	8	.0045	.3774	.3789	12.25	1.47
22	27	.0044	.3819	.3744	12.63	3.45
21	57	.0045	.3774	.3699	13.04	3.90
20	22	.0046	.3728	.3652	13.49	2.76
19	42	.0050	.3678	.3604	13.96	3.28
18	38	.0052	.3626	.3554	14.49	2.75
17	23	.0053	.3573	.3502	15.08	2.58
16	48	.0054	.3519	.3448	15.75	4.35
15	44	.0059	.3459	.3392	16.47	4.05
14	43	.0065	.3394	.3333	17.28	5.10
13	70	.0066	.3329	.3271	18.21	5.32
12	51	.0081	.3247	.3205	19.19	4.43
11	60	.0096	.3151	.3135	20.25	5.97
10	71	.0104	.3047	.3059	21.47	8.40
9	83	.0106	.2941	.2976	23.02	5.67
8	97	.0112	.2829	.2883	24.96	5.69
7	59	.0143	.2685	.2779	27.17	**6.77**
6	80	.0179	.2506	.2657	29.76	12.43
5	144	.0191	.2315	.2510	33.58	14.41
4	151	.0292	.2021	.2321	37.76	19.26
3	156	.0402	.1619	.2059	43.29	18.52
2	300	.0535	.1084	.1560	54.62	27.38
1	451	.1084	.0000	.0000	NA	54.62

Ward's method created a covariance matrix of variables and observations, then began joining observations at 450 clusters and ended with one cluster that contained all 451 observations. While Ward's method suggested that seven clusters existed in the data set, it indicated little about the actual structure of those clusters. This is an inherent characteristic of cluster analysis.

Frequency tables with classification criteria were used to interpret cluster results. Table 5 shows how the seven occupations were sorted by cluster. As Table 5 suggests, four occupations appeared with relative independence in clusters 2, 3, 4, 5 and 7; however, there was considerable occupational overlap in clusters 1 and 6.

Cluster 1 showed overlap with business-related occupations in the following descending order of frequency: personnel managers (32), insurance agents (25), accountants (9) and secretaries (6). Cluster 2 was dominated by teachers (56) with some overlap with engineers (7) and musicians (5). Personnel managers (65) clearly grouped in Cluster 3, with some overlap with musicians (5). Cluster 4 belonged to civil engineers with no overlap. Teachers (36) occupied Cluster 5 with musicians (5). Cluster 6 showed significant overlap among accountants (36), secretaries (28), engineers (18), and insurance agents (13). Finally, Cluster 7 had musicians (58) with no overlap.

Cluster analysis finds similarity among groups which may help to explain the occupational overlap. Apparently, the overlapping business-related groups shared similar respondent ratings on certain characteristics. Also, the accountants, engineers, insurance agents and secretaries in Cluster 6 shared similar ratings on other characteristics. However, the splitting of teachers into Clusters 2 and 5 with little overlap was not

Table 5

Frequencies of Cluster by Occupation Results Based on 268 JSI Variables

C#	CPA	CE	IA	MUS	PM	SEC	TCH	Total
1	9. 2.00 12.16 19.15	1.00 0.22 1.35 1.56	25. 5.54 33.78 59.52	0. 0.00 0.00 0.00	32. 7.10 43.24 32.00	6. 1.33 43.24 32.00	1. 0.22 1.69 1.0	74. 16.41
2	1. 0.22 1.41 2.13	7 1.55 9.86 10.94	2. 0.44 2.82 4.76	5. 1.11 7.04 7.35	0. 0.00 0.00 0.00	0. 0.00 0.00 0.00	56. 12.42 78.87 58.95	71. 15.74
3	1. 0.22 1.43 2.13	1. 0.22 2.27 1.56	2. 0.44 2.86 4.76	0. 0.00 0.00 0.00	65. 14.41 92.86 65.00	1. 0.22 1.43 2.86	0. 0.00 0.00 0.00	70. 15.52
4	0. 0.00 0.00 0.00	36. 7.98 100.00 56.25	0. 0.00 0.00 0.00	0. 0.00 0.00 0.00	0. 0.00 0.00 0.00	0. 0.00 0.00 0.00	0. 0.00 0.00 0.00	36. 7.98
5	0. 0.00 0.00 0.00	1. 0.22 2.27 1.56	0. 0.00 0.00 0.00	5. 1.11 7.04 7.35	2.0 0.44 4.55 2.00	0. 0.00 0.00 0.00	36. 7.98 81.82 58.95	44. 9.76
6	36. 7.98 37.11 76.60	18. 3.99 18.56 28.13	13. 2.88 13.40 30.95	0.00 0.00 0.00 0.00	1. 0.22 1.03 1.00	28. 6.21 28.87 80.00	1. 0.22 1.35 1.05	97. 21.51
7	0. 0.00 0.00 0.00	0. 0.00 0.00 0.00	0. 0.00 0.00 0.00	58. 12.86 98.31 85.29	0. 0.00 0.00 0.00	0. 0.00 0.00 0.00	0. 0.00 0.00 0.00	59 13.08
T = %	47. 10.42	64. 14.19	42. 9.31	68. 15.08	100. 22.17	35. 7.76	95. 21.06	451. 100.00

Note: Frequency missing = 163. Each cell lists in order the frequency, percent, row percent and column percent. Occupational abbreviations are: CPA = certified public accountant; CE = civil engineer; IA = insurance agent; MUS = musician; PM= personnel manager; SEC = secretary; TCH = elementary teacher. C# = cluster.

explainable by the cluster analysis data.

Each JSI part was cluster analyzed. The pseudo t fusion coefficients (t) for each JSI part are displayed in Table 6. Skills (t = 8.92) and job content (t = 9.18) indicated that seven cluster solutions were optimal, while job context (t = 6.48), relationships (t = 13.49) and work focus (t = 12.88) variables pointed toward six cluster solutions. Variability increased when JSI parts were used to analyze cluster solutions, as seen in Tables 7 to 11 which provide frequencies of clusters by occupations.

As presented in Table 7, only Cluster 6 with 62 musicians did not show overlap in skills with other groups. Cluster 1 included 65 teachers with minor overlap in skills with all other occupations. In Cluster 2, teachers (45) grouped primarily with personnel managers (18) and somewhat with all other occupations. Cluster 3 was dominated by engineers (44) and personnel managers (31). Cluster 4 had the most extensive overlap with personnel managers (64), insurance agents (24), accountants (17) and engineers (14) sharing similar ratings on skills. Secretaries (31) and accountants (12) shared Cluster 5. Finally, Cluster 7 had significant overlap among all occupations except teachers.

From Table 7, it appears that teachers and personnel managers rated some skills similarly but that personnel managers also shared skill ratings with engineers, accountants and insurance agents. Secretaries and accountants clearly overlapped in their skill ratings, while musicians showed the least skill overlap with other occupations.

Job content variables in Table 8 show five relatively independent clusters and two clusters with substantial overlap. Cluster 1 was dominated by personnel managers (55) with content overlap with insurance agents (13). In Clusters 2 and 3, teachers stood

Table 6

Pseudo t Fusion Coefficients for Ward's Method for the JSI Parts and Total Inventory.

No. of Clusters	Part 1: Abilities	Part 2: Content	Part 3: Context	Part 4: Relations	Part 5: Focus	Total JSI
15	7.92	5.96	2.76	10.17	5.32	4.05
14	5.00	3.58	5.18	12.41	5.95	5.10
13	4.02	6.27	5.26	14.47	9.51	5.32
12	15.04	10.89	5.89	7.69	17.67	4.43
11	11.47	13.68	4.03	11.17	12.17	5.97
10	7.16	8.42	9.43	15.66	4.99	8.40
9	11.28	9.29	7.93	12.48	8.98	5.67
8	14.62	9.57	11.55	11.30	15.51	5.69
7	**8.92**	**9.18**	8.39	18.78	13.02	**6.77**
6	17.34	18.26	**6.48**	**13.49**	**12.88**	12.43
5	11.81	43.19	14.26	29.80	31.68	14.41
4	29.47	37.52	9.92	37.89	18.49	19.26
3	35.99	48.09	21.51	27.14	62.81	18.52
2	44.56	54.65	14.57	54.30	54.31	27.38
1	81.96	165.56	63.15	172.68	180.57	54.62

Note: Number preceding a large jump in the fusion coefficient suggests the optimal cluster solution.

apart from the other occupations with only slight content overlap. Clusters 4 and 5 showed similar content overlap by accountants, secretaries, personnel managers and insurance agents. Apparently, the respondents in these business-related occupations rated JSI content variables similarly. Engineers in Cluster 6 and musicians in Cluster 7 rated

Table 7

Frequencies of Cluster by Occupation for JSI Part One: Abilities and Skills

C#	CPA	CE	IA	MUS	PM	SEC	TCH	Total
1	2. 0.36 2.41 3.64	4. 0.72 4.82 5.48	3. 0.54 3.61 6.25	5. 0.90 6.02 6.33	2. 0.36 2.41 1.65	2. 0.36 2.41 3.85	65. 11.67 78.31 50.39	83. 14.90
2	4. 0.72 4.71 7.27	5. 0.90 5.88 6.85	8. 1.44 9.41 16.67	1. 0.18 1.18 1.27	18. 3.23 21.18 14.88	4. 0.72 4.71 7.69	45. 8.08 52.94 34.88	85. 15.26
3	6. 1.08 6.74 10.91	44. 7.90 49.44 60.27	3. 0.54 3.37 6.25	0. 0.00 0.00 0.00	31. 5.57 34.83 25.62	2. 0.36 2.25 3.85	3. 0.54 3.37 2.33	89. 15.98
4	17. 3.05 12.59 30.91	14. 2.51 10.37 19.18	24. 4.31 17.78 50.00	2. 0.36 1.48 2.53	64. 11.49 47.41 52.89	2. 0.36 1.48 3.85	12. 2.15 8.89 9.30	135. 24.24
5	12. 2.15 23.53 21.82	1. 0.18 1.96 1.37	1. 0.18 1.96 2.08	0. 0.00 0.00 0.00	2. 0.36 3.92 1.65	31. 5.57 60.78 59.62	4. 0.72 7.84 3.10	51. 9.16
6	0. 0.00 0.00 0.00	0. 0.00 0.00 0.00	0. 0.00 0.00 0.00	62. 11.13 100.00 78.48	0. 0.00 0.00 0.00	0. 0.00 0.00 0.00	0. 0.00 0.00 0.00	62. 11.13
7	14. 2.51 26.92 25.45	5. 0.90 9.62 6.85	9. 1.62 17.31 18.75	9. 1.62 17.31 18.75	4. 0.72 7.69 3.31	11. 1.97 21.15 21.15	0. 0.00 0.00 0.00	52. 9.34
Total %	55. 9.87	73. 13.11	48. 8.62	79. 14.18	121. 21.72	52. 9.34	129. 23.16	557. 100.00

Note: Frequency missing = 57. Each cell lists in order the frequency, percent, row percent and column percent. Occupational abbreviations are as follows: CPA = certified public accountant; CE = civil engineer; IA = insurance agent; MUS = musician; PM= personnel manager; SEC = secretary; TCH = elementary teacher.
C# = cluster number.

Table 8

Frequencies of Cluster by Occupation for JSI Part Two: Job Content

C#	CPA	CE	IA	MUS	PM	SEC	TCH	Total
1	1. 0.18 1.33 1.92	2. 0.36 2.67 2.70	13. 2.37 17.33 27.66	0. 0.00 0.00 0.00	55. 10.04 73.33 47.41	4. 0.73 5.33 8.00	0. 0.00 0.00 0.00	75. 13.69
2	0. 0.00 0.00 0.00	7. 1.28 7.78 9.46	0. 0.00 0.00 0.00	2. 0.36 2.22 2.47	0. 0.00 0.00 0.00	0. 0.00 0.00 0.00	80. 14.60 88.89 62.50	90. 16.42
3	0. 0.00 0.00 0.00	0. 0.00 0.00 0.00	0. 0.00 0.00 0.00	2. 0.36 4.35 2.47	1. 0.18 2.17 0.86	0. 0.00 0.00 0.00	43. 7.85 93.48 33.59	46. 8.39
4	32. 5.84 37.65 61.54	4. 0.73 4.71 5.41	10. 1.82 11.76 21.28	0. 0.00 0.00 0.00	14. 2.55 16.47 12.07	25. 4.56 29.41 50.00	0. 0.00 0.00 0.00	85. 15.51
5	19. 3.47 16.81 36.54	3. 0.55 2.65 4.05	21. 3.83 18.58 44.68	2. 0.36 1.77 2.47	46. 8.39 40.71 39.66	20. 3.65 17.70 40.00	2. 0.36 1.77 1.56	113. 20.62
6	0. 0.00 0.00 0.00	58. 10.58 85.29 78.38	2. 0.36 2.94 4.26	7. 1.28 10.29 8.64	0. 0.00 0.00 0.00	1. 0.18 1.47 2.00	0. 0.00 0.00 0.00	68. 12.41
7	0. 0.00 0.00 0.00	0. 0.00 0.00 0.00	0. 0.00 0.00 0.00	68. 12.41 95.77 83.95	0. 0.00 0.00 0.00	0. 0.00 0.00 0.00	3. 0.55 4.23 2.34	71. 12.96
Total %	52. 9.49	74. 13.50	46. 8.58	81. 14.78	116. 21.17	50. 9.12	128 23.36	548 100.

Note: Frequency Missing = 66. Each cell lists in order the frequency, percent, row percent and column percent. Occupational abbreviations are as follows: CPA = certified public accountant; CE = civil engineer; IA = insurance agent; MUS = musician; PM= personnel manager; SEC = secretary; TCH = elementary teacher.
C# = cluster number.

content variables differently than respondents in the other occupations.

Accountants rated job content variables similarly to other business-related occupations and occupied only Clusters 4 and 5. Civil engineers differentiated their content variables clearly by showing little overlap and dominance in one cluster. Insurance agents appeared in three clusters and overlapped their content ratings primarily with other business-related respondents. Musicians overlapped with all groups in four clusters but clearly differentiated their content ratings in Cluster 7. Personnel managers shared three clusters primarily with the other business raters. Secretaries placed their content ratings into two clusters shared with the other three business groups. Finally, teachers rated content variables differently than other occupational groups and occupied two clusters independently of other raters.

Job context variables showed extensive overlap among occupations with few clear patterns emerging. As seen in Table 9, only Clusters 4, 5 and 7 showed clear job context differentiation. In Cluster 4, musicians and teachers showed similar context ratings, while insurance agents in Cluster 5 and musicians in Cluster 7 were relatively independent of other groups. Musicians had content ratings in six clusters and showed less differentiation on context variables than on skill and job content variables.

There were fewer relationship variables than other JSI variables. This might account for the undifferentiated results seen in Table 10. The clearest relationship pattern was in Cluster 3 with personnel managers. Otherwise, examination of occupational groupings suggested that all respondents clearly differentiated three or four relationship styles as having significance for their occupations.

Table 9

Frequencies of Cluster by Occupation for JSI Part Three: Job Context

C#	CPA	CE	IA	MUS	PM	SEC	TCH	Total
1	1. 0.19 2.08 1.85	4. 0.75 8.33 5.71	7. 1.32 14.58 15.56	4. 0.75 8.33 5.00	12. 2.26 25.00 10.34	0. 0.00 0.00 0.00	20. 3.77 41.67 16.81	48. 9.04
2	17. 3.20 9.19 31.48	19. 3.58 10.27 27.14	3. 0.56 1.62 6.67	25. 4.71 13.51 31.25	62. 11.68 33.51 53.45	7. 1.32 3.78 14.89	52. 9.79 28.11 43.70	185. 34.84
3	34. 6.40 27.42 62.96	37. 6.97 29.84 52.86	1. 0.19 0.18 2.22	2. 0.38 1.61 2.50	35. 6.59 28.23 30.17	8. 1.51 6.45 17.02	7. 1.32 5.65 5.88	124. 23.35
4	0. 0.00 0.00 0.00	3. 0.56 3.90 4.29	0. 0.00 0.00 0.00	35. 6.59 45.45 43.75	0. 0.00 0.00 0.00	2. 0.38 2.60 4.26	37. 6.97 48.05 31.09	77. 14.50
5	0. 0.00 0.00 0.00	0. 0.00 0.00 0.00	31. 5.84 93.94 68.89	0. 0.00 0.00 0.00	1. 0.19 3.03 0.86	0. 0.00 0.00 0.00	1. 0.19 3.03 0.84	33. 6.21
6	1. 0.19 2.08 1.85	7. 1.32 14.58 10.00	3. 0.56 6.25 6.67	2. 0.38 4.17 2.50	6. 1.13 12.50 5.17	28. 5.27 58.33 59.57	1. 0.19 2.08 0.84	48. 9.04
7	1. 0.19 6.25 1.85	0. 0.00 0.00 0.00	0. 0.00 0.00 0.00	12. 2.26 75.00 15.00	0. 0.00 0.00 0.00	2. 0.38 12.50 4.26	1. 0.19 6.25 0.84	16. 3.01
Total %	54. 10.17	70. 13.18	45. 8.47	80. 15.07	116. 21.85	47. 8.85	119. 22.41	531. 100.

Note: Frequency missing = 83. Each cell lists in order the frequency, percent, row percent and column percent. Occupational abbreviations are as follows: CPA = certified public accountant; CE = civil engineer; IA = insurance agent; MUS = musician; PM= personnel manager; SEC = secretary; TCH = elementary teacher.
C# = cluster number.

Table 10

Frequencies of Cluster by Occupation for JSI Part Four: Relationships

C#	CPA	CE	IA	MUS	PM	SEC	TCH	Total
1	7. 1.16 13.46 12.50	3. 0.50 5.77 3.95	13. 2.15 25.00 26.53	5. 0.83 9.62 5.75	2. 0.33 3.85 1.54	18. 2.98 34.62 32.14	4. 0.66 7.69 2.65	52. 8.60
2	2. 0.33 4.35 3.57	3. 0.50 6.52 3.95	3. 0.50 6.52 6.12	7. 1.16 15.22 8.05	12. 1.98 26.09 9.23	4. 0.66 8.70 7.14	15. 2.48 32.61 9.93	46. 7.60
3	0. 0.00 0.00 0.00	1. 0.17 3.33 1.32	1. 0.17 3.33 1.32	2. 0.33 6.67 2.30	19. 3.14 63.33 14.62	2. 0.33 6.67 3.57	5. 0.83 16.67 3.31	30. 4.96
4	11. 1.82 6.71 19.64	26. 4.30 15.85 34.21	4. 0.66 2.44 8.16	38. 6.28 23.17 43.68	28. 4.63 17.07 21.54	5. 0.83 3.05 8.93	52. 8.60 31.71 34.44	164. 27.11
5	6. 0.99 4.32 10.71	12. 1.98 8.63 15.79	10. 1.65 7.19 20.41	14. 2.13 10.07 16.09	54. 8.93 38.85 41.54	5. 0.83 3.60 8.93	38. 6.28 27.34 25.17	139. 22.98
6	19. 3.14 16.67 33.93	5. 0.83 4.39 6.58	16. 2.64 14.04 32.65	18. 2.98 15.79 20.69	4. 0.66 3.51 3.08	18. 2.98 15.79 32.14	34. 5.62 29.82 22.52	114. 18.84
7	11. 1.82 18.33 19.64	26. 4.30 43.33 34.21	2 4.30 43.33 34.21	3. 0.50 5.00 3.45	11. 1.82 18.33 8.46	4. 0.66 6.67 7.14	3. 0.50 5.00 1.99	60. 9.92
Total %	56. 9.26	76. 12.56	49. 8.10	87. 14.38	130. 21.49	56. 9.26	151. 24.96	605. 100.

Note: Frequency missing = 9. Each cell lists in order the frequency, percent, row percent and column percent. Occupational abbreviations are as follows: CPA = certified public accountant; CE = civil engineer; IA = insurance agent; MUS = musician; PM= personnel manager; SEC = secretary; TCH = elementary teacher.
C# = cluster number.

As shown in Table 11, work focus variables were not clearly differentiated by either cluster or occupation. Cluster 7 contained only eight observations, supporting the fusion coefficient that pointed toward a six-cluster solution for work focus variables. Otherwise, the only detectable pattern was that respondents in each occupation rated three to five out of 22 possible work focus variables as significant.

In evaluating clustering methods, Anderberg[3] said that choice of variables had the greatest influence on cluster analysis results. When all 268 variables were used, a seven-cluster solution appeared optimal; however, as variables were partitioned into inventory parts, cluster solutions and response patterns became more varied. Aldendefer and Blashfield observed that little published guidance exists on interpreting cluster solutions and that determining the number of optimal clusters was a problem. Additionally, they pointed out that it is not reasonable for real world data to conform to multivariate sample distributions but an appropriate validation criterion or method could be used to help interpret cluster results.[4]

As Table 4 shows, the JSI captured five relatively independent clusters and segmented three or four of the seven occupations accurately by cluster. Nonetheless, significant overlap did exist in two clusters. Fortunately, Ward's method is usually effective with overlapping clusters but it is sensitive to cluster size and outliers.[5] The method tends to form clusters of roughly equal sizes and, thus, may have had difficulty in estimating cluster membership because of unequal occupational group sizes. However, like other cluster procedures, Ward's method imposes structure on a data set, but that structure is often difficult to interpret. Cluster analysis is best used as a descriptive,

Table 11

Frequencies of Cluster by Occupation for JSI Part Five: Work Focus

C#	CPA	CE	IA	MUS	PM	SEC	TCH	Total
1	8. 1.34 5.93 14.04	17. 2.85 12.59 22.67	19. 3.18 14.07 39.58	13. 2.18 9.63 15.48	25. 4.19 18.52 19.23	7. 1.17 5.19 11.86	46. 7.71 34.07 31.94	135. 22.61
2	20. 3.35 9.71 35.09	32. 5.36 15.53 42.67	8. 1.34 3.88 16.67	25. 4.19 12.14 29.76	62. 10.39 30.10 47.69	16. 2.68 7.77 27.12	43. 7.20 20.87 29.86	206. 34.51
3	10. 1.68 14.29 17.54	3. 0.50 4.29 4.00	8. 1.34 11.43 16.67	9. 1.51 12.86 10.71	21. 3.52 30.00 16.15	5. 0.84 7.14 8.47	14. 2.35 20.00 9.27	70. 11.73
4	5. 0.84 7.69 8.77	2. 0.34 3.08 2.67	5. 0.84 7.69 10.42	14. 2.35 21.54 16.67	4. 0.67 6.15 3.08	9. 1.51 13.85 15.25	26. 4.36 40.00 18.06	65. 10.89
5	14. 2.35 20.29 24.56	16. 2.68 23.19 21.33	5. 0.84 7.25 10.42	14. 2.35 20.29 16.67	7. 1.17 10.14 5.38	9. 1.51 13.85 15.25	4. 0.67 5.80 2.78	69. 11.56
6	0. 0.00 0.00 0.00	5. 0.84 11.36 6.67	3. 0.50 6.82 6.26	6. 1.01 13.64 7.14	10. 1.68 22.73 7.69	9. 1.51 20.45 15.25	11. 1.84 25.00 7.64	44. 7.37
7	0. 0.00 0.00 0.00	0. 0.00 0.00 0.00	0. 0.00 0.00 0.00	3. 0.50 37.50 3.57	1. 0.17 12.50 0.77	4. 0.67 50.00 6.78	0. 0.00 0.00 0.00	8. 1.34
Total %	57. 9.55	75. 12.56	48. 8.04	84. 14.07	130. 21.78	59. 9.88	144. 24.12	597. 100.

Note: Frequency missing = 17. Each cell lists in order the frequency, percent, row percent and column percent. Occupational abbreviations are as follows: CPA = certified public accountant; CE = civil engineer; IA = insurance agent; MUS = musician; PM= personnel manager; SEC = secretary; TCH = elementary teacher. C# = cluster number.

summary and exploratory device. Its results should be viewed as a proposal about the structure of the data set.[6] Unfortunately, cluster analysis results tell little about the internal structure of each cluster. Some variables may dominate a cluster solution, and clusters with widely varying sizes of subgroups within that solution may be especially difficult to interpret.[7] These limitations of cluster analysis became especially apparent with interpretation of JSI parts.

These issues and considerations led to a decision to conduct additional evaluation in an attempt to reveal more information about the content of the cluster solutions and the structure of the inventory itself. Several additional procedures were designed and implemented. First, as originally proposed, discriminant analysis was conducted on the cluster analysis solutions to examine the discriminating ability of the JSI. Second, the 268 variables were reduced to 38 scales to meet the guideline of having approximately five to ten times the number of observations as variables for obtaining reliable factor analysis results. Principal factor analysis was used to identify structure in the JSI data. Third, analysis of variance was conducted at several levels to investigate differences among occupations, clusters, JSI parts and JSI factors.

Discriminant Analysis:

Unlike cluster analysis which does not require prior knowledge about the structure of the data set, discriminant analysis does require prior knowledge of criterion or classification variables. Discriminant analysis uses a weighted combination of predictor variables, called a discriminant function, to classify respondents into criterion groups.

The discriminant function is derived from a weighted sum of values on respondents' scores on the JSI. The weights are based on correlations among the predictor variables. Each respondent can be assigned a discriminant score based on the values of 268 JSI variables. The SAS computer program finds a cutoff score to assign observations into classifications in a way that minimizes the number of classification errors. As Kachigan observed, unless there is no overlap between the criterion groups with respect to the predictor variable, there will be classification errors.[8] Smaller differences between groups on predictor variables will result in more classification errors. Conversely, larger differences on predictor variables will result in fewer classification errors. Accuracy of the discriminant function is evaluated by the actual numbers and types of its classification errors and by several multivariate statistics.

Discriminant analysis was conducted at two levels for both clusters and occupations. First, discriminant functions were calculated at both the variable and scale levels to classify observations into clusters. Table 12 presents the discriminant analysis summary for the number and percent of observations classified into clusters based on 268 variables; Table 13 gives the results from the 38 scales. JSI variables produced a 99.556% accurate classification for clusters, while the 38 scales gave an 89.356% accuracy rate. Second, discriminant functions were calculated from 268 JSI variables and from 38 JSI scales for classification into seven occupations. The results for occupational classifications are given in Table 14 for the 268 variables and Table 15 for the 38 scales. The 268 variables in Table 14 were 100% accurate in classifying observations into one of seven occupations, while the 38 JSI scales in Table 15 were 93.5

Table 12

Discriminant Analysis Classification Summary for Clusters
Based on 268 JSI Variables.

Number and Percent Classified into Cluster:

Cluster	1	2	3	4	5	6	7	Total
1	74 100.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	74 100.0
2	0 0.0	70 0.0	0 0.0	0 0.0	1 1.41	0 0.0	0 0.0	71 100.0
3	1 1.43	0 0.0	69 98.57	0 0.0	0 0.0	0 0.0	0 0.0	70 100.0
4	0 0.0	0 0.0	0 0.0	36 100.0	0 0.0	0 0.0	0 0.0	36 100.0
5	0 0.0	0 0.0	0 0.0	0 0.0	44 100.0	0 0.0	0 0.0	44 100.0
6	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	97 100.0	0 0.0	97 100.0
7	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	59 100.0	59 100.0
Total % Priors	75 16.63 .1641	70 15.52 .1574	69 15.30 .1552	36 7.98 .0798	45 9.98 .0976	97 21.51 .2151	59 13.08 .1308	451 100.0

Error Count Estimates for Cluster:

Cluster	1	2	3	4	5	6	7	Total
Rate	.0	.0141	.0143	.0	.0	.0	.0	.0044
Priors	.1641	.1574	.1552	.0798	.0976	.2151	.1308	

Table 13

Discriminant Analysis Classification Summary for Clusters
Based on 38 JSI Scales.

Number and Percent Classified to Cluster

From Cluster	1	2	3	4	5	6	7	Total %
1	32 91.43	0 0.	0 0.	3 8.57	0 0.	0 0.	0 0.	35 100.
2	1 1.23	66 81.48	9 11.11	2 2.47	1 1.23	0 0.	2 2.47	81 100.
3	0 0.	7 5.47	117 91.41	1 .78	1 .78	2 1.56	0 0.	128 100.
4	1 1.67	0 0.	0 0.	58 96.67	1 1.87	0 0.	0 0.	60 100.
5	0 0.	1 1.79	1 1.79	3 5.36	51 91.07	0 0.	0 0.	56 100.
6	0 0.	0 0.	5 7.04	0 0.	2 2.82	61 85.92	3 4.23	71 100.
7	0 0.	0 0.	1 5.00	1 5.00	0 0.	0 0.	18 90.00	20 100.
Total % Priors	34 7.54 .078	74 16.41 .180	133 29.49 .284	68 15.08 .133	56 12.42 .124	63 13.97 .157	23 5.10 .044	451 100.

Error Count Estimates for Cluster:

	1	2	3	4	5	6	7	Total
Rate	.0857	.1852	.0859	.0333	.0893	.1408	.1000	.1064
Priors	.0776	.1796	.2838	.1330	.1242	.15	.0443	

Table 14

Discriminant Analysis Classification Summary
for 268 JSI Variables by Occupation.

Number of Observations and Percent Classified into Occupation

From	CPA	CE	IA	MUS	PM	SEC	TCH	Total %
CPA	47 100.	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.	47 100.
CE	0 0.0	64 100.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	64 100.0
IA	0.0 0.0	0 0.0	42 100.	0 0.0	0 0.0	0 0.0	0 0.0	42 100.0
MUS	0 0.0	0 0.0	0 0.0	68 100.	0 0.0	0 0.0	0 0.0	68 100.0
PM	0 0.0	0 0.0	0 0.0	0 0.0	100 100.	0 0.0	0 0.0	100 100.0
SEC	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	35 100.	0 0.0	35 100.0
TCH	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	95 100.	95 100.0
Total % Priors	47 10.42 .104	64 4.19 .1419	42 9.31 .0931	69 15.08 .1508	100 22.17 .2217	35 7.76 .0776	95 21.06 .2106	451 100.0

Note: CPA = Public Accountant; CE = Civil Engineer; IA = Insurance Agent; MUS = Musician; PM= Personnel Manager; SEC = Secretary; TCH = Teacher.

% accurate in correctly classifying observations into occupations. While these results were encouraging, they were interpreted conservatively. First, the sample was designed to enhance distinctions among occupations. Second, in the cases of the JSI scales and cluster results, the discriminant functions were derived from variables that were

Table 15

Discriminant Analysis Classification Summary for Occupations Based on 38 Scales

Number of Observations and Percent Classified into Occupations

From	CPA	CE	IA	MUS	PM	SEC	TCH	Total %
CPA	43 91.49	0 0.	2 4.26	0 0.	2 4.26	0 0.	0 0.	47 100.
CE	2 3.13	58 90.63	0 0.	0 0.	4 6.25	0 0.	0 0.	64 100.
IA	2 4.76	0 0.	36 85.71	0 0.	3 7.14	0 0.	1 2.38	42 100.
MUS	0 0.	2 2.94	0 0.	64 94.12	0 0.	0 0.	2 2.94	68 100.
PM	1 1.0	0 0.	2 2.0	0 0.	96 96.0	0 0.	1 1.0	100 100.
SEC	2 5.71	0 0.	0 0.	0 0.	1 2.86	32 91.43	0 0.	35 100.
TCH	0 0.	1 1.05	0 0.	1 1.05	0 0.	0 0.	93 97.89	95 100.
Total % Priors	50 11.08 .104	61 13.53 .142	40 8.87 .093	65 14.41 .151	106 23.50 .222	32 7.10 .078	97 21.51 .211	451 100.

Note: CPA = Certified Public Accountant; CE = Civil Engineer; IA = Insurance Agent; MUS = Musician; PM= Personnel Manager; SEC = Secretary; TCH = Teacher.

previously combined as either averages or as correlations. The discriminant analysis results reflected these prior associations. Because the use of correlated or averaged data tends to violate discriminant analysis assumptions, these results were viewed with caution. However, the discriminant analysis results based on the 268 JSI variables were

difficult to explain because errors were expected. Nonetheless, since these results were based on raw data, they were the most appropriate ones to use in testing the occupational distance hypotheses. Generalized squared distance estimates among occupations provided a basis for evaluating the JSI with two external criteria. These estimates were calculated and are presented in Table 16.

A method was needed to determine which occupational classification system (Holland or ACT) the JSI most closely approximated. Spearman rank correlation coefficients were used to estimate agreement between JSI occupational classifications and both the Holland occupational codes and the ACT job families. Pairwise generalized distances between occupations were ranked against the Holland and ACT rankings to produce the correlation coefficients. The rankings of the JSI distance values correlated nonsignificantly ($p > .05$) at .643 with the Holland classification and significantly ($p < .05$) at .929 with the ACT classification system. Results are presented in Tables 17 and 18 (Appendix D). Interpretations of these correlations were made cautiously because the rankings for Holland and ACT occupational models were based on judgments, not empirical relationships. Nonetheless, the correlation estimates suggested that the JSI bore more similarity to the ACT classifications than to Holland's typology. The associations could be due to the methods and types of information used by each model to determine occupational similarities and differences. Holland's typology was derived from interest inventories, while the ACT model used a recoding of Department of Labor data based on multiple methods of job analysis, including ability test criteria. More simply, Holland's model was based on people and the ACT model was based on jobs.

Table 16

Pairwise Generalized Distance Between Occupations Based on Discriminant Analysis of 268 JSI Variables for 451 Observations

Generalized Squared Distance to Occupation

From	CPA	CE	IA	MUS	PM	SEC	TCH
CPA	4.52	139.36	173.76	346.36	109.03	129.97	193.50
CE	139.98	3.90	199.56	340.14	133.09	191.47	180.76
IA	173.53	198.71	4.75	295.23	132.71	199.72	198.56
MUS	347.09	340.26	296.19	3.78	275.05	312.63	219.77
PM	110.54	133.98	134.45	275.82	3.01	128.25	150.72
SEC	129.38	190.27	199.36	311.30	126.15	5.11	211.24
TCH	194.90	181.55	200.19	220.44	150.62	213.23	3.11

Note: CPA = Certified Public Accountant; CE = Civil Engineer; IA = Insurance Agent; MUS = Musician; SEC = Secretary; TCH = Teacher

Factor Analysis:

Principal factor analysis evaluated the structure of the JSI. Kachigan described factor analysis as a data reduction procedure for removing redundancy from correlated variables and for representing the variables with a smaller set of factors.[9] The task of factor analysis is to form relatively independent factors that reflect underlying dimensions in data. Factor loadings represent the degree to which each variable correlates with each factor and reflect the nature of the factors.[10] Nunnally explained that factor analysis is used either to test hypotheses about constructs or to search for constructs in variables.[11] Usually, factor analysis is a prelude to more extensive study of constructs. Nunnally

defined a factor as any linear combination of variables in a data matrix.[12]

As indicated above, the 268 variables of the JSI were reduced to 38 scales representing the five component parts of the instrument. Scales were constructed by adding the variable scores within each subsection, then computing the mean of those variables as the scale score. This data reduction step was designed to aid interpretation of JSI structure and to meet recommended factor analysis guidelines of one variable per five to ten observations. Here, that guideline was exceeded with 451 observations for 38 scales.

Principal methods factor analysis was run with a Promax oblique rotation using the SAS program.[13] A seven-factor solution was specified for comparison to the seven clusters identified with cluster analysis. Interpretation of the factors was accomplished by examining the content of scales with loadings of .40 or higher on a factor. Factor loadings are presented in Table 19. Inter-factor correlations are given in Table 20.

Referring to Table 19, Factor I was defined as task processes that involve both abilities (produce and create) and job content (sensory, tangibles, technical and mechanisms). Except for mechanisms (.417), all other scales loaded .57 to .85.

The task processes factor involved creating abilities (painting, composing, inventing, innovating, designing, writing, processing creatively) and producing abilities (constructing, building, assembling, fabricating, molding, forming, shaping, crafting, making, processing). These abilities linked with tangibles (equipment, tools, materials, objects), technical content (engineering, behavioral science, social science, mathematics, etc.), sensory inputs (shapes, rhythm, design, spatial relationships, sound, etc.), and

Table 19

Promax Oblique Rotated Factor Pattern Matrix for JSI Scales

	FACTORS						
SCALES	Task Process	Cognitive Process	Affective Process	Work Focus	Work Style	Work Context	Public Perform
Sensory	**.853**	-.058	.091	-.072	-.037	-.108	.152
Tangibles	**.795**	-.092	-.243	-.063	.072	.216	.267
Produce	**.789**	.044	-.095	.015	.002	.029	.016
Technical	**.688**	.072	.210	-.079	.018	.103	-.221
Create	**.578**	.195	.116	.095	.035	-.111	.048
Mechanisms	**.417**	.108	.335	.046	-.081	.294	-.116
Develop	.298	.256	.319	.075	-.077	-.096	.063
Evaluate	-.014	**.715**	.065	-.041	.065	.123	.030
Investigate	-.008	**.670**	-.129	.149	.049	.096	-.056
Organize	.054	**.682**	-.037	-.089	.010	.177	.124
Plan	.145	**.468**	.085	.035	.028	.020	.369
Communicate	-.067	**.423**	.288	-.112	.092	.286	-.093
Conceptualize	.200	**.414**	.255	.071	-.011	-.072	.092
People	-.096	.018	**.771**	-.010	-.032	.025	-.009
Recognition	-.104	-.215	**.579**	-.004	.190	.259	.321
Influence	-.151	.170	**.577**	.004	.300	.064	-.176
Activators	.241	-.002	**.557**	.015	-.029	.129	-.039

Table 19 continued

Intangibles	-.054	.198	**.551**	-.002	-.021	.068	.091
Structure	.238	-.017	**.449**	.004	-.112	.242	.031
Performance	-.102	-.016	-.069	**.787**	.067	.016	-.021
Control	.057	.039	-.102	**.709**	.206	.071	-.068
Purpose	-.087	.015	.139	**.523**	-.072	.203	.128
Process	.145	-.056	**.446**	**.516**	-.182	-.073	.019
Object	.212	-.006	.014	**.444**	.065	-.026	-.012
Contributor	-.071	-.003	.076	**.417**	.185	.015	.199
Manager	.041	.003	-.189	.127	**.786**	.088	-.009
Influencer	.008	-.017	.188	.146	**.618**	-.072	-.033
Oversee	.046	.305	.259	-.159	**.482**	-.043	.090
Teach	.139	.115	**.407**	.011	.361	-.241	.093
Data	-.099	.328	-.013	.016	-.101	**.608**	-.034
Measures	-.114	.255	.074	.234	-.112	**.511**	.216
Conditions	.289	-.022	-.014	.083	.203	**.486**	.037
Functions	.078	.055	.334	.172	.022	.387	-.005
Organization	.062	.073	.394	.051	.197	.363	-.030
Uniqueness	.278	.067	.283	.031	.007	.288	-.003
Do/Act	.386	.075	-.171	.054	-.043	.079	**.559**
Learn	-.051	**.482**	.099	.029	-.100	-.014	**.481**
Perform	.340	-.147	.168	.013	.157	-.150	**.416**

mechanisms (strategies, techniques, procedures, controls, calculations, networks, etc.)

Factor II represented a set of ability scales that primarily reflected cognitive processes. The cognitive processes factor involved evaluation (by analyzing, assessing, appraising, judging, comparing, and discerning); investigation (by gathering information, interviewing, and researching); organization (by structuring, defining, classifying, systematizing, and integrating); planning (by setting goals, strategizing, arranging, practicing, and scheduling); communication (by articulating, reporting, writing, discussing, and describing); and conceptualization (by hypothesizing, theorizing, imagining, and visualizing).

Inspection of Factor III loadings revealed a complex integration of scales described as affective processes that included abilities, content, context and work focus variables. Affective processes involved working with people as individuals or in groups, to teach and influence them in several ways (suggesting, selling, motivating, persuading, negotiating, counseling, encouraging, and/or marketing). Affective processes included work situations that involved certain stimuli (needs, problems, causes, challenges, competition, and/or emergencies) certain structure (growth, routine, fluid situations, and/or instructions), and recognition elements (audiences, visibility, reputation, status, and/or supporting role). Affective processes also included intangibles, like values, ethics, ideas, principles, philosophy, thoughts, knowledge, policies and spiritual matters. However, the process scale also loaded on Factor III. The process scale dealt with the purpose of a job (e.g., develop, form, fulfill role, become proficient, progress, and/or advance). The high loading of the process scale was considered an anomaly.

Factor IV clearly reflected work outcome scales and was defined as work focus. Factor IV also included the relationship style of contributor who typically achieves work results through his or her own direct efforts. Work focus dealt with personal performance (excel, gain recognition, be key person), power or control (command, overcome, prevail, acquire, possess, mastery, comprehension and demonstration of knowledge), focus on an object (improve, achieve potential, gain response, shape, make effective), and defined purpose (completion, make the grade, meet the challenge, meet needs).

Factor VI was defined by two relationship styles and one ability. The relationship styles factor captured the work relationships of people who achieve results by influencing others as trainers, facilitators, coordinators, and/or spark plug organizers. The factor also included the relationship style of those who get results by actively managing resources and people as team leaders, directors, managers, and engineers. The work style factor included an ability to oversee others by monitoring, directing, coordinating, facilitating, leading, controlling or managing.

Inspection of Factor VI loadings above .40 showed three scales that dealt with data (details, numbers, logistics, money, facts, and words), measures (grades, ratings, standards, objectives, efficiency, effectiveness, value, quality, and profitability) and conditions (stress, deadlines, risks, difficulties, ambiguity, travel, and response time). Together, these scales described a work context factor.

Factor VII had three ability scales with the weakest loadings. These scales appeared to represent a public performance dimension and included abilities to learn,

do/act, and perform. The learn ability included studying, reading, observing, examining, listening, expressing, memorizing, repeating and trying skills. The do/act ability incorporated a variety of skills--following directions, implementing, operating or running something, manual or physical action, maintaining, and keeping something in condition. Perform was defined by playing an instrument, acting a role, singing, dancing, public speaking and giving presentations.

Table 20 shows low to moderate inter-factor correlations. Factor III (affective processes) had the highest correlations with other factors, ranging from .207 to .574. Affective processes correlated .575 with cognitive processes, .514 with task processes, .467 with work focus, .443 with work style, .309 with job context, and .207 with public performance. Factor IV (work focus) ranked second in strength of correlations with other factors. Excluding affective processes, work focus correlated .378 with job context, .307 with cognitive processes, .305 with relationship style, .294 with task processes, and .289 with public performance. Excluding previously cited correlations, Factor I (task processes) ranked third with correlations of .385 with work style, .305 with cognitive processes, .207 with public performance, and .173 with job context. Factor IV (cognitive processes) ranked fourth in strength of correlations with other factors. In addition to the above cited correlations, cognitive processes correlated .284 with job context, .189 with relationship style, and .027 with public performance. Factor V (relationship style) ranked fifth with correlations of .143 with job context and .117 with public performance. Factor VI (job context) ranked sixth with a -.007 correlation with public performance, in addition to its other correlations. Finally, Factor VII (public

Table 20

Inter-factor Correlations from the Oblique Rotation

Factor	I	II	III	IV	V	VI	VII
I	1.000	.305	.514	.294	.385	.173	.207
II	.305	1.000	.575	.307	.189	.284	.027
III	.514	.575	1.000	.467	.443	.309	.207
IV	.294	.307	.467	1.000	.305	.378	.289
V	.385	.189	.443	.305	1.000	.143	.117
VI	.173	.284	.309	.378	.143	1.000	-.007
VII	.207	.027	.207	.289	.117	-.007	1.000

Note: Factor I = Task Processes; Factor II = Cognitive Processes; Factor III = Affective Processes; Factor IV = Work Focus; Factor V = Work Style; Factor VI = Work Context; Factor VII = Public Performance

performance) ranked last in strength of inter-factor correlations that ranged from -.007 to .289.

In sum, principal methods factor analysis of JSI scales suggested that the inventory was systematically capturing underlying structure in the occupations. All seven factors were clearly identified with the oblique rotation. Comparing the frequency and magnitude of loadings, the first six factors seemed to have substantial support. The public performance factor had the weakest support, but it might be especially reflective of JSI ratings given by teachers and musicians.

The factor structure of the JSI provided evidence of three new underlying

constructs--task processes, cognitive processes, and affective processes. The task processes factor combined skills and job content variables similar to standard task definitions. The cognitive processes factor described primarily mental and information processing skills used in work. The affective processes factor was the most complex by combining skills, content, context and work focus variables associated with intrapersonal and interpersonal functions. Additionally, as a possible fourth construct, the public performance factor combined abilities dealing with input and output functions.

Factor analysis results supported the JSI parts of job context, work relationship and work focus. Factor IV, work focus, essentially described JSI Part Five: motivation focus, but included the relationship variables of individual contributors. Factor V, work style, reflected JSI Part Four: work relationships of influencer and manager combined with overseeing skills. Finally, Factor VI, work context, captured JSI Part Three: job context variables combined with one JSI content variable, data. In sum, JSI factor structure provided support to infer constructs within and between inventory parts.

Analysis of Variance:

Analysis of variance is a powerful statistical technique. According to Glass and Hopkins, ". . .analysis of variance (ANOVA) is used to determine whether the differences among two or more means are greater than would be expected from sampling error alone."[14] ANOVA partitions variance among observations into portions associated with sources of variation defined by the data. Partitioning is based on the sum of squares (SS) and the related degrees of freedom (DF). "Degrees of freedom are numbers

associated with sums of squares. They represent the number of independent differences used to compute the sum of squares. . . .Total degrees of freedom are partitioned into degrees of freedom associated with the sum of squares associated with each factor and the residual."[15] Residual refers to what remains after subtracting SS from each factor.

Mean squares (MS) are computed by dividing each SS by its DF to give a ratio of mean squares called the F ratio. F ratios reflect the amount of variability from each source of variation.[16] Main effects of variation measure variability among factor means. Interaction effects of variation refer to variability associated with crossing factors and ". . .measures the failure of the effects of one factor to be the same at all levels of another factor."[17] The F test in ANOVA tests the null hypothesis that all factor means are equal. The F ratio is an omnibus test that indicates if significant differences exist among the factor means, but says little about those differences. Accordingly, multiple comparison tests are usually calculated to explicate the differences among factor means. Repeated measures analysis is used to examine changes, known as within-subject effects, in measurements taken on each subject.[18] Repeated measures make several observations of one subject.

Analysis of variance was used to evaluate the effects of the structural components of the JSI in differentiating occupations and clusters. The SAS general linear model was used to perform analysis of variance because the occupations had unequal sample sizes.[19] Occupations and clusters served as independent or class variables while JSI part and JSI factor means served as dependent variables. In addition, a repeated measures design was incorporated to generate multiple comparisons of JSI structural dimensions. The Ryan-

Einat-Gabriel-Welsch (REGWQ) multiple range test evaluated the statistical significance of differences in mean scores of both dependent variables for occupations and clusters. REGWQ is a powerful F-ratio test and provides a conservative test of statistical significance, especially against Type I errors.[20]

JSI Part Effects: JSI parts were analyzed to examine their effects in identifying occupations and clusters. Scores on the parts were dependent variables, while occupations and clusters served as independent variables.

As indicated in Table 21, there were significant main effects ($p < .01$) for occupations (F ratio = 21.11) and JSI parts (F ratio = 10.68). Further, the occupations by JSI parts interaction (F ratio = 10.68) was also statistically significant ($p < .01$). In line with recommendations by Glass and Hopkins, main effects were not examined further because their interactions were significant.[21]

As displayed in Table 22, skill importance ratings differed significantly across the occupations. Teachers rated skills ($M = 5.390$) as significantly ($p < .05$) more important than other occupational groups. Engineers ($M = 4.457$), insurance agents ($M = 4.516$), personnel managers ($M = 4.564$) and musicians ($M = 4.260$) did not differ significantly on skill ratings. However, secretaries ($M = 3.863$) and accountants ($M = 4.061$) rated skills significantly lower ($p < .05$) than all other occupational groups, except musicians. Secretaries rated the fewest skills as important compared with other occupational groups. These comparisons suggested that teachers perceived more skills as important in their work than did other occupational groups. In contrast, secretaries

Table 21

Summary Table for Occupations by JSI Parts Analysis

Source	df	MS	F-ratio	Pr>F
Between Respondents				
Occupations (O)	6	52.910	21.11	.01
Respondents (R)	444	2.507		
Within Respondents				
JSI Parts (P)	4	74.884	10.68	.01
P x O	24	7.011	19.77	.01
P x R/O	1,776	.355		

and accountants saw fewer skills as important in their work. Of 21 possible differences, 12 means differed significantly among the occupational groups.

Job content ratings differed significantly across four occupations. Again, teachers gave the highest ratings (M = 5.169) and differed significantly ($p < .05$) from other occupational groups. In scoring the lowest ratings (M = 3.115), accountants differed significantly ($p < .05$) from engineers (M = 4.306), insurance agents (M = 3.713) and teachers (M = 4.868), but not from musicians (M = 3.425), personnel managers (M = 3.427) or secretaries (M = 3.293) in rating content variables. Insurance agents also rated significantly ($p < .05$) different from engineers, accountants and teachers, but not

Table 22

Means for the JSI Parts by Occupations Interaction

n	Occu-pation	Part 1 Skills	Part 2 Content	Part 3 Context	Part 4 Relations	Part 5 Focus	Overall Mean
47	CPA	4.061 (C, D)	3.115 (D)	4.376 (B, C)	3.561 (B)	4.697 (C)	3.962
64	CE	4.457 (B)	4.306 (B)	4.500 (A, B, C)	4.286 (A)	4.842 (B ,C)	4.488
42	IA	4.516 (B)	3.713 (C)	4.753 (A, B)	3.606 (B)	5.351 (A)	4.396
68	MUS	4.260 (C, B)	3.425 (C, D)	4.209 (C, D)	4.328 (A)	4.830 (B, C)	4.329
100	PM	4.564 (B)	3.427 (C, D)	4.624 (A, B)	4.451 (A)	4.803 (B, C)	4.374
35	SEC	3.863 (C, D)	3.293 (C, D)	3.923 (D)	3.321 (B)	4.514 (C)	3.783
95	TCH	5.390 (A)	5.169 (A)	4.868 (A)	4.501 (A)	5.248 (B, C)	5.035
	Mean	4.565	3.902	4.527	4.160	4.923	4.416

Note: Column means that have different parenthesized letters differ significantly at the .05 level. Occupational abbreviations are as follows: CPA = certified public accountant; CE = civil engineer; IA = insurance sales agent; MUS = instrumental musician; PM = personnel manager; SEC = secretary; TCH = elementary teacher.

from musicians, personnel managers or secretaries. Of 21 possible differences, there were 12 significantly different means among the groups.

Job context variables differed significantly only across three occupational groupings. Again, teachers produced the highest (M = 4.868) and secretaries the lowest (M = 3.923) scores. In their ratings, teachers differed significantly ($p < .05$) from

accountants (M = 4.376), musicians (M = 4.209) and secretaries (M = 3.923), but not from personnel managers (M = 4.624), insurance agents (M = 4.753) or civil engineers (M = 4.500). Secretaries rated work context variables significantly ($p < .05$) lower than teachers, personnel managers, insurance agents, engineers, or accountants. Job context variables produced nine significantly different means among the seven occupations.

Relationship variables differed significantly across only two occupational groupings. Engineers (M = 4.286), musicians (M = 4.328), personnel managers (M = 4.451), and teachers (M = 4.501) did not differ in their ratings from each other, but did differ significantly ($p < .05$) from accountants (M = 3.561), insurance agents (M = 3.606) and secretaries (M = 3.321). Of 21 possible differences, means differed significantly in 12 combinations among the groups.

Only insurance agents (M = 5.351) differed significantly ($p < .05$) from all other occupations in work focus ratings. Rating differences among the other occupations were not significant. Six significantly different means were observed.

In sum, the JSI parts differed significantly among occupational groupings. Of 21 possible differences in means among occupational groups, the JSI parts showed the following number of significant differences: skills = 12; job content = 12; job context = 9; relationships = 12; and work focus = 6. Overall, the five JSI parts together produced 51 significantly different means out of 105 total possible, for a 48.6% yield rate. These relatively high numbers of significant differences suggested that the JSI parts were differentiating occupations quite well. Furthermore, these high numbers of

differentiated occupations provided construct validity evidence for JSI parts.

Differentiation between clusters was also significant. As reported in Table 23, there were significant ($p < .01$) main effects for clusters (F ratio = 117.38) and JSI parts (F ratio = 8.65). In addition, the clusters by JSI parts interaction (F = 18.34) was also statisticaliy significant ($p < .01$). Following the Glass and Hopkins recommendations,[22] main effects were not examined further because their interactions were significant.

Analysis of JSI part means by the REGWQ multiple comparison test explicated the differences among JSI parts. Table 24 displays the clusters by parts interaction and indicates the primary occupational composition of each cluster. As shown, skills differed significantly across five clusters. Cluster 1 with personnel managers and insurance agents (M = 5.014), Cluster 2 with teachers (M = 5.751), and Cluster 6 with overlapping groups (M = 3.670) differed significantly ($p < .05$) from all other clusters in their skill ratings. Cluster 7 (M = 4.097) contained musicians who differed significantly ($p < .05$) from all groups except personnel managers in Cluster 3 (M = 4.345). Clusters 3, 4, and 5 did not differ from each other. In Cluster 2, teachers produced the highest mean rating, while mixed groups in Cluster 6 (M = 3.670) gave the lowest mean score. Of 21 possible mean differences, skills differed significantly in 17 combinations among clusters.

Job content differed significantly across four clusters. Both Cluster 1 (M = 5.014)) and Cluster 2 (5.751) differed significantly ($p < .05$) in their ratings from other clusters. Cluster 3 (M = 3.183), Cluster 6 (M = 2.993) and Cluster 7 (M = 3.202) did

Table 23

Summary for Clusters by JSI Parts Analysis

Source	df	MS	F-ratio	Pr>F
Between Respondents				
Clusters (C)	6	146.227	117.38	.01
Respondents (R)	444	1.246		
Within Respondents				
JSI Parts (P)	4	53.317	8.65	.01
P x C	24	6.162	18.34	.01
P x C/R	1,776	.336		

not differ from each other but did differ significantly ($p < .01$) from other clusters. Cluster 4 ($M = 4.599$) and Cluster 5 ($M = 4.407$) differed significantly ($p < .05$) from other clusters, but not from each other. Again, teachers in Cluster 2 ($M = 5.684$) produced the highest mean score, while several occupations in Cluster 6 ($M = 2.993$) gave the lowest ratings. Of the 21 possible differences in job content, the means differed significantly in 17 combinations with clusters.

Job context differed significantly across four clusters. Both Cluster 1 ($M = 5.082$) with personnel managers and insurance agents and Cluster 2 ($M = 5.392$) with teachers, who gave the highest ratings, differed significantly ($p < .05$) from six clusters.

Table 24

Means for the Clusters by JSI Parts Interaction

n	Cluster	Part 1 Skills	Part 2 Content	Part 3 Context	Part 4 Relation	Part 5 Focus	Overall Mean
74	1: TCH	5.014 (B)	3.985 (C)	5.082 (B)	4.600 (A, B)	5.511 (A)	4.834
71	2: TCH PM	5.751 (A)	5.684 (A)	5.392 (A)	4.970 (A)	5.672 (A)	5.494
70	3: PM CE	4.345 (D, E)	3.183 (D)	4.394 (C, D)	4.187 (B)	4.532 (B, C)	4.128
36	4: Mixed	4.592 (C, D)	4.599 (B)	4.667 (C)	4.378 (B)	4.947 (B)	4.637
44	5: SEC CPA	4.833 (C, D)	4.407 (B)	4.281 (D, E)	4.204 (B)	4.902 (B)	4.525
97	6: MUS	3.670 (F)	2.993 (D)	3.914 (F)	3.096 (C)	4.360 (C)	3.607
59	7: Mixed	4.097 (E)	3.202 (D)	4.054 (E, F)	4.189 (B)	4.681 (B, C)	4.044
	Overall	4.566	3.902	4.527	4.160	4.924	4.416

Note: Column means that have different parenthesized letters differ significantly at the .05 level. Occupational abbreviations are as follows: CPA = certified public accountant; CE = civil engineer; IA = insurance sales agent; MUS = instrumental musician; PM = personnel manager; SEC = secretary; TCH = elementary teacher; Mixed = overlapping occupations.

The mixed occupations in Cluster 6 ($M = 3.914$) produced the lowest score and differed significantly ($p < .05$) from all clusters except musicians in Cluster 7 ($M = 4.054$). The remaining clusters showed considerable overlap in their ratings of context variables. However, 16 statistically significant mean differences among clusters were observed.

Relationships differed significantly across three clusters. Clusters 1 with personnel managers and insurance agents (M = 4.600) and Cluster 2 with teachers (M = 4.970), who ranked highest, differed significantly ($p < .05$) from other clusters but not each other. Cluster 6 (M = 3.096) with several groups rated lowest and differed significantly ($p < .05$) from six clusters. Overlap was observed among the remaining clusters. Relationships had the fewest significant differences with clusters (i. e., 10), suggesting that respondents rated fewer relationship variables as salient in their jobs.

Finally, work focus differed significantly across three cluster groups. Again, the personnel managers and insurance agents in Cluster 1 (M = 5.511) and teachers in Cluster 2 (M = 5.672) differed significantly ($p < .05$) from other clusters but not each other. The mixed occupations in Cluster 6 (M = 4.360) with the lowest score did not differ from personnel managers in Cluster 3 (M = 4.532) and musicians in Cluster 7 (M = 4.681), but did differ significantly ($p < .05$) from the rest. The remaining clusters did not differ. Only 12 statistically significant differences were observed among clusters. This suggested that fewer work focus variables were considered important by respondents. However, it should be noted that work focus attained the highest total mean score among JSI parts.

In sum, the JSI parts differed significantly among clusters. Of 21 possible differences in means among clusters, the JSI parts captured the following number of significant differences: skills = 17; job content = 17; job context = 16; work relationships = 10; and work focus = 12. Out of 105 total possible differences, JSI parts together accounted for 72 significant differences, or a 68% yield. These high

numbers of significant differences suggested that the JSI parts were effective in differentiating clusters. Additionally, except for a lower number on relationships, the significant differences among clusters were 48% higher than the distribution of significant differences among occupations on JSI parts. The high number of differentiated clusters and their high degree of correspondence with occupations strengthened the evidence for the construct validity of the JSI parts.

JSI Factor Effects: The seven factors obtained from the factor analysis were used as classification variables in an analysis of variance. This analysis of variance examined differences in factor scores due to occupations, clusters and their interactions.

Analysis of variance of occupations by factors is summarized in Table 25. As shown by the F ratio of 12.61, there were significant differences ($p < .01$) among occupations in ratings of JSI factors. Differences among JSI factors within respondents were not significant. This was expected since each factor's scores are scaled to have a mean of zero. However, the occupation by factor interaction did show strong (F ratio = 82.83) and significant ($p < .01$) differences. Given the emphasis on interaction effects and the recommendations of Glass and Hopkins, the main effect was not explored further.[23] The REGWQ multiple comparison test was used to examine the occupations by factors interaction. These results are presented in Table 26.

Factor 1 (task processes) differed significantly ($p < .01$) across three occupations. Teachers rated task processes ($M = 1.239$) significantly higher ($p < .05$) than other occupational groups. The business occupations of accountant ($M = -.704$),

Table 25

Summary for Occupations by JSI Factors Analysis

Source	df	MS	F-ratio	Pr>F
Between Respondents				
Occupations (O)	6	19.426	12.61	.01
Respondents (R)	444	1.540		
Within Respondents				
Factors (F)	6	5.214	.154	
O x F	36	33.879	82.83	.01
O x F/R	2,664	.409		

insurance agent (M =-.604), personnel manager (M = -.666), and secretary (M = -.567) had the lowest mean scores and differed significantly ($p < .05$) from teachers, engineers and musicians, but not from each other. With mid-range scores, engineers (M= .630) and musicians (M = -.193) differed significantly from other occupations but not each other in rating task processes. Of 21 possible mean differences, task processes yielded 14 statistically significant differences.

Factor 2 (cognitive processes) differed significantly across five occupations. Teachers (M = .942) and insurance agents (M = .692) rated cognitive processes significantly higher ($p < .05$) than other occupations, but did not differ from each other.

Table 26

Means for the Occupations by JSI Factors Interaction

n	Job	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6	Factor 7	Over-all
47	CPA	-.704 (D)	-.791 (D)	.571 (A)	-.640 (C)	.345 (B)	.028 (B, C)	-.115 (B, C)	-1.307
64	CE	.630 (B)	-.983 (D)	.357 (A)	.576 (A)	.437 (B)	-.257 (C, D)	-.351 (C)	.773
42	IA	-.604 (D)	.692 (A)	.072 (B)	-1.207 (D)	.826 (A)	-.472 (D)	.806 (A)	.109
68	MUS	-.193 (B)	-.212 (C)	-1.651 (C)	.073 (B)	-.409 (C)	1.371 (A)	.041 (B, C)	-.980
100	PM	-.666 (D)	.329 (B)	.216 (A, B)	.565 (A)	.405 (B)	-.808 (E)	-.363 (C)	-.322
35	SEC	-.567 (D)	-.054 (D)	.507 (A)	-1.083 (D)	-.393 (C)	.325 (B)	-.036 (B, C)	-2.301
95	TCH	1.239 (A)	.942 (A)	.212 (A, B)	.213 (A, B)	-.820 (D)	.118 (B)	.303 (B)	2.207
	Over-all	0.	0.	0.	0.	0.	0.	0.	-1.821

Note: Column means that have different parenthesized letters differ significantly at the .05 level. Occupational abbreviations are as follows: CPA = certified public accountant; CE = civil engineer; IA = insurance sales agent; MUS = instrumental musician; PM = personnel manager; SEC = secretary; TCH = elementary teacher.

Personnel managers (M = .329) differed significantly ($p < .05$) from all other occupational groups in their ratings. Similarly, musicians (M = -.212) differed significantly ($p < .05$) from all other groups. Secretaries (M = -.054) attained the lowest mean score and differed significantly ($P < .05$) from all groups except

accountants and engineers. Cognitive processes showed 17 significantly different means among the occupational groups.

Factor 3 (affective processes) differed significantly across three occupations and had the lowest number of significant differences of the factors. With the lowest score, musicians (M = -1.651) differed significantly ($p < .05$) from other occupations. Insurance agents (M = .072) differed significantly ($p < .05$) from accountants (M =.571), engineers (M = .357), musicians, and personnel managers (M = .216). Personnel managers and teachers (M = .212) differed significantly ($p < .05$) only from musicians. Affective processes had nine significant differences among the groups.

Factor 4 (work focus) was rated significantly different across four occupations. Accountants (M = -.640) differed significantly ($p < .05$) from all groups in their ratings. With their lowest ratings, insurance agents (M = -1.207) and secretaries (M = -1.083) differed significantly ($P < .05$) from all other occupations but not from each other. Musicians (M = .073) did not differ from teachers (M = .213) but were significantly different ($p < .05$) from all other occupations in rating the work focus factor. Of the 21 possible differences, the work focus factor had 16 significantly different means across the seven occupations.

Factor 5 (work style) differed significantly across four occupations. Insurance agents (M = .826) with the highest mean score and teachers (M = -.820) with the lowest mean score differed significantly ($p < .05$) from all other occupations in ratings of work style. Accountants (M = .345), engineers (M = .437) and personnel managers (M = .405) did not differ from each other but did differ significantly ($p < .05$) from

the remaining occupational groups. Similarly, musicians (M = -.409) and secretaries (M = -.393) did not differ from each other in mean scores on work style, but did differ significantly (P < .05) from the other occupational groups. Work style tied with cognitive processes on having 17 statistically significant mean differences among the occupations.

Factor 6 (work context) means were significantly different across four occupations. With the highest mean score, musicians (M = 1.371) differed significantly (p < .05) from other occupational groups. In contrast, personnel managers (M = -.808) had the lowest mean score on this factor, and they differed significantly (p < .05) from all groups. Ratings of insurance agents (M = -.427) differed significantly (p < .05) from all groups except engineers (M = -.257). In total, the work context factor yielded 16 statistically significant mean differences among the occupational groups.

The last factor, public performance, claimed significantly different scores across three occupations. Only insurance agents (M = .806) differed significantly (p < .05). from other groups. The remaining occupational groups fell into two overlapping combinations. The public performance factor had eight significant mean differences across occupations.

In sum, the JSI factors differed significantly among occupational groups. Of 21 possible differences in means among occupational groups, the JSI factors produced the following numbers of significant differences: task processes = 14; cognitive processes = 17; affective processes = 9; work focus = 16; relationship style = 17; work context = 16; and public performance = 8 mean differences. Given 147 possible differences,

the JSI factors together produced 97 significant differences, or 65.98% of the total. These high numbers of significant differences suggested that the JSI factors differentiated occupations well. Further, the strong occupational differentiations gave evidence for the construct validity of JSI factors.

Analysis of variance next examined the effects of clusters. As presented in Table 27, clusters differed significantly ($p < .01$) with an F ratio of 90.899. Within respondents, factor means were not significantly different as expected. However, the clusters by factors interaction was significant ($p < .01$) with an F ratio of 55.35. Again, following the Glass and Hopkins recommendations, the main effect was not examined further. Emphasis was given to the interaction effects. REGWQ multiple comparison tests were used to explicate the nature of those interactions in Table 28.

Factor 1 (task processes) differed significantly across four clusters. In Cluster 2, teachers ($M = 1.645$) gave the highest ratings on task processes and differed significantly ($p < .05$) from all other clusters. Cluster 4 ($M = .802$) with engineers and Cluster 5 with teachers ($M = .648$) differed significantly ($p < .05$) from other clusters but not from each other on task processes. Cluster 1 with business occupations ($M = 1.297$) and Cluster 7 musicians ($M = -.398$), who had the lowest ratings, differed significantly ($p < .05$) from all other clusters but not from each other. Similarly, Cluster 3 with personnel managers ($M = -.886$) and Cluster 6 with mixed groups ($M = -.688$) differed significantly ($p < .05$) from other clusters but not from each other. Of the 21 possible mean differences, task processes yielded 18 significant differences.

Factor 2 (cognitive processes) differed significantly across four clusters. Teachers

Table 27

Summary for Clusters by Factors Analysis

Source	df	MS	F-ratio	Pr>F
Between Respondents				
Clusters (C)	6	73.538	90.89	.01
Respondents (R)	422	.809		
Within Respondents				
Factors (F)	6	1.545	.056	
C x F	36	27.454	55.35	.01
C x F/R	2,664	.496		

in Cluster 2 (M = .951) rated cognitive processes higher than any other cluster and differed significantly ($p < .05$) from them. Cluster 1 with business occupations (M = .547) and Cluster 5 with teachers (M = .629) varied significantly ($p < .05$) from other clusters but not from each other. Personnel managers (M = .228) in Cluster 3 and musicians (M= -.295) in Cluster 7 differed significantly from all other clusters. Finally, Cluster 4 with engineers (M = -.949) and Cluster 6 with mixed occupations (M = -1.033) differed significantly ($p < .05$) from other clusters but not from each other. Cognitive processes produced 19 significant mean differences among clusters.

Factor 3 (affective processes) varied significantly across four clusters. Cluster 4

Table 28

Means for the Clusters by JSI Factors Interaction

n	C #	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6	Factor 7	Overall Mean
74	1	-.297 (C)	.547 (B)	.488 (A, B)	.107 (B, C)	.817 (A)	-.101 (C)	.569 (A)	2.130
71	2	1.645 (A)	.951 (A)	.311 (A, B)	.475 (A, B)	.009 (C)	.499 (B)	.565 (A)	4.405
70	3	-.886 (D)	.228 (C)	.143 (B)	.495 (A, B)	.193 (B, C)	-.975 (D)	-.632 (D)	-1.434
36	4	.802 (B)	-.949 (E)	.527 (A)	.656 (A)	.538 (A, B)	-.084 (C)	-.241 (B, C, D)	1.249
44	5	.648 (B)	.629 (B)	-.191 (C)	-.058 (C)	-1.175 (E)	-.302 (C)	.180 (A, B)	-0.269
97	6	-.688 (D)	-1.033 (E)	.256 (A, B)	-1.042 (D)	-.061 (C)	-.277 (C)	-.318 (C, D)	-3.160
59	7	-.398 (C)	-.295 (D)	-1.756 (D)	.063 (C)	-.616 (D)	1.416 (A)	-.109 (B, C)	-1.690
		0.	0.	0.	0.	0.	0.	0.	1.231

Note: Column means that have different parenthesized letters differ significantly at the .05 level. Occupational abbreviations are as follows: CPA = certified public accountant; CE = civil engineer; IA = insurance sales agent; MUS = instrumental musician; PM = personnel manager; SEC = secretary; TCH = elementary teacher. C# = cluster number. n = frequency of observations.

with engineers (M = .527) differed significantly ($p < .05$) from Cluster 3's personnel managers (M = .143), Cluster 5's teachers (M= -.191) and Cluster 7's musicians (M = -1.756). Teachers in Cluster 5 (M = -.191) and the lowest scoring musicians in Cluster 7 (M = -1.756) were significantly different ($p < .05$) from other clusters. This

factor attained 12 out of 21 significant mean differences.

Factor 4 (work focus) differed across four cluster combinations. Cluster 6 (M = -1.041) with its mixed occupations scored significantly ($p < .05$) lower than other clusters on work focus. Engineers in Cluster 4 (M =.656) scored significantly higher ($p < .05$) than Cluster 1 with business groups (M = .107), Cluster 5 with teachers (M = -.058), Cluster 6 with mixed groups (M = -1.042), and Cluster 7 with musicians (M = .063). However, engineers did not differ from Cluster 2's teachers (M = .475) and Cluster 3's personnel managers (M = .495). The work focus factor had 13 statistically significant different means among seven clusters.

Factor 5 (work style) was significantly different across four clusters. In Cluster 1, business occupations (M = .817) scored significantly ($p < .05$) higher than other clusters, except engineers in Cluster 4 (M = .538). Teachers in Cluster 5 (M = -1.175) had the lowest mean score on work style and differed significantly ($p < .05$) from other clusters. Similarly, Cluster 7 with its musicians (M = -.616) attained significantly different ($p < .05$) scores than other clusters. Work style had 16 significant mean differences across seven clusters.

Factor 6 (work context) also varied significantly over four clusters. In Cluster 7, musicians (M = 1.416) had the highest score and differed significantly ($P < .05$) from other clusters. Also, Cluster 2 with teachers (M = .499), Cluster 4 with personnel managers (M = -.084), and Cluster 7 with musicians (M = 1.416) differed significantly ($p < .05$) from other clusters. As noted, musicians scored highest and personnel managers scores lowest on work context. Out of 21 possibilities, the work context factor

had 15 significant mean differences among the clusters.

Factor 7 (public performance) differed significantly across four cluster groupings. The mixed occupations in Cluster 6 (M = -.318) differed significantly ($p < .05$) from personnel manager and insurance agents in Clusters 1 (M = .569), and teachers in both Cluster 2 (M = .565) and Cluster 5 (M = .180). Personnel managers in Cluster 3 (M = -.632) varied significantly ($p < .05$) from Clusters 1, 2, 5 and 7. The public performance factor attained the lowest number (i.e., 11) of significant mean differences among the clusters.

In sum, the JSI factors differed significantly among clusters. Of 21 possible differences in means among clusters, the JSI factors produced the following numbers of significant differences: task processes = 18; cognitive processes = 19; affective processes = 12; work focus = 13; relationship style = 16; job context = 15; and public performance = 11. From a total of 147 possible differences, the JSI factors generated 104 significant differences among seven clusters, for a 70.7% yield. The high frequency of significant differences suggested that JSI factors differentiated clusters well. This analysis provided additional evidence for the construct validity of JSI factors.

Discussion of Research Questions

The primary research question investigated whether the JSI demonstrated internal reliability and could identify similarities and differences among a set of occupations. Seven related research questions were offered and are discussed below.

1. The JSI demonstrates internal reliability. This question was confirmed.

Cronbach's coefficient alpha ranged from .965 to .985 across seven occupations for the total instrument. In terms of JSI component parts, coefficient alpha estimates ranged as follows: .949 to .961 for abilities; .916 to .956 for job content; .917 to .961 for work context; .721 to .879 for relationships, and .877 to .936 for work focus. Except for one estimate of .721 (relationship with civil engineers), all other internal reliability coefficients exceeded the recommended lower value of .80 for coefficient alpha.

2. The JSI identifies similarities among job groups in a large data set at the level of five job element categories and the total job. This hypothesis was partially confirmed. Cluster analysis results showed that JSI variables identified seven clusters as the optimal solution, but overlap did occur in the clusters. When component parts were analyzed separately, mixed results emerged. Abilities and job context variables suggested seven-cluster solutions, while job context, relationship and work focus variables pointed toward six-cluster solutions. In parts with fewer variables, more cluster overlap did occur. Cluster solutions from JSI parts seemed to reflect their corresponding reliability estimates, in that, parts with high reliability estimates appeared to give clearer cluster solutions, while parts with lower reliability estimates gave weaker solutions. One possible conclusion to draw was that the JSI as a total instrument was more accurate than any of its component parts in identifying similarities among jobs and that all 268 variables should be used in job analysis.

3. The JSI accurately differentiates cluster solutions. The hypothesis was tentatively confirmed as defined, but caution is advised with interpretation. Discriminant analysis results showed clear differentiation among clusters. Classification accuracy was

99% for 268 variables and 88% for 38 scales. Although discriminant analysis was recommended to test differentiation among clusters, its use of combined variables tended to violate distributional assumptions of normalcy. Therefore, a second discriminant analysis was conducted on the entire raw data set of 268 variables. Results showed no errors in classification of occupations as reported in Table 14. These outcomes require further investigation since classification errors typically occur. However, if these results can be confirmed and explained through additional research, accurate classification of job groups by the JSI could lead to predicting occupational matching for individuals based on their motivated behavior analysis.

4. The pairs of job groups with the strongest degrees of differentiation according to Holland's model are:

a. accountant and elementary school teacher;

b. personnel manager and secretary;

c. insurance agent and civil engineer.

Table 16 presented the squared distances between occupations based on discriminant analysis of 268 variables. The following results were observed:

a. The original six Holland occupations excluded musician; therefore, the hypothesis was confirmed that teacher was the occupation most distant from accountant. However, secretary was the occupation with the greatest distance from teacher, followed by insurance agent, then accountant. Thus, the equivocal results only partially confirmed this hypothesis.

b. The hypothesis was not confirmed that secretary was the occupation

furthest from personnel manager. Secretary was second closest after accountant. Civil engineer, insurance agent and teacher obtained distance scores greater than secretary. Using distance from secretary, personnel manager had the smallest distance estimate.

c. The hypothesis that insurance agent and civil engineer were most distant was not confirmed as stated. Only one point separated the distances from insurance agent to civil engineer, secretary and teacher. However, the distance from civil engineer to insurance agent was the greatest when musician was excluded. From this perspective, the hypothesis was confirmed.

Overall, the predicted distances between three sets of occupations based on Holland's RIASEC model were partially confirmed.

5. The pairs of job groups with the strongest degree of differentiation according to ACT's occupational classification system are:

a. accountant and instrumental musician;

b. insurance agent and civil engineer.

Referring to Table 16 which shows the squared distances between occupations, the following relationships were observed:

a. The hypothesized relationship between accountant and musician was confirmed. Both distances between these two occupations were the largest estimated by discriminant analysis.

b. The hypothesized relationship between insurance agent and civil engineer was not confirmed. The distances from both occupations ranked second after their respective relationship to musician.

6. The job groups with the weakest degree of differentiation according to ACT's occupational classification system are insurance agent, personnel manager and secretary. The hypothesized relationship was partially confirmed. Using personnel managers as the reference, the hypothesized relationship was confirmed. Using insurance agent as the reference, the hypothesized relationship was confirmed with personnel manager but not with the other occupations. Finally, using secretary as the reference, the hypothesized relationship was confirmed with personnel manager but not with insurance agent. Both accountant and engineer ranked in closer proximity.

7. The JSI identifies important job factors that describe a profile that has utility for human resource applications. As indicated earlier, this hypothesis required a subjective judgment. Principal factor analysis identified seven relatively independent factors among JSI scales. Analysis of variance showed that both JSI parts and JSI factors differed significantly across both occupations and clusters, and suggested that using either JSI parts or JSI factors would have utility in characterizing job groups.

From an applied perspective, the descriptive statistics generated from analyzing occupations have practical significance. For example, the JSI required only 25 to 30 minutes per to complete and it seemed easy to use. Job profiles assembled from the highest rated JSI variables could be used to define critical job specifications for use with applicants' motivational pattern reports or with behavioral description interviewing methods. Line managers typically have difficulty in conducting job analysis and in specifying selection criteria; the JSI could help to structure these tasks. However, to make the JSI functional in applied settings, operational definitions are needed to guide

users in how to determine selection criteria, predictor variables and rating measures.

In sum, the preliminary research presented here suggested that the JSI demonstrated high reliability, captured job variables and factors that differed significantly across occupations, and was an efficient method of job analysis.

ENDNOTES

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CHAPTER FIVE

SUMMARY AND CONCLUSIONS

This chapter provides an overview of the study, discusses questions and research findings, assesses limitations, offers conclusions, suggests possible applications for the inventory, and makes recommendations for future research.

An Overview of the Study

This study tested a new job analysis tool, the Job Specification Inventory (JSI), derived from a clinical-type behavioral consistency method (BCM) used to identify behavior thought to be intrinsically motivated. The JSI was designed to identify worker specifications of jobs as an initial step in measuring person-job (P-J) fit. If P-J fit could be defined and measured in terms commensurate with motivated behavior, then work performance and job satisfaction might be enhanced, resulting in desirable outcomes for individuals, organizations, and the larger society.

This study was placed in a broad context of public policy issues related to employment. The conflict between economic efficiency and social equity has been an ongoing public policy debate for over two decades. Recently, the debate has taken on new significance because of economic threats imposed by global competition and trends in the work force. High productivity, quality performance and cost containment are

operating imperatives in the new economy for both public and private organizations. In the past, employers relied on ability tests to help screen and select qualified workers. Ability tests have job-related predictive validity for use in employment decisions and have been linked to gains in job performance and organizational productivity.[1] Unfortunately, ability tests have adverse impact on some minority groups. In response, behavioral consistency methods (BCMs) have emerged as alternate selection strategies that use a content validity strategy for defining job-related criteria in the performance domain. The criteria are used to develop job-related measures for use in employment decisions. BCMs tend to be perceived as fair and nondiscriminatory by applicants because of their face validity. However, BCMs can be difficult and costly to develop and few employers seem to know how to use them. Meanwhile, the public policy debate on ability testing continues and valid alternative selection methods are needed. This is especially true with the growing diversity of the population and the work force and with the increasing skill requirements of jobs in the new economy.

The central thesis of this research was that the degree of P-J fit has significant consequences for the employee, the employer and the larger society. However, defining P-J fit has been problematic and a method that uses commensurate P-J terms is needed. BCMs are based on the principle that the best predictor of future performance is past performance. BCMs have been receiving increased attention due to their utility and legal defensibility. One BCM, developed by Miller, appears to tap intrinsic motivation which is linked to effective performance and high work satisfaction. His assessment method has shown reliability, validity, and client acceptance;[2] however, a commensurate job

analysis procedure has been lacking. This study attempted to fill that void by developing and testing the Job Specifications Inventory as a parallel job analysis method and as a step toward measuring P-J fit.

A multidisciplinary approach framed this study. First, behavioral consistency methods were reviewed in depth to explicate issues and to guide the research. Second, an interactionist perspective was incorporated to examine the complexity of P-J fit as a congruence problem. This review provided guidelines for conceptualizing the JSI.

Third, Miller's clinical assessment method was described and linked to behavioral consistency methods, interactionist models, and intrinsic motivation. Miller's BCM had not been linked previously to any theory. Mechanistic theories of motivation offered some insight but generally were not congruent with Miller's observations. Within this paradigm, Dawis and Lofquist's theory of work adjustment was the most compatible, but it left significant conceptual gaps with Miller's model. Within the organismic paradigm, Deci and Ryan's theory of self-determination and intrinsic motivation provided the most congruent framework for Miller's BCM. Although Deci and Ryan used different types of assessment data and methods in self-determination theory, their general description of intrinsic motivation dovetailed with Miller's observations about motivational patterns. Both models appeared to be describing essentially the same phenomenon but through differing methodologies and reference points. Miller's approach was method and behaviorally driven, while Deci and Ryan's work was theory and construct driven. However, both approaches characterized motivation similarly. This study assumed that Miller's BCM fell within the organismic paradigm and could be explained by self-

determination and intrinsic motivation theory.

A selective review of job analysis literature provided guidelines for designing and administering the JSI within parameters of acceptable professional practice. The JSI was developed iteratively with two pilot tests at an urban, state university. The pilot tests used two different job classes. Respondents, members of a Human Subjects Review Committee, a job analyst, and a survey researcher provided comments and recommendations to refine the inventory. Internal reliability estimates (low .90s) from pilot tests were adequate to justify continuation of the study. Sample size estimates were calculated for the field test involving seven occupations and were set conservatively at 140 observations per group.

The source and coverage of the JSI taxonomy, its iterative development, and the use of SMEs both during development and in the field test gave support for the content validity of the JSI.

Discussion of Research Questions and Findings

The first research question asked if the JSI demonstrated acceptable internal reliability. Acceptable internal reliability was operationally defined by a value of .80 or higher. Across occupations, the total instrument achieved internal reliability estimates of .96 to .98. Therefore, the first research question was confirmed.

Cronbach's coefficient alpha was calculated for each JSI part and for the total instrument by occupation. Internal reliability estimates based on the total inventory of 268 variables varied from .965 to .985. As shown in Table 3, reliability estimates for

JSI component parts ranged as follows: Part One (abilities) from .946 to .961; Part Two (job content) from .916 to .955; Part Three (job context) from .917 to .961. Respectively, these three parts accounted for 83, 61 and 86 JSI items, or for 230 of the 268 total variables. Not surprisingly, these JSI parts had higher reliability estimates than the remaining parts. These higher reliability estimates appeared to effect cluster analyses when component parts were segmented for evaluation. For example, both skills and content variables yielded seven-cluster solutions and clearer patterns than the other parts. Part Four (relationships) had 12 JSI items and the lowest reliability estimates in the study (.721 to .879). These lower reliability estimates appeared to create more variability in cluster analysis results.

Only the .721 reliability estimate on JSI Part Four (relationship) for civil engineers fell below the recommended .80 value. Examination of completed instruments revealed that almost half of the respondents were Naval officers, many with supervisory responsibilities. Rynes, Tolbert and Strausser found that managerial aspirations are common among both engineering students and experienced engineers and that such aspirations appear to be largely predispositional.[3] Perhaps the managerial predispositions of engineers affected their responses to the JSI. Except for this one group, all other JSI parts across occupations showed acceptable to high internal reliability.

Part Five (work focus) had reliability estimates from .877 to .936. Despite its difficulty to interpret, work focus seemed to cause little confusion among respondents. Since it is based on Miller's achievement taxonomy, the JSI is the only job analysis instrument that addresses work results in these terms.

In sum, the JSI demonstrated acceptable to high internal reliability and the first research question was confirmed.

The second research question asked if the JSI could accurately identify similarities among occupations at the levels of the total inventory and its five component parts. Cluster analysis results suggested that the total inventory accurately identified similarities among four or five occupational groups, but overlap emerged among three occupational groups. The total JSI appeared to be accurate in identifying similarities among accountants, civil engineers, musicians, secretaries and teachers. Insurance agents and personnel managers placed in two primary clusters each. Their overlap was explained by the close proximity of these occupations in both the Holland and ACT classification models.

As presented in Table 7, skill variables placed civil engineers, insurance agents, musicians, and secretaries into one primary cluster each. Skill variables clustered most clearly for teachers, secretaries and musicians, suggesting that other occupational groups had more overlap in the skills deemed important. Inspection of the highest rated variables in the occupational profile illustrations in Appendix C shows that the pattern of skill overlap for personnel managers, insurance agents, accountants and engineers included investigating, planning, evaluating and communicating. This skill pattern is similar to the cognitive processes factor shown in Table 19.

In Table 8, job content variables placed only engineers and musicians into one cluster each. Inspection of the highest rated variables in both occupations (Appendix C) revealed that only three to five content variables were rated important; perhaps this

narrow range accounted for their clear differentiation in cluster results. All other occupational groups were captured in two or three clusters each. Teachers occupied two clusters independent of other occupations. Business groups showed the greatest amount of overlap in job content. Inspection of their highest rated content variables in Appendix C revealed a pattern of numbers, facts, figures, money/financial information, polices, ethics and people.

As shown in Table 9, job context variables placed insurance agents and secretaries into one primary cluster each. The pattern of overlap among other occupational groups (Appendix C) included situational variables like pressure, stress, customer satisfaction, quality concern, effectiveness and, to some extent, team work.

In Table 10, relationship variables classified all occupations into two or more groups. As shown in Appendix C, the pattern of overlap included team work (as a member or leader) and individual contributors. Only personnel managers claimed a clear role as managers. These results made sense in terms of occupational role functions.

Finally, work focus variables placed all occupations into three or four clusters as shown in Table 11. Inspection of the highest rated variables in Appendix C showed that the overlap was relatively narrow, considering that 22 motivational orientations were listed on the JSI. A clear pattern emerged across occupational groups that included three primary foci: 1) demonstrating knowledge and/or competence; 2) reaching objectives and/or completing projects; and 3) satisfying expectations and/or meeting needs. Assuming some leeway to generalize, this observation suggested that these occupational groups have a narrower range in work focus or results than do people's motivational

directions in general. This observation implied that jobs and occupations might be more homogeneous and more narrow in focus on important rated outcomes than are people's intrinsic motivational patterns. While more data is needed to confirm these observations, the implication of this finding is that good P-J fit could elude both employers and employees in significant numbers. Additionally, this observation implied that assessment of a job's expected outcomes/results and of a person's motivational focus/direction should be included in employment decisions.

In sum, the cluster analysis results suggested that the JSI identified variables associated with occupational groups reasonably well. The inventory clearly differentiated five out of seven clusters. Overlap occurred among two to four occupational groups and varied by JSI parts. Overlap was most apparent among the business-related groups. Since occupations typically have common characteristics and requirements, cluster analysis should capture those similarities. Accordingly, some overlap among these occupational groups seemed reasonable.

The third research question asked if the JSI accurately differentiated between cluster solutions. As presented in Tables 12 and 13, discriminant analysis results showed that the JSI made clear distinctions between clusters based on discriminant function scores. However, these results were discounted, in part, because cluster analysis and JSI scale data used in discriminant analysis tended to violate distributional assumptions about normalcy. Additional discriminant analysis using the raw data matrix of 268 JSI variables by 451 observations resulted in correct classification of all respondents into their respective occupations as shown in Table 14. These results could be due to the fact

that the data did not represent a normal, multivariate population. The total sample was designed to emphasize dissimilarity between groups. Additionally, unequal sample sizes among occupations could have distorted the weighting of discriminant scores. These discriminant results should be verified with nonparametric methods and additional analyses. Nonetheless, it was noteworthy that the JSI scales were not as accurate as the 268 JSI variables. Similar to cluster analysis, the entire inventory of 268 variables discriminated occupational groups with more accuracy. These results suggested that using the entire inventory is preferable to using a reduced number of variables or subscales of variables.

The fourth research question used an external criterion to validate JSI discriminant results. This research question asked if the JSI could identify the pairs of occupations that were most dissimilar according to Holland occupational codes. The results were equivocal and the research question was only partially confirmed. As suggested by the nonsignificant correlation of .64 between JSI and Holland occupational rankings reported in Table 17, a reasonable interpretation is that the JSI taps different variables and/or structural factors than Holland's model. Perhaps the conceptual frameworks of the two models could explain the lack of significant relationship. The Holland occupational codes were based primarily on holistic judgments made by expert raters familiar with Holland's psychological constructs. Holland's classification criteria are derived from basic and occupation interests which tap an affective domain. The JSI occupational rankings were obtained from ratings of behavioral variables. These differences might reflect the low correlation between the two models. Regardless, the JSI differed from Holland's model.

The fifth research question evaluated the JSI's occupational group ranks based on discriminant analysis scores against the external criteria of the ACT occupational classification system's job families. Again, the results were equivocal and the research question was only partially confirmed. The ACT system used Department of Labor (DOL) job analysis procedures based primarily on analyses of job tasks and job content, but also on cognitive ability test criteria. However, as indicated by the significant ($p < .05$) correlation of .929 in Table 18, the JSI appeared to be more similar to the ACT classification model than to Holland's scheme. Perhaps the JSI could be used as an alternate or supplement to DOL job analysis methods; its content validity strategy should avoid adverse impact and its relative ease of use may provide a low cost approximation of DOL occupational classifications.

The sixth research question presented an alternate test of the JSI using ACT job families as external criteria. It asked if JSI discriminant score differences were smallest for three occupations located in close proximity on the ACT model. Again, discriminant results were equivocal and the research question was only partially confirmed.

In sum, the JSI appeared more closely related to ACT occupational classifications than to the Holland scheme for this data set. The significant correlation with the ACT classifications provided evidence to infer construct validity for the JSI as a job analysis instrument.

Additional analyses of JSI data were conducted to examine the structure of the inventory and its dynamics among occupations and clusters. First, factor analysis was employed to reveal underlying structure among variables in the data set. Then, several

analysis of variance tests gave insight into the effects of JSI parts and factors.

The 268 JSI variables were collapsed into 38 scales. Principal factor analysis was conducted with an oblique rotation and revealed seven factors--task processes, cognitive processes, affective processes, work focus, work context, work style and public performance. As presented in Table 19, the task processes factor related certain production-type abilities with specific classes of job content to imply task statements. Affective processes combined abilities, content, context and relationship variables that seemed to deal with people and the meaning of work. The work context factor was tied to measurements, standards and performance dimensions of a job. Work style dealt with how managers and influencers function. The public performance factor appeared to reflect the classroom or stage behavior of teachers and musicians. Table 20 showed moderate to low inter-factor correlations. Inspection of these correlations revealed the relative strength of each factor in rank order as follows: affective processes; work focus; task processes; cognitive processes; relationship style; job context; and public performance.

In sum, the JSI captured underlying structure among the occupational groups. However, the strength of the factors in differentiating occupational group and cluster differences was not apparent until additional analysis explicated their interactions among occupations and clusters.

Analysis of variance showed significant differences ($p < .01$) among occupational groups in their ratings of JSI parts (Table 21) and JSI factors (Table 25). Similarly, clusters differed significantly ($p < .01$) by JSI parts (Table 23) and by JSI factors (Table

27). JSI parts differed significantly ($p < .01$) across occupations and clusters, but JSI factors did not. Multiple comparison tests showed that the JSI captured 51 out of 105 possible significant ($p < .05$) mean differences, or 48.6%, in the occupations by parts interaction. For the clusters by parts interaction, the JSI produced 72 significant ($p < .05$) mean differences for 68% of the total. Similarly, JSI factors accounted for significant variance. In their interaction with occupational groups, JSI factors claimed 97 significant ($p < .05$) mean differences out of 147 possibilities for a 65.98% yield. Factor by cluster interactions produced a 70.7% yield with 104 significantly ($p < .05$) different mean scores. Overall, the statistically significant interaction effects provided evidence to infer construct validity for JSI parts, JSI factors and the total inventory.

Further construct validity evidence was provided by rank ordering the mean scores from each set of interactions. JSI parts displayed similar interaction patterns with both occupations (Table 29) and clusters (Table 31). Although work focus ranked first in importance, it had the fewest number of significant differences among JSI parts (Table 23). Apparently, raters across occupations had high agreement on the importance of specific work focus variables. Next, work context ranked second and skills ranked third in importance. Job content and work relationships tended to share the lowest ranks. This comparison supported the differentiating ability of the JSI to accurately place observations congruently with a priori defined criteria, namely, occupational groups.

JSI factors also showed high congruence between occupational groups (Table 30) and clusters (Table 32) in the rank ordering of mean scores. For example, engineers gave identical rankings between the two types of classifications, as did teachers in

Cluster 5. Inspection of factor ranks between the tables shows similar patterns between occupations and clusters.

In sum, the weight of all statistical analyses gave strong evidence that the JSI accounted for significant variance between and within occupational groups. The JSI found strong similarities and differences among the occupations. Further, the JSI displayed clear internal structure through its parts and factors, and their interactions across groups. Overall, the JSI demonstrated its ability to differentiate important characteristics among occupational groups.

Finally, the seventh research question asked if the JSI could identify important job specifications that described a profile with practical utility. While more development is needed to define operational procedures, several indicators supported this research question in some job analysis situations. Average JSI completion time was 25 to 30 minutes; even if the JSI replicated other classification methods, it may provide a more efficient alternative for defining job specifications. Additionally, literature reviewed in Chapter Two indicated that job analysis procedures should be reliable and valid. JSI internal reliability was substantial (.96 to .98 across occupations) and examination of each occupational profile suggested face validity. The higher scored variables were assembled as important worker specification profiles for their respective occupations. These occupational profiles might have face validity with job applicants, incumbents and employers. Further, as the above discussion illustrates, the JSI accounted for significant variance among groups and its structural components interacted with occupational groups differentially, suggesting evidence of construct validity. It is argued that the JSI

displayed acceptable internal reliability, that highly rated JSI variables described as a job profile showed face validity, and that the JSI was tolerant of varying administration conditions.

Limitations

Several limitations of this study were noted. First, typical sampling assumptions were not made. The total sample was designed to maximize the possibility of having the JSI find occupational distinctions; seven occupations were classified a priori by two external criteria to assure differences among samples. Additionally, respondents within occupations were not selected randomly. Convenience sampling of respondents was used to fill sample quotas. However, it is reasonable to assume that respondents were generally representative of their occupational groups. For example, insurance agents represented large, national firms with respected training programs and well defined job functions. Personnel managers worked in large to medium sized organizations in several industries nationwide. Teachers came from both public and private schools in both urban and suburban settings. Accountants represented large national firms and regional firms respected in the industry; these firms all competed from essentially similar labor pools and offered similar experience in auditing at the staff level. Secretaries were drawn from a university, public and private elementary schools, government agencies, a large newspaper and a large transportation company. Engineers, however, were obtained primarily from two organizations--the U.S. Navy and a transportation company, and, therefore, they could be less representative of civil engineers in general. Likewise,

musicians were surveyed primarily from military bands, which may account for their cluster strength.

Although occupations were chosen according to two external classification criteria to maximize differences, only white collar occupations were included in the study. As cluster analysis suggested, there was significant overlap among the occupational groups, especially those representing traditional business and administrative functions. The reliance on only white collar occupations probably restricted range, whereas a sample that included several blue collar and craft occupations might have shown greater differentiation.

The distribution and size of the samples could have affected discriminant analysis results. Classification errors were probable; no classification errors were improbable. Sample distributions and sizes could have combined to produce variable weights that distorted discriminant scores. A nonparametric method of discriminant analysis might give different results.

Second, sample sizes could have been a limitation. The targeted sample size of 140 respondents per occupation was not achieved. Larger sample sizes would have provided a more reliable test of the JSI. However, the sample sizes obtained were respectably above thirty observations per group and could permit some leeway in assuming population normalcy. Nonetheless, the differences in sample sizes could have influenced results. Cluster analysis tends to create structures with roughly equal sizes and may not give accurate results with unequal groups. Similarly, analysis of variance assumes a normal population, independence of scores, and groups of equal size. The

independence assumption was met and the fairly large sample sizes aided the normalcy assumption. As a safeguard, the general linear method (GLM) option was used to evaluate mean differences among groups to accommodate unequal group sizes.

Third, return rates might have limited interpretation of the results. Return rates varied from 5% to 90% within occupation by employer. Return rates were probably influenced by method of administration and by level of sponsoring organization support. Return rates were both highest and lowest among musicians. Those in a regional symphony orchestra provided a 5% return rate, while those in military bands gave 40% to 90% return rates. One group of military musicians was directed to complete the JSI; members in other groups were asked to participate. Respondents in other occupations gave from 18% to 35% return rates.

Personnel managers were surveyed directly by mail for an 18% return rate. This occupational group had the most consistent administration conditions. Their relatively low return rates were explained by two possible factors. The JSI originally was printed single-sided on heavy weight paper; its bulk and length probably dissuaded respondents from participating in the study. Additionally, initial JSI instructions estimated a one hour completion time which proved to be inflated. The length, bulk and stated time estimate of the JSI apparently served as disincentives for these busy professionals.

Approximately 12% of the returned JSIs in the first pilot test were unusable; less than 5% of field test JSI were returned in unusable condition. This suggested, in part, that revisions made during development were appropriate.

Conclusions

Several conclusions were made about the evaluation of the Job Specifications Inventory. First, the JSI demonstrated high internal validity. Two pilot test groups and seven field test groups attained acceptable reliability estimates in the mid to high .90s range. Since Cronbach's coefficient alpha is a conservative reliability test, future research would have a comfortable margin above the .80 value to support additional testing of the JSI.

Second, the JSI did find similarities and differences among the occupations in this data set. Cluster analysis, discriminant analysis and analysis of variance showed that the JSI differentiated systematically among groups. Restriction of range and unequal sample sizes could have influenced results, but the total weight of all analyses done in this study suggested that the JSI did account for significant variance among occupational groups in the total sample.

Third, the JSI revealed underlying structure within and among occupations. Principal factor analysis identified seven factors that varied systematically by occupational groups and by clusters. JSI parts also varied systematically by occupational groups and clusters.

Fourth, the JSI appeared to tap different job dimensions than Holland's typology or the ACT occupational classification model. However, the JSI was more similar to the ACT model based on ranked occupational distances.

Fifth, the JSI displayed practical utility as a job analysis instrument within the context of behavioral consistency methods. The JSI was relatively quick and easy to use;

it produced behavioral job profiles that could have utility in selection, placement and career management applications. The JSI showed significant results despite being administered under noncontrolled and varied conditions; therefore it may be tolerant of administration conditions in applied settings.

Sixth, the JSI reflected evidence of content validity. It was based on a taxonomy derived from behavioral data on over 20,000 diverse men and women. Its development was iterative and included SMEs in each phase. Further, the field test showed high reliability within groups of SMEs.

Seventh, the discriminating ability of the JSI improved when all 268 variables were used. Factor analysis showed that variables combined across JSI parts to differentiate occupational groups. JSI variables did not operate in isolation, but covaried by group.

Eighth, SMEs were adept in making judgments about JSI variables given the high reliability within groups, the systematic differentiation among groups on JSI variables, and the varied administration conditions.

Finally, the cumulative results from cluster analysis, discriminant analysis, factor analysis, and analysis of variance provided construct validity evidence for JSI parts, JSI factors and the total instrument. Additionally, the use of independent SMEs to rate the JSI strengthens support for construct evidence.

Implications for Theory and Practice

A legitimate challenge could be raised about the need for and value of developing

the JSI. Many reliable and sophisticated job analysis procedures exist. What contributions and what incremental value could the JSI add to human resource management and the study of P-J fit?

JSI job analysis could add value in several ways. First, the JSI used person-centered information since its taxonomy was derived from content analyses of over 160,000 actual behavioral incidents from over 20,000 men and women both here and abroad.[4] The extensive breadth and depth of source coverage suggests that the JSI could generalize across sexes, races, and cultures. This inferred transportability of JSI worker specifications could have importance in the global economy as organizations move jobs and workers to new locations around the world.[5]

Second, since the person-centered taxonomy was performance based, the JSI analyzed jobs in terms commensurate with performance. Thus, the test and performance domains were interchangeable. This congruence in data could allow point-to-point comparisons of persons and jobs that reveals dynamic interactions in new terms. It could support research on P-J fit

Third, as Cascio observed, leading job analysis instruments are more suited to blue collar jobs while managerial jobs, in particular, and professional jobs are difficult to analyze.[6] Since the JSI taxonomy was derived mainly from managers and professionals whose achievement incidents were work related, it should have content validity for analyzing managerial and professional jobs.

Fourth, the JSI taxonomy used 268 variables in five performance dimensions--abilities and skills, job content, job context, work relationships and work focus. These

variables and performance dimensions provided extensive coverage of worker specifications given the significant differentiation seen among occupational groups. The JSI is not a narrowly focused inventory; it captures multiple attributes. This is important since multiple attributes contribute to effectiveness in professional, managerial and executive positions where whole person measurement is needed.[7] The JSI would be appropriate to use in this context.

Fifth, the source of JSI variables was presumed to be intrinsically motivated behavior. Accordingly, the JSI probably incorporated the stimulus conditions for effective performance (work adjustment theory) and/or the optimal challenge parameters (self-determination and intrinsic motivation theory) as jobs were analyzed and profiled. These constructs have been linked to sustained, high quality performance. Work motivation is seen as human capital in this era of cost containment, total quality management, and productivity improvement.

Sixth, the JSI variables represented elemental first-order skills and other performance dimensions. While this level of detail and specificity created measurement complexity, it also added precision to JSI analyses as evidenced by the statistical test results. Using first-order KSAOs should provide face validity to end-users of job analytic information. Further, the worker specifications described by the JSI were rated reliably by SMEs and, therefore, should enable end-users to adopt the inventory in applied settings with minimal investment.

Seventh, as Hough's research on the accomplishment record method suggested, behavioral consistency methods tap performance domains unrelated to traditional selection

indicators.[8] Accordingly, the JSI could be used to supplement and complement established selection systems without negating other selection criteria. From a selection perspective, the JSI could add incremental validity to selection decisions without requiring the costly redesign of existing systems.

Eighth, the combination of using the JSI with Miller's BCM could show high utility in the later stages of a selection process when detailed information is critical for deciding among top candidates. Since the performance and test domains are interchangeable, there is psychological fidelity between the JSI and Miller's BCM. Both procedures use similar judgment processes. Accordingly, the JSI/BCM model might provide an important increment of high quality information to refine selection decision when staffing key positions.

Ninth, no job analysis method was available as a parallel procedure to Miller's BCM. The JSI helped to address the criterion problem inherent in using Miller's BCM as a predictor and, thus, could improve the utility of Miller's procedure in applied settings.

Tenth, the development and use of the JSI could offer another theoretical framework for conducting research on P-J fit and other human resource management problems. The JSI represents a taxonomy of behavior linked to intrinsic motivation. No other approach to the study of work-related motivation currently provides the level of detail found in Miller's BCM. Its rich information could offer new possibilities for research at the level of the individual. Further, it might contribute to research in self-determination and intrinsic motivation theory.

Eleventh, research on job analysis as a content validity strategy has been lean.[9] Further, there has been a dearth of KSAO taxonomies.[10] The JSI might contribute to both of these research needs.

Additionally, a large scale motivational problem might develop with the declining promotional opportunities imposed by organizational downsizing and the elimination of managerial and professional positions.[11] Many individuals might confront career plateaus at mid-life or earlier because of flattened organizations and fewer career ladders. One possible solution would be the development of career lattices in organizations that could offer a variety of career paths for individual development and contribution across occupations and organizations.[12] The JSI might provide a means to classify occupations in terms of worker specifications that could support the definition of career lattices.

Next, job analysis should be taken to higher levels, like occupations and occupational groups, and should capture situational and organizational factors. Higher level job analysis would search for commonalities in work and for constructs that contribute to effective performance across occupations. Such an approach would allow organizations to maximize their management of human resources with more accurate transfer of KSAOs, and thus, be able to adapt to changing environmental conditions with more effectiveness.[13] The cumulative results from the field test suggested evidence of construct validity for the JSI in differentiating occupational groups. Accordingly, the JSI might have utility in higher level occupational analysis.

Finally, the JSI should be considered within the imperatives of public policy. For over 25 years, there has been an ongoing public policy conflict over economic efficiency

and social equity. Both public and private organizations must operate productively and must use fair employment practices. The JSI/BCM model explored here addressed the problem of person-job fit within these public policy issues. The JSI incorporated a content validity strategy that should be fair to minority groups and legally defensible for employers. Further, since it is based on effective and motivated performance, the JSI might contribute to productivity in organizations and satisfaction for individuals. These are important management issues.

The development and test of the Job Specifications Inventory were preliminary steps toward improving P-J fit. When coupled with commensurate assessment data, the JSI could yield information for use in: selection and placement decisions; human resource planning; career pathing; occupational group analysis; career counseling; and daily human resource management.

Recommendations for Future Research

Considering the limitations of this study, future research should first address issues of sample size and distribution of occupations. The existing data set should be enlarged to have roughly equal sample sizes per occupation. This would provide a more rigorous test of the JSI with cluster analysis, discriminant analysis and analysis of variance. Furthermore, if the total data set could be enlarged to over 2,000 observations, factor analysis could be done at the variable level. Although this would generate a very large factor matrix, doing so would yield more specificity for identifying factors and occupational structure.

Restriction of range should be addressed in the future. Several blue collar and craft occupations should be added as contrast groups. Doing so may give a fairer test of the JSI's ability to capture similarities and differences among occupations. Similarly, one or two scientific occupations should be added to round out the occupational spread among white collar jobs. These groups would be difficult to survey in requisite numbers given return rates reported here, but their participation would add dimensionality to the total data set.

Given the length of the JSI, standard optical scanning answer sheets were not available and a custom designed one would have been prohibitively expensive. However, if the JSI warrants further research and development, then investment in creating an optical scanning answer sheet and a question booklet would cut overall costs and improve reliability.

After addressing issues of sample size and distribution, the results of this preliminary study should be verified and challenged by replicating some procedures and by using alternate procedures. The cluster analysis results using Ward's method indicated cluster overlap among three occupations. Although no longer available in SAS, an overlapping cluster analysis procedure should be run to compare cluster solutions and occupational distributions. Additionally, the discriminant analysis results must be challenged. With the current data set, nonparametric discriminant functions should be calculated and their results should be compared with the frequency table and error rates reported here for the 268 JSI variables. Additionally, the research questions that addressed distances between occupations should be revisited with any new data for both

the Holland typologies and the ACT occupational classification system. If occupation samples were sufficiently large, factor analysis by occupation might reveal important structural dimensions within groups that could contribute to understanding dynamics of occupational mobility. Additionally, occupational factor analysis might shed new light on performance dimensions within occupations. For example, certified public accountants (CPAs) in this study rated the role of team member as being most important at the staff level; however, the role of CPA partner has different relational demands--supervision, client and business development, and partner relations. Understanding these distinctions is important for career management and firm performance. Similarly, the array of competencies required at the first and second tiers of management are different than those required for effectiveness as a general manager. As mentioned in Chapter Two, analysis of management positions has been a problem; perhaps the JSI could be used to identify critical job specifications in management positions and to differentiate the critical performance differences between various levels of management.

The issue of measuring P-J fit remains. Next steps in the development of the JSI/BCM model could be the exploration and testing of P-J fit indices. For example, the most highly rated variables on both persons and jobs could be used to examine congruence. Alternately, the JSI could be converted to a person assessment inventory, tested, then used with commensurate JSI job analysis data to produce a P-J fit index as a score. To illustrate, the score could be correlated with job performance criteria (e.g., sales performance of insurance sales agents) to test the construct of P-J fit. Further, the P-J fit score could be analyzed by job satisfaction measures taken from self-determination

theory to test both the construct of P-J fit and the intrinsic motivation assumptions of Miller's BCM.

Finally, the JSI should be put to controlled practical use by line managers to evaluate its efficacy. Specifically, an initial test of the JSI could be made in organizations using behavioral description interviewing methods. Managers could use the JSI to analyze jobs, define performance factors, formulate interview questions and prepare structured rating forms to evaluate candidates' responses. Ease of use and the content validity of the resulting job profiles could be evaluated by managers and applicants. A more rigorous test could involve organizations currently using Miller's BCM for assessing individuals. Since motivation patterns exist on job incumbents in these organizations, jobs could be analyzed with the JSI to provide point-to-point comparisons of person and job characteristics. An index of P-J fit could be correlated with outcome measures, such as supervisor performance ratings, job satisfaction, absenteeism, stress, strain, turnover, and, if available, hard indicators of productivity. Such a research and development effort might contribute to productivity improvement and the quality of work life.

ENDNOTES

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11. Offermann, Lynn, and Marilyn Gowing. Personnel selection in the future: the impact of changing demographics and the nature of work. In Personnel Selection in Organizations by Neal Schmitt, Walter Borman and Associates. San Francisco: Jossey-Bass, 1993. p. 386.

12. Ibid., p. 406.

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APPENDIX A

Cover Letter and Job Specifications Inventory

SAMPLE COVER LETTER

Dear :

You are being asked to participate in the **Occupational Research Project**. The purpose of this research is to develop occupational or job profiles that can enhance career and employment decisions for both job candidates and employers and that can help us understand person-job fit better. This project is important because very little research has been done from the perspective of analyzing occupations based on the importance of specific motivational characteristics. This project is being sponsored, in part, by the Middle Atlantic Placement Association and the Southern College Placement Association.

You are being asked to participate in this study because of your position and your first-hand knowledge of the work of the (name of occupation). Your evaluation of this occupation is very important and provides the basis for an accurate analysis of job characteristics and requirements.

My request is that you serve as a "subject matter expert" on the occupation of (named) by completing the attached Job Specifications Inventory (JSI). The JSI is easy to complete and, compared to other job analysis procedures that take several hours, the JSI can be finished in 30 to 35 minutes. All of your responses are confidential and will be used only in combination with those of other respondents to develop a behavioral profile of the job.

Please return the completed JSI in the next 3 to 4 weeks to me in the envelope provided. If you would like a copy of the research report when completed next winter, please return this cover letter with your JSI.

Your knowledge of the (named) occupation is important and valuable. I thank you in advance for your cooperation and assistance in this research. Please call me if you have any questions.

Sincerely,

William J. Banis

JOB SPECIFICATIONS INVENTORY

Introduction: The Job Specifications Inventory (JSI) is used to identify and evaluate the importance of specific job characteristics. The only special knowledge you need to complete the JSI is a clear understanding of the job being evaluated. Your evaluation of this job is very important, in that, it may help employers, employees and career counselors understand job requirements better in order to improve employment decisions.

Organization: The JSI is divided into 5 main sections that reflect different job characteristics:

(1) abilities and skills required for effective performance on the job;
(2) generic content or subject matter that is part of the job;
(3) situational factors and circumstances typically encountered on the job;
(4) type of relationships required with others on the job;
(5) work results or outcomes expected for effective job performance.

The JSI is easy to complete. First determine if each defined characteristic is part of the job, then evaluate its overall importance in the job by drawing a circle around the most appropriate rating based on your understanding of the job. Not every JSI characteristic listed will apply to this job.

Instructions for Completing the JSI:

1. Note below the position being evaluated. You should have a working knowledge of the job from your personal experience in actually performing the job or from closely observing someone who has worked in the job. Your reviewing a current job description may be helpful in rating JSI items.

2. Please schedule one-half hour of uninterrupted time to complete the JSI.

3. Next, if possible, please recall up to the five (5) most effective and the five (5) least effective persons you can remember who held this job. Think about the differences in performance between the most and least effective persons. This comparison will help you to identify the most important job characteristics. Use initials only as a personal reminder.

   Most Effective Performers = 1. _____; 2. _____; 3. _____; 4. _____; 5. _____.

   Least Effective Performers = 1. _____; 2. _____; 3. _____; 4. _____; 5. _____.

4. Proceed through all five sections and rate each item. As you rate each item, keep the entire job in mind. Refer to a job description if needed. Ask yourself how important each characteristic is for this job in this organization. Then, rate each item in terms of its overall importance in the job.

6. If you have questions about the meaning of any term, please refer to a dictionary.

7. If you have questions about completing the JSI, please call the person listed on the last page.

8. Please complete the identifying information on page two then proceed with the job evaluation. Your responses will remain confidential and will be use only to create a composite profile of the job.

Please evaluate the following job:

Title of Job: PERSONNEL or HUMAN RESOURCE MANAGER/DIRECTOR

Name of Your Employer: _____

Your NAME: Last_____First_____MI_____

A. Your Social Security Number: _____/_____/_____ Today's Date:_____

Your Current Job Title:_____

B. How long have you been in this position? (1) Years =_____; (2) Months = _____.

C. What is your relationship to the job under study: (Check one)

____ 1) INCUMBENT: Currently performing job.
____ 2) FORMER INCUMBENT: Previously performed the job.
____ 3) SUPERVISOR: Currently supervise individual(s) who perform(s) job.
____ 4) SUBORDINATE: Currently supervised directly by individual who performs the job.
____ 5) KNOWLEDGEABLE COLLEAGUE OR OBSERVER: Not in reporting line but am familiar with the job functions and tasks.
____ 6) JOB ANALYST OR HUMAN RESOURCE PROFESSIONAL
____ 7) OTHER: (Please Specify)_____

D. How long have you had a working knowledge of the job under study?

1) Number of Years:_____; 2) Months:_____.

E. How knowledgeable are you about the job under study? (Check one)

___ 0. No direct knowledge
___ 1. Little direct knowledge
___ 2. Some direct knowledge
___ 3. Substantial amount of knowledge
___ 4. Exceptional amount of knowledge
___ 5. Actually performed job

RATING SCALE: For each JSI item, please rate its overall importance in the job. CIRCLE the most appropriate response according to the following rating scale:

0 = DOES NOT APPLY to this job and is not a required part of the job.

1 = Very Low Importance overall in the job.

2 = Low Importance overall in the job.

3 = Moderately Low Importance overall in the job.

4 = Moderate Importance overall in the job.

5 = Moderately High Importance overall in the job.

6 = High Importance overall in the job.

7 = Very High Importance overall in the job.

FOR OFFICE USE ONLY

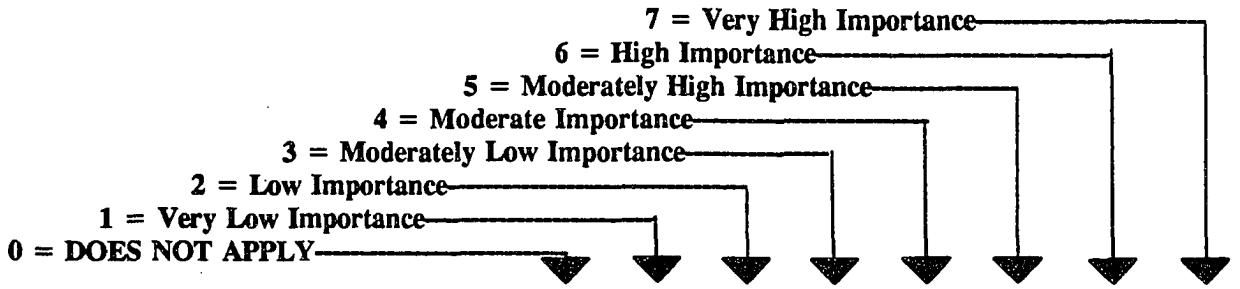
F. Employer Code = 303. G. DOT Number = 166117018. H. Holland Code = AES.

I. ACT Number = 310. J. ACT Group Code = B. K. Class = 03.

PART I: ABILITIES AND SKILLS REQUIRED FOR EFFECTIVE JOB PERFORMANCE - Please identify the skills required for effective performance in this job by circling the most appropriate response based on your understanding of the job. Use the importance rating scale.

0 = DOES NOT APPLY
1 = Very Low Importance
2 = Low Importance
3 = Moderately Low Importance
4 = Moderate Importance
5 = Moderately High Importance
6 = High Importance
7 = Very High Importance

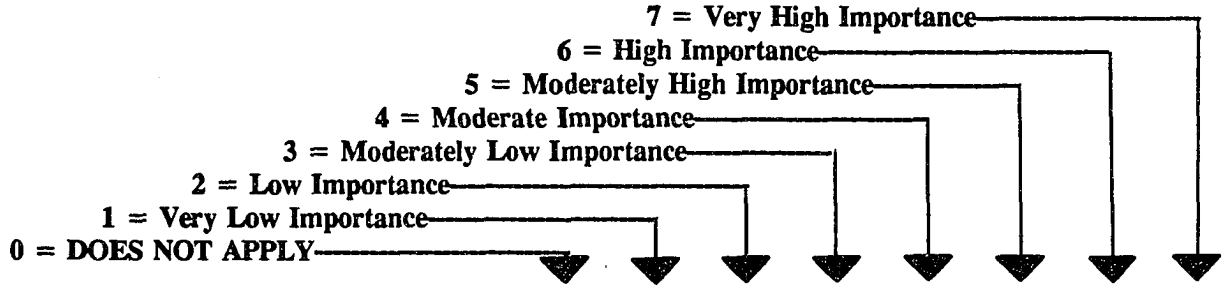
How important is it to **LEARN** on the job by:								
1. studying, reading	0	1	2	3	4	5	6	7
2. observing, examining.....	0	1	2	3	4	5	6	7
3. listening, expressing.....	0	1	2	3	4	5	6	7
4. doing, trying.....	0	1	2	3	4	5	6	7
5. memorizing, repeating.....	0	1	2	3	4	5	6	7
How important is it to **INVESTIGATE** on the job by:								
6. surveying, gathering information ...	0	1	2	3	4	5	6	7
7. interviewing, inquiring.....	0	1	2	3	4	5	6	7
8. in-depth researching.....	0	1	2	3	4	5	6	7
9. tinkering.....	0	1	2	3	4	5	6	7
How important is it to **EVALUATE** on the job by:								
10. analyzing	0	1	2	3	4	5	6	7
11. empathizing, discerning.....	0	1	2	3	4	5	6	7
12. deciding pros & cons, judging merits...	0	1	2	3	4	5	6	7
13. figuring, calculating.....	0	1	2	3	4	5	6	7
14. comparing to a standard.....	0	1	2	3	4	5	6	7
15. appraising worth, assessing value....	0	1	2	3	4	5	6	7
How important is it to **CONCEPTUALIZE** on the job by:								
16. conceiving ideas, concepts.....	0	1	2	3	4	5	6	7
17. visualizing, picturing.....	0	1	2	3	4	5	6	7



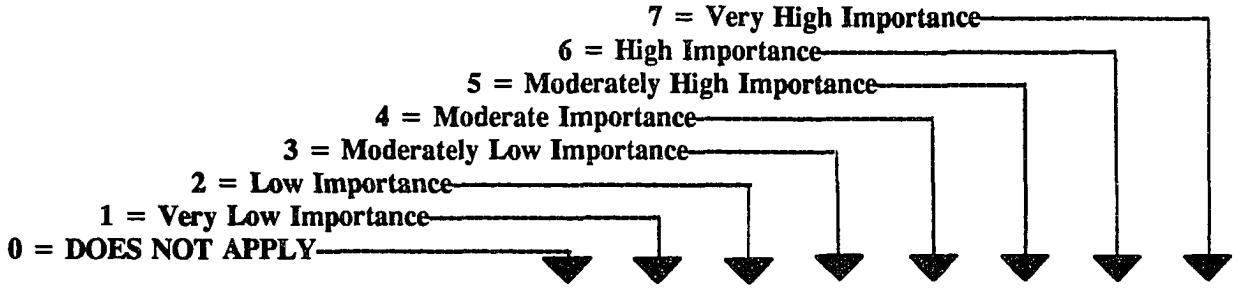
18. hypothesizing, theorizing.....	0	1	2	3	4	5	6	7
19. fantasizing, imagining.....	0	1	2	3	4	5	6	7
How important is it to **ORGANIZE** on the job by:								
20. structuring, providing definition....	0	1	2	3	4	5	6	7
21. classifying, categorizing.....	0	1	2	3	4	5	6	7
22. gathering pieces together, integrating	0	1	2	3	4	5	6	7
23. systematizing, establishing procedures...	0	1	2	3	4	5	6	7
How important is it to **PLAN** on the job by:								
24. setting goals.....	0	1	2	3	4	5	6	7
25. strategizing, charting course.....	0	1	2	3	4	5	6	7
26. arranging details, scheduling.....	0	1	2	3	4	5	6	7
27. laying out, drafting.....	0	1	2	3	4	5	6	7
28. practicing, getting ready.....	0	1	2	3	4	5	6	7
How important is it to **DO** or **ACT** by:								
29. following directions, implementing...	0	1	2	3	4	5	6	7
30. doing something manually, physically...	0	1	2	3	4	5	6	7
31. operating something, running it.....	0	1	2	3	4	5	6	7
32. maintaining, keeping in condition....	0	1	2	3	4	5	6	7
How important is it to **CREATE** on the job by:								
33. painting.....	0	1	2	3	4	5	6	7
34. composing.....	0	1	2	3	4	5	6	7
35. inventing, innovating.....	0	1	2	3	4	5	6	7
36. designing.....	0	1	2	3	4	5	6	7

0 = DOES NOT APPLY
1 = Very Low Importance
2 = Low Importance
3 = Moderately Low Importance
4 = Moderate Importance
5 = Moderately High Importance
6 = High Importance
7 = Very High Importance

37. writing (creatively).....	0	1	2	3	4	5	6	7
38. processing (creatively).....	0	1	2	3	4	5	6	7
39. sculpting.....	0	1	2	3	4	5	6	7
How important is it to **PERFORM** by:								
40. playing an instrument.....	0	1	2	3	4	5	6	7
41. acting a role.....	0	1	2	3	4	5	6	7
42. singing.....	0	1	2	3	4	5	6	7
43. dancing.....	0	1	2	3	4	5	6	7
44. public speaking, giving presentations...	0	1	2	3	4	5	6	7
How important is it to **DEVELOP** by:								
45. growing, cultivating, building up....	0	1	2	3	4	5	6	7
46. adapting, modifying, improvising.....	0	1	2	3	4	5	6	7
47. synthesizing, blending, formulating..	0	1	2	3	4	5	6	7
48. adding to, extending.....	0	1	2	3	4	5	6	7
49. refining, clarifying.....	0	1	2	3	4	5	6	7
How important is it to **PRODUCE** something by:								
50. constructing, building.....	0	1	2	3	4	5	6	7
51. assembling, fabricating.....	0	1	2	3	4	5	6	7
52. molding, forming, shaping.....	0	1	2	3	4	5	6	7
53. crafting, making.....	0	1	2	3	4	5	6	7
54. processing.....	0	1	2	3	4	5	6	7
How important is it to **OVERSEE** by:								
55. monitoring, checking, making sure....	0	1	2	3	4	5	6	7



56. coordinating performance of others...	0	1	2	3	4	5	6	7
57. directing how it is to be done.....	0	1	2	3	4	5	6	7
58. manipulating, subtly controlling.....	0	1	2	3	4	5	6	7
59. facilitating, providing a way.....	0	1	2	3	4	5	6	7
60. leading, showing the way.....	0	1	2	3	4	5	6	7
61. actively managing others' talents....	0	1	2	3	4	5	6	7
62. nursing, caring for.....	0	1	2	3	4	5	6	7
How important is it to **INFLUENCE** on the job by:								
63. initiating, suggesting.....	0	1	2	3	4	5	6	7
64. selling.....	0	1	2	3	4	5	6	7
65. motivating, inspiring.....	0	1	2	3	4	5	6	7
66. convincing, persuading.....	0	1	2	3	4	5	6	7
67. mediating, arbitrating.....	0	1	2	3	4	5	6	7
68. negotiating, bargaining.....	0	1	2	3	4	5	6	7
69. politicking, positioning.....	0	1	2	3	4	5	6	7
70. involving, getting participation.....	0	1	2	3	4	5	6	7
71. counseling, advising.....	0	1	2	3	4	5	6	7
72. encouraging, nurturing.....	0	1	2	3	4	5	6	7
73. promoting, marketing.....	0	1	2	3	4	5	6	7
How important is it to **TEACH** on the job by:								
74. lecturing, instructing.....	0	1	2	3	4	5	6	7
75. tutoring, guiding.....	0	1	2	3	4	5	6	7
76. stimulating, eliciting response.....	0	1	2	3	4	5	6	7



77. demonstrating, showing.....	0	1	2	3	4	5	6	7
78. coaching, mentoring.....	0	1	2	3	4	5	6	7

How important is it to **COMMUNICATE** on the job by:

79. articulating, explaining.....	0	1	2	3	4	5	6	7
80. conferring, discussing.....	0	1	2	3	4	5	6	7
81. reporting, describing.....	0	1	2	3	4	5	6	7
82. publicizing, getting the word out....	0	1	2	3	4	5	6	7
83. writing.....	0	1	2	3	4	5	6	7

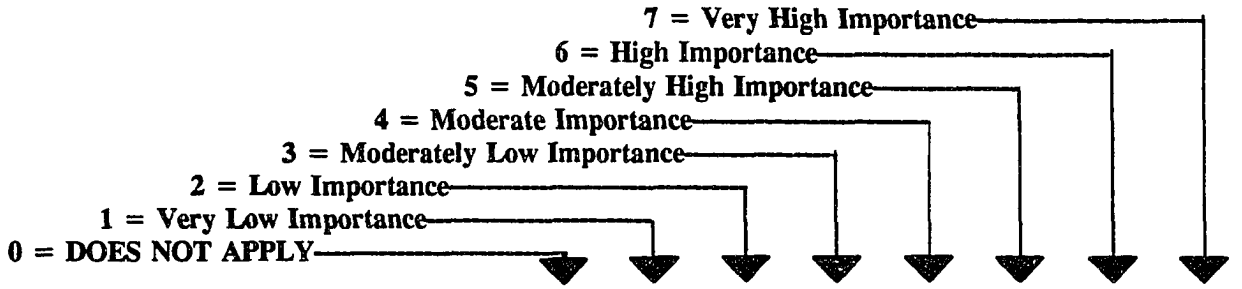
PART TWO: GENERAL JOB CONTENT AND SUBJECT MATTER - Please identify and evaluate the importance of the general job content or subject matter that an incumbent uses to get results on the job.

How important are INTANGIBLES in the job?

84. Values, ethics.....	0	1	2	3	4	5	6	7
85. Ideas, theories, concepts.....	0	1	2	3	4	5	6	7
86. Principles, philosophy.....	0	1	2	3	4	5	6	7
87. Policies.....	0	1	2	3	4	5	6	7
88. Knowledge, information.....	0	1	2	3	4	5	6	7
89. Thoughts, expression.....	0	1	2	3	4	5	6	7
90. Spiritual, religious matters.....	0	1	2	3	4	5	6	7

How important are TANGIBLES in the job?

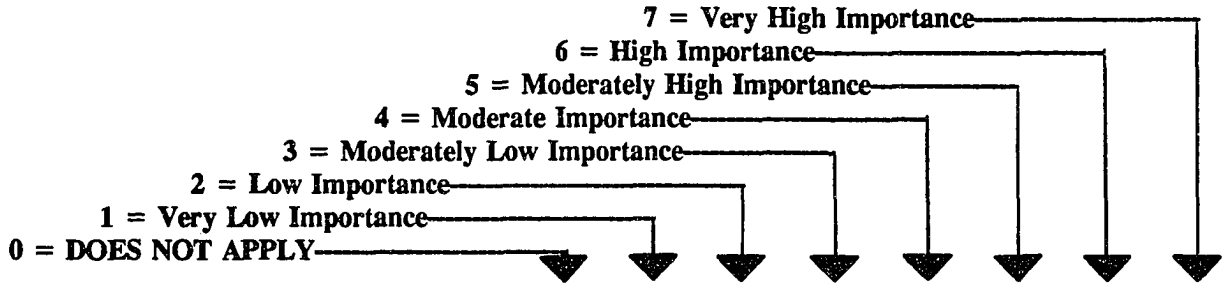
91. Materials - metal, wood, clay, etc.	0	1	2	3	4	5	6	7
92. Phenomena of any kind.....	0	1	2	3	4	5	6	7
93. Physical objects.....	0	1	2	3	4	5	6	7
94. Structural objects.....	0	1	2	3	4	5	6	7



95. Animals.....	0	1	2	3	4	5	6	7
96. Plants.....	0	1	2	3	4	5	6	7
97. Machinery.....	0	1	2	3	4	5	6	7
98. Vehicles.....	0	1	2	3	4	5	6	7
99. Instruments, gadgets.....	0	1	2	3	4	5	6	7
100. Tools.....	0	1	2	3	4	5	6	7
101. Equipment.....	0	1	2	3	4	5	6	7
How important are DATA elements in the job?								
102. Details, particulars.....	0	1	2	3	4	5	6	7
103. Numbers, figures.....	0	1	2	3	4	5	6	7
104. Logistics, arrangements.....	0	1	2	3	4	5	6	7
105. Money, financial information.....	0	1	2	3	4	5	6	7
106. Words.....	0	1	2	3	4	5	6	7
107. Language.....	0	1	2	3	4	5	6	7
108. Facts, data.....	0	1	2	3	4	5	6	7
Are PEOPLE a focus of work?								
109. People as individuals.....	0	1	2	3	4	5	6	7
110. People in groups.....	0	1	2	3	4	5	6	7
111. People in societies, cultures.....	0	1	2	3	4	5	6	7
112. Human behavior.....	0	1	2	3	4	5	6	7
Is SCIENTIFIC or TECHNICAL CONTENT used?								
113. Mathematics.....	0	1	2	3	4	5	6	7
114. Life Science.....	0	1	2	3	4	5	6	7

7 = Very High Importance
6 = High Importance
5 = Moderately High Importance
4 = Moderate Importance
3 = Moderately Low Importance
2 = Low Importance
1 = Very Low Importance
0 = DOES NOT APPLY

115. Physical Science.....	0	1	2	3	4	5	6	7
116. Engineering.....	0	1	2	3	4	5	6	7
117. Environmental science.....	0	1	2	3	4	5	6	7
118. Behavioral science	0	1	2	3	4	5	6	7
119. Social science.....	0	1	2	3	4	5	6	7
120. Scientific experimentation.....	0	1	2	3	4	5	6	7
121. Evaluation research.....	0	1	2	3	4	5	6	7
Are SENSORY OR VISUAL ELEMENTS used?								
122. Colors.....	0	1	2	3	4	5	6	7
123. Shapes, forms.....	0	1	2	3	4	5	6	7
124. Motion, rhythm.....	0	1	2	3	4	5	6	7
125. Sound, music.....	0	1	2	3	4	5	6	7
126. Design.....	0	1	2	3	4	5	6	7
127. Texture, feel.....	0	1	2	3	4	5	6	7
128. Taste, smell.....	0	1	2	3	4	5	6	7
129. Scenes, pictures.....	0	1	2	3	4	5	6	7
130. Space, spatial relationships.....	0	1	2	3	4	5	6	7
Are certain MECHANISMS used in the job?								
131. Strategies, tactics.....	0	1	2	3	4	5	6	7
132. Techniques, methods.....	0	1	2	3	4	5	6	7
133. Systems.....	0	1	2	3	4	5	6	7
134. Procedures.....	0	1	2	3	4	5	6	7
135. Controls, constraints.....	0	1	2	3	4	5	6	7

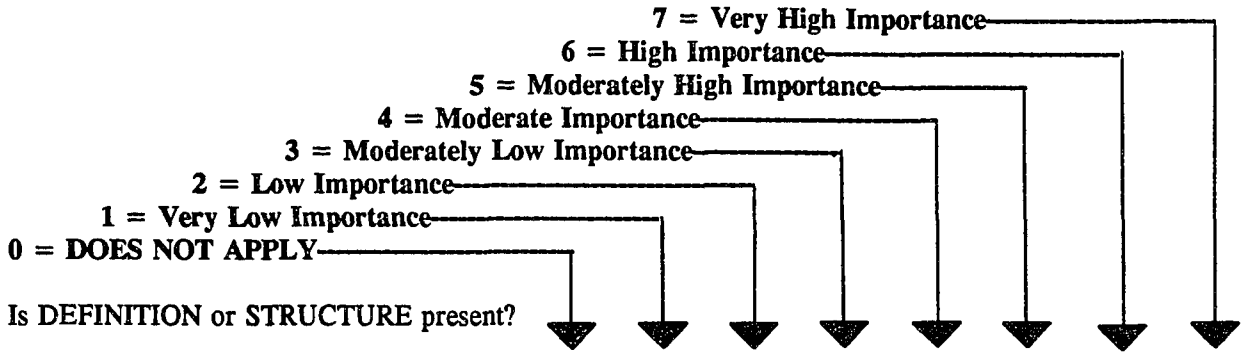


136. Technology.....	0	1	2	3	4	5	6	7
137. Trade, craft.....	0	1	2	3	4	5	6	7
138. Calculations, estimations.....	0	1	2	3	4	5	6	7
139. Personal expertise.....	0	1	2	3	4	5	6	7
140. Roles, parts.....	0	1	2	3	4	5	6	7
141. Models, examples.....	0	1	2	3	4	5	6	7
142. Graphics, pictures.....	0	1	2	3	4	5	6	7
143. Stories, literature.....	0	1	2	3	4	5	6	7
144. Networks, interrelationships.....	0	1	2	3	4	5	6	7
145. Angles, perspectives, contexts.....	0	1	2	3	4	5	6	7

PART THREE: JOB CIRCUMSTANCES AND SITUATIONAL FACTORS - This section asks you to evaluate the environmental and situational dimensions that are part of the job in this organization. Some of the elements may seem unusual at first and you may have to think about their relationship to the position.

Are ACTIVATING FACTORS important in the job?

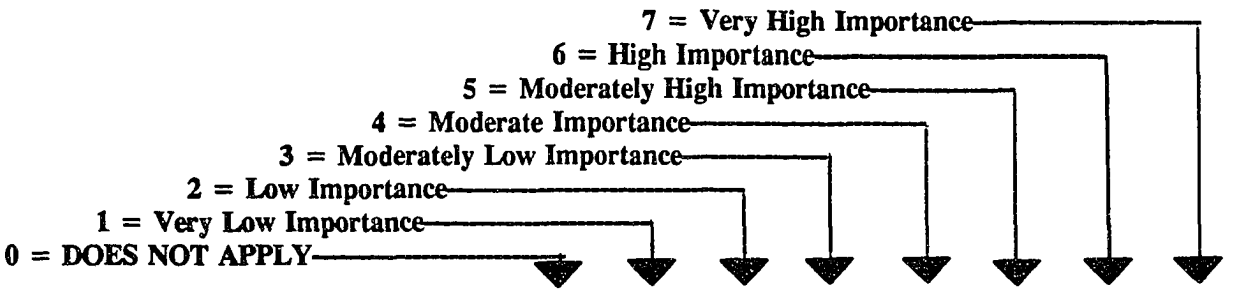
146. Needs.....	0	1	2	3	4	5	6	7
147. Problems.....	0	1	2	3	4	5	6	7
148. Causes or Missions.....	0	1	2	3	4	5	6	7
149. Tests, Contests.....	0	1	2	3	4	5	6	7
150. Challenges.....	0	1	2	3	4	5	6	7
151. Competition (head-to-head).....	0	1	2	3	4	5	6	7
152. Competition against standards, records	0	1	2	3	4	5	6	7
153. Emergencies.....	0	1	2	3	4	5	6	7
154. Handicaps.....	0	1	2	3	4	5	6	7



Is DEFINITION or STRUCTURE present?								
155. Unstructured, fluid situations.....	0	1	2	3	4	5	6	7
156. Structured, ordered situations.....	0	1	2	3	4	5	6	7
157. Routine, scripted situations.....	0	1	2	3	4	5	6	7
158. Instructions/specifications.....	0	1	2	3	4	5	6	7
159. Growth, developing situations.....	0	1	2	3	4	5	6	7
160. Potential/possible, not known/sure...	0	1	2	3	4	5	6	7
Are certain WORKING CONDITIONS part of the job?								
161. Pressure, stress.....	0	1	2	3	4	5	6	7
162. Lack of pressure.....	0	1	2	3	4	5	6	7
163. Deadlines.....	0	1	2	3	4	5	6	7
164. Risks, hazards.....	0	1	2	3	4	5	6	7
165. Difficulties, obstacles.....	0	1	2	3	4	5	6	7
166. Immediate response required.....	0	1	2	3	4	5	6	7
167. Learning time is available.....	0	1	2	3	4	5	6	7
168. Travel.....	0	1	2	3	4	5	6	7
169. Outdoors, nature.....	0	1	2	3	4	5	6	7
170. Ambiguity, lack of direction.....	0	1	2	3	4	5	6	7
Are RECOGNITION FACTORS important?								
171. Audiences, viewers, listeners.....	0	1	2	3	4	5	6	7
172. Visibility.....	0	1	2	3	4	5	6	7
173. Reputation.....	0	1	2	3	4	5	6	7
174. Status settings, positions.....	0	1	2	3	4	5	6	7

7 = Very High Importance
6 = High Importance
5 = Moderately High Importance
4 = Moderate Importance
3 = Moderately Low Importance
2 = Low Importance
1 = Very Low Importance
0 = DOES NOT APPLY

175. Awards, badges, trophies.....	0	1	2	3	4	5	6	7
176. Behind-the-scenes role.....	0	1	2	3	4	5	6	7
177. Supporting role.....	0	1	2	3	4	5	6	7
Are MEASURABLE RESULTS important?								
178. Grades, ratings, standards.....	0	1	2	3	4	5	6	7
179. Goals, objectives.....	0	1	2	3	4	5	6	7
180. Finished product(s).....	0	1	2	3	4	5	6	7
181. Application of energy and/or effort	0	1	2	3	4	5	6	7
182. Efficiency.....	0	1	2	3	4	5	6	7
183. Precision, exactness.....	0	1	2	3	4	5	6	7
184. Value, cost efficiency.....	0	1	2	3	4	5	6	7
185. Quality concern.....	0	1	2	3	4	5	6	7
186. Profitability, financial gain.....	0	1	2	3	4	5	6	7
187. Effectiveness.....	0	1	2	3	4	5	6	7
188. Customer satisfaction.....	0	1	2	3	4	5	6	7
Are there UNIQUE circumstances with the job?								
189. New, novel, different	0	1	2	3	4	5	6	7
190. Unexplored, unknown areas.....	0	1	2	3	4	5	6	7
191. Starts from scratch, from nothing...	0	1	2	3	4	5	6	7
192. Uses what exists, a jumping-off place	0	1	2	3	4	5	6	7
193. Uses a model, an established approach	0	1	2	3	4	5	6	7
194. Involves a variety of tasks.....	0	1	2	3	4	5	6	7
195. Periodic changes.....	0	1	2	3	4	5	6	7



196. Frequent changes.....	0	1	2	3	4	5	6	7
197. Stable, unchanging.....	0	1	2	3	4	5	6	7

What ORGANIZATIONAL FACTORS are part of the job?

198. Projects, programs.....	0	1	2	3	4	5	6	7
199. Group or team work.....	0	1	2	3	4	5	6	7
200. Participative management.....	0	1	2	3	4	5	6	7
201. Use of authority.....	0	1	2	3	4	5	6	7
202. Entrepreneurial effort.....	0	1	2	3	4	5	6	7
203. Creative atmosphere.....	0	1	2	3	4	5	6	7
204. Political considerations.....	0	1	2	3	4	5	6	7
205. Social interactions.....	0	1	2	3	4	5	6	7
206. Results orientation.....	0	1	2	3	4	5	6	7
207. Cooperation, partnerships.....	0	1	2	3	4	5	6	7
208. Centralization.....	0	1	2	3	4	5	6	7
209. Decentralization.....	0	1	2	3	4	5	6	7
210. Close supervision.....	0	1	2	3	4	5	6	7
211. Distance supervision.....	0	1	2	3	4	5	6	7
212. Self-management.....	0	1	2	3	4	5	6	7
213. Peer management.....	0	1	2	3	4	5	6	7
214. Work tasks determined by technology	0	1	2	3	4	5	6	7

What FUNCTIONS are important in this job?

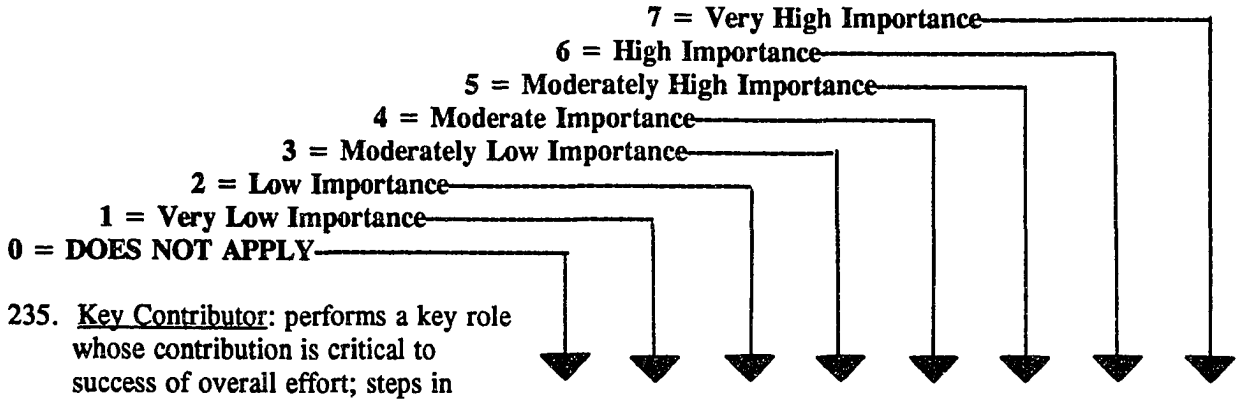
215. Services.....	0	1	2	3	4	5	6	7
216. Operations.....	0	1	2	3	4	5	6	7

7 = Very High Importance
6 = High Importance
5 = Moderately High Importance
4 = Moderate Importance
3 = Moderately Low Importance
2 = Low Importance
1 = Very Low Importance
0 = DOES NOT APPLY

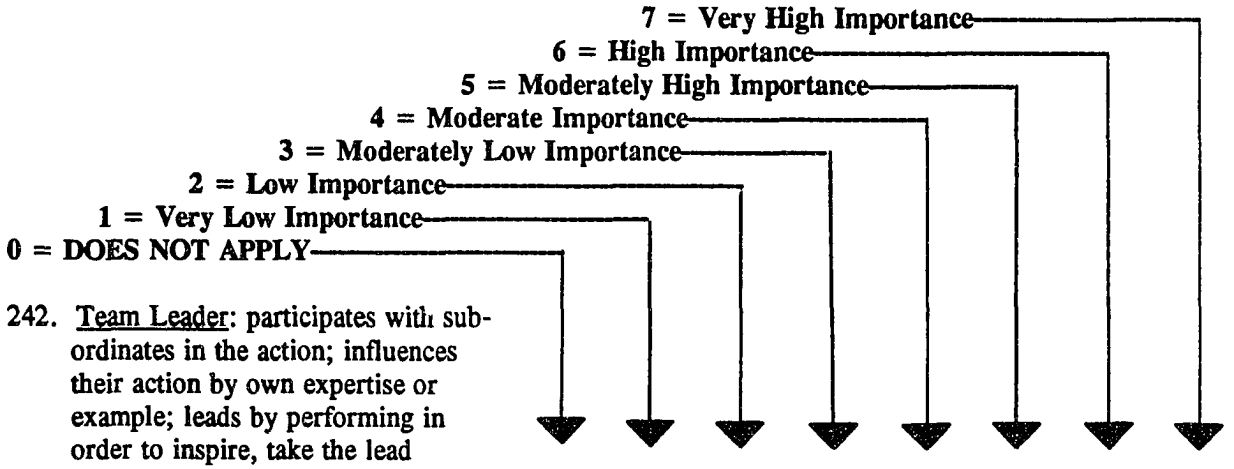
217. Production.....	0	1	2	3	4	5	6	7
218. Marketing.....	0	1	2	3	4	5	6	7
219. Entertainment.....	0	1	2	3	4	5	6	7
220. Research.....	0	1	2	3	4	5	6	7
221. Education.....	0	1	2	3	4	5	6	7
222. Communications.....	0	1	2	3	4	5	6	7
223. Finance.....	0	1	2	3	4	5	6	7
224. Relations.....	0	1	2	3	4	5	6	7
225. Development.....	0	1	2	3	4	5	6	7
226. Administration.....	0	1	2	3	4	5	6	7
227. Sales.....	0	1	2	3	4	5	6	7
228. Maintenance.....	0	1	2	3	4	5	6	7
229. Troubleshooting.....	0	1	2	3	4	5	6	7
230. Legislation.....	0	1	2	3	4	5	6	7
231. Regulation.....	0	1	2	3	4	5	6	7
232. Inspiration.....	0	1	2	3	4	5	6	7

PART FOUR: PRIMARY OPERATING RELATIONSHIP WITH OTHERS - In this section, please carefully consider the type of relationship(s) that are required to be performed on the job. First read all the descriptions then rate each one. Try to limit your highest ratings to only one or two important relationships.

233. Team Member: works with others and views contribution as merged with efforts of others; effort does not require others to take action.	0	1	2	3	4	5	6	7
234. Individualist: operates with others or alone; occupies a well defined role; achieves results through own direct efforts.	0	1	2	3	4	5	6	7



235. Key Contributor: performs a key role whose contribution is critical to success of overall effort; steps in with advice or expertise.	0	1	2	3	4	5	6	7
236. Star: fills performer-audience relationship; efforts are viewed by others; effort does not require others to take action.	0	1	2	3	4	5	6	7
237. Trainer: develops the capabilities of others through own influence; coaches others through programs or structured activities; does not have overall responsibility for managing others.	0	1	2	3	4	5	6	7
238. Enabler: develops capability of others through own influence; works on a one-to-one basis in a highly personalized, unstructured way to help others develop or attain goals.	0	1	2	3	4	5	6	7
239. Facilitator: makes others' activities easier, more enjoyable or successful by setting up and adjusting the work environment, materials, or conditions; personally arranges programs, projects or events.	0	1	2	3	4	5	6	7
240. Coordinator: coordinates the activities of others in a participatory fashion but does not use hire or fire authority; causes others who are not under his or her authority to take action.	0	1	2	3	4	5	6	7
241. Spark Plug Organizer: serves as the promoter or communicator of a new idea, activity or vision; may spark successive new thrusts within an activity, but moves on to another role after impact has been made.	0	1	2	3	4	5	6	7

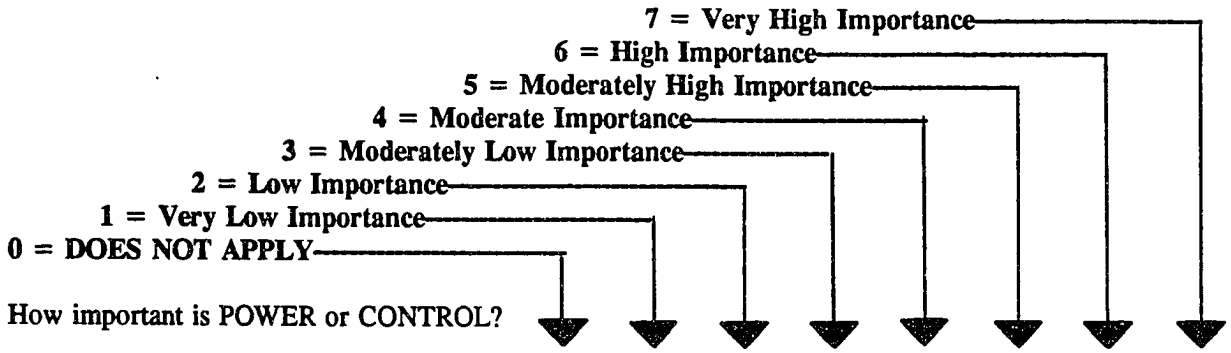


242. Team Leader: participates with subordinates in the action; influences their action by own expertise or example; leads by performing in order to inspire, take the lead or show the way.	0	1	2	3	4	5	6	7
243. Director: directs the action of others to perform in an exact way; gets involved at the level of detail; maintains close control; uses people as extensions of self to get the job done.	0	1	2	3	4	5	6	7
244. Manager: actively manages the talents of others to achieve results; consistently delegates functions; may or may not maintain close control but does confront others on performance when necessary.	0	1	2	3	4	5	6	7
245. Engineer: controls others in precise ways by devising a plan of action for them to follow and then feeding them into it; relates to others primarily through the plan as opposed to relying on personal direction or administration.	0	1	2	3	4	5	6	7

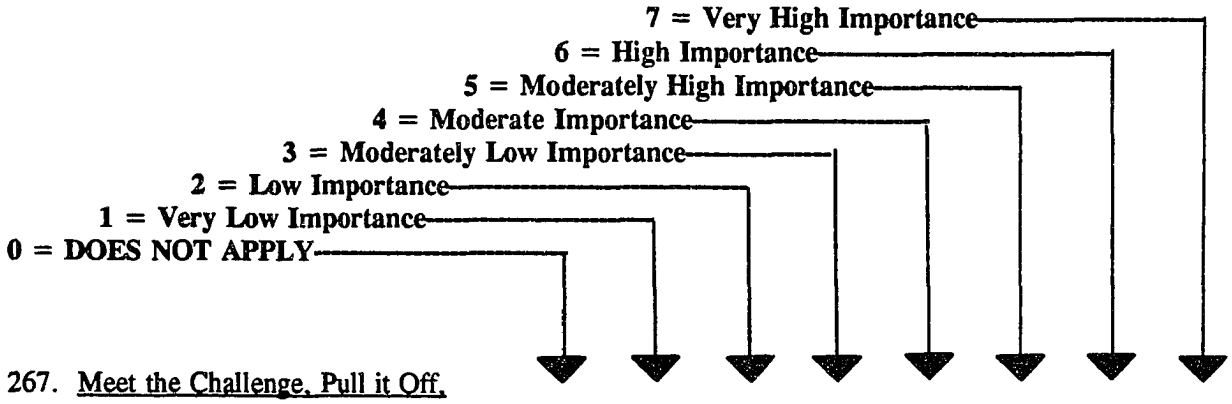
PART FIVE: IMPORTANT JOB RESULTS OR OUTCOMES - This section requires careful evaluation. Assume that the job has a primary purpose, driving force or broad outcome. Perhaps asking what the organization requires for sustained job results would help you. Rate each description from the perspective of what the incumbent has to do in order to be effective in the job. Use the "importance" rating scale again.

How important is PERSONAL PERFORMANCE as a job result?

246. Excel - Be the Best at something....	0	1	2	3	4	5	6	7
247. Be Unique - Be Outstanding.....	0	1	2	3	4	5	6	7
248. Gain Recognition - Attention.....	0	1	2	3	4	5	6	7
249. Be the Key Person, Be Central.....	0	1	2	3	4	5	6	7



How important is POWER or CONTROL?								
250. Be in Charge/Command/Control...	0	1	2	3	4	5	6	7
251. Overcome - Prevail.....	0	1	2	3	4	5	6	7
252. Acquire, Possess, Own.....	0	1	2	3	4	5	6	7
253. Master - Perfect - Become Expert...	0	1	2	3	4	5	6	7
254. Comprehend & Demonstrate Knowledge, Communicate Understanding.....	0	1	2	3	4	5	6	7
Is a FOCUS ON AN OBJECT required?								
255. Improve/Make Better/Enhance.....	0	1	2	3	4	5	6	7
256. Make Work - Make Effective.....	0	1	2	3	4	5	6	7
257. Extract - Achieve Potential.....	0	1	2	3	4	5	6	7
258. Gain Response/Influence Behavior...	0	1	2	3	4	5	6	7
259. Impact/Make Mark/Shape.....	0	1	2	3	4	5	6	7
Does the job FOCUS ON A PROCESS?								
260. Build - Develop - Form.....	0	1	2	3	4	5	6	7
261. Realize Concept/Fulfill Image, Role	0	1	2	3	4	5	6	7
262. Become Proficient, Demonstrate Competence.....	0	1	2	3	4	5	6	7
263. Pioneer, Explore.....	0	1	2	3	4	5	6	7
264. Advance/Progress/Move Forward...	0	1	2	3	4	5	6	7
Is a DEFINED EFFORT or PURPOSE important?								
265. Bring to Completion; Reach the Objective.....	0	1	2	3	4	5	6	7
266. Make the Team, Grade.....	0	1	2	3	4	5	6	7



267. Meet the Challenge, Pull it Off, Meet the Test.....	0	1	2	3	4	5	6	7
268. Meet Needs, Fulfill Requirements; Satisfy Expectations.....	0	1	2	3	4	5	6	7

IMPORTANCE OF JOB ELEMENTS - Every job has some characteristics which are more important or carry more weight than others. Assume that you have 100 points to distribute among the five major job elements you have just rated. Based on your understanding of the job, please give each general category below any number of points form 0 to 100 according to their relative importance toward effective performance in this job so that the total points add up to 100.

JOB ELEMENT	Importance Points
269. Abilities and skills =	1._____
270. Job content and subject matter =	2._____
271. Job circumstances or work situation =	3._____
272. Relationship with others =	4._____
273. Job purpose, results or outcome =	5._____
	TOTAL = 100 Points

FOR RESEARCH PURPOSES ONLY - Please complete.

274. YOUR SEX: Check one. A. Male___; B. Female___.

275. YOUR AGE: _____ Years.

276. Your total number of years of FULL TIME WORK EXPERIENCE: _____.

277. YOUR ETHNIC BACKGROUND: (Check one)
- ___ A. Caucasian
- ___ B. Afro-American
- ___ C. Hispanic
- ___ D. Asian or Pacific Islander
- ___ E. Native American Indian
- ___ F. Other:_____

278. YOUR EDUCATIONAL LEVEL: (Check one.)

___ A. Did not graduate from high school
___ B. High School Graduate
___ C. Trade or Vocational School Graduate
___ D. Community or Junior College Graduate
___ E. College or University Graduate (BS or BA degree)
___ F. Master's Degree
___ G. Doctoral Degree
___ H. Professional Degree (Lawyer, M.D., D.D.S., etc.)

279. YOUR TOTAL NUMBER OF YEARS OF EDUCATION: _____.

280. How much time did it take to complete the JSI? _____ Hours; _____Minutes.

* * * * * * * * * *

Thank you for completing the Job Specifications Inventory. Your evaluation of this job is important and may help both employers and employees understand job requirements better. Please return this completed form and all materials as instructed to your organizational contact or to:

William J. Banis, Director
Career Development Services
Old Dominion University
Norfolk, VA 23529
Tel. 804-683-4388
FAX: 804-683-4955.

THANK YOU VERY MUCH!

APPENDIX B

List of Participating Organizations

List of Participating Organizations

Certified Public Accountants:

Arthur Andersen and Company, Washington, D.C.
Coopers and Lybrand, Norfolk, VA
Ernst and Young, Norfolk, VA
Frederick B. Hill and Company, Norfolk, VA
KPMG Peat Marwick, Norfolk, VA
Price Waterhouse, Norfolk, VA

Civil Engineers:

Naval Civil Engineer Corps, Alexandria, VA
Naval Facilities Engineering Command, Atlantic Division, Norfolk, VA
Norfolk Naval Shipyard, Portsmouth, VA
Norfolk Southern Corporation, Norfolk, VA
Federal Highway Administration, Richmond, VA

Elementary Teachers:

Atlantic Shores Christian School, Virginia Beach, VA
Hebrew Academy of Tidewater, Virginia Beach, VA
Glori Dei Lutheran School, Newport News, VA
Greenbriar Academy, Chesapeake, VA
Norfolk Academy, Norfolk, VA
Norfolk Collegiate Elementary School, Norfolk, VA
Norfolk Public Schools, Norfolk, VA

Human Resource/Personnel Directors/Managers:

Banks, mid-Atlantic and southeast
College Placement Council, Inc. members in the mid-Atlantic and southern regions
College and University Personnel Association members in the mid-Atlantic and southern regions
High technology firms, mid-Atlantic and southern regions
Hospitals, mid-Atlantic
Hotels, nationally
Human Resource Management Society, Southeast Virginia Chapter
International Personnel Management Association, Virginia members
Manufacturing firms, east and midwest
Food processing firms and restaurants, mid-Atlantic and southeast
Printing and publications, nation-wide
Retailers and wholesalers, mid-Atlantic and southeast

Musicians:

Richmond Symphony, Richmond, VA
Tactical Air Command Band, Langley Air Force Base, Hampton, VA
U. S. Continental Army Band, Ft. Monroe, Hampton, Virginia
U. S. Armed Forces School of Music, Norfolk Amphibious Base, Norfolk, VA

Insurance Sales Agents:

Equitable Life Assurance Society, Virginia Beach, VA
John Hancock Financial Services, Virginia Beach, VA
Mass Mutual Companies, Atlanta, GA
Mass Mutual Companies, Virginia Beach, VA
Met Life Securities and Affiliated Companies, Norfolk, VA
Prudential Insurance Company of America, Virginia Beach, VA

Secretaries:

KPMG Peat Marwick, Norfolk, VA
Norfolk Public Schools, Norfolk, VA
Norfolk Southern Corporation, Norfolk, VA
Old Dominion University, Norfolk, VA
The Virginian Pilot and The Ledger Star, Norfolk, VA

APPENDIX C

Illustrations of Highest Rated JSI Variables by Occupation

Illustration 1. Highest Rated JSI Variables by 57 Certified Public Accountants at the Staff Level.

Variable	Mean	Standard Deviation	Description
4.	6.456	0.825	Learn by doing, trying
6.	6.351	0.973	Investigate by surveying, gathering information
10.	6.579	0.680	Evaluate by analyzing
29.	6.368	0.747	Do/Act by following directions, implementing
79.	6.403	0.728	Communicate by articulating, explaining
103.	6.667	0.636	Numbers, figures
105.	6.526	1.135	Money, financial information
108.	6.474	0.709	Facts, data
161.	6.263	0.917	Pressure, stress
163.	6.386	0.840	Deadlines
182.	6.316	0.759	Efficiency
185.	6.316	0.736	Quality concern
188.	6.649	0.582	Customer satisfaction
199.	6.298	0.886	Group or team work
215.	6.333	0.786	Services
233.	6.281	0.977	Team member
254.	6.403	0.678	Comprehend and demonstrate knowledge, communicate understanding
265.	6.403	0.677	Bring to completion, reach objective

Illustration 2. Highest Rated JSI Variables by 76 Civil Engineers.

Variable	Mean	Standard Deviation	Description
10.	6.000	0.980	Evaluate by analyzing
24.	6.026	1.154	Plan by setting goals
55.	6.013	1.013	Oversee by monitoring, making sure, checking
56.	6.000	1.071	Oversee by coordinating performance of others
79.	6.237	1.031	Communicate by articulating, explaining
80.	6.237	0.781	Communicate by conferring, discussing
84.	6.210	1.050	Values, ethics
88.	6.197	0.864	Knowledge, information
103.	6.053	1.130	Numbers, figures
108.	6.132	1.170	Facts, data
116.	6.368	1.209	Engineering
180.	6.131	0.957	Finished products
185.	6.184	0.962	Quality concern
188.	6.263	1.024	Customer satisfaction
198.	6.079	0.949	Projects, programs
235.	5.052	1.460	Key contributor
242.	5.224	1.554	Team leader
244.	5.131	1.715	Manager
254.	6.133	0.859	Comprehend and demonstrate knowledge, communicate understanding

Illustration 2 cont. - Civil Engineers

265.	6.144	1.054	Bring to completion. reach objectives
268.	5.947	1.044	Meet needs, fulfill requirements, satisfy expectations

Illustration 3. Highest Rated JSI Variables by 153 Elementary Teachers.

Variable	Mean	Standard Deviation	Description
2.	6.464	0.866	Learn by observing, examining
3.	6.379	0.910	Learn by listening, expressing
4.	6.719	0.612	Learn by doing, trying
20.	6.444	0.818	Organize by structuring, providing definition
22.	6.397	0.869	Organize by gathering pieces together, integrating
23.	6.582	0.703	Organize by systematizing, establishing procedures
24.	6.856	0.404	Plan by setting goals
25.	6.601	0.814	Plan by strategizing, charting course
26.	6.582	0.713	Plan by arranging details
29.	6.438	0.916	Do/Act by following directions, implementing
55.	6.569	0.923	Oversee by monitoring, making sure
65.	6.601	0.806	Influence by motivating, inspiring
70.	6.311	1.120	Influence by involving, getting participation
72.	6.608	0.745	Influence by encouraging, nurturing
75.	6.444	0.849	Teach by tutoring, guiding
76.	6.706	0.616	Teach by stimulating, eliciting response
77.	6.634	0.695	Teach by demonstrating, showing
78.	6.425	0.971	Teach by coaching, mentoring

Illustration 3 cont. - Elementary Teachers

79.	6.699	0.669	Communicate by articulating, explaining
80.	6.627	0.668	Communicate by conferring, discussing
84.	6.605	0.853	Values, ethics
85.	6.314	0.935	Ideas, theories, concepts
86.	6.346	0.941	Principles, philosophy
88.	6.523	0.689	Knowledge, information
89.	6.320	0.886	Thoughts, expression
109.	6.752	0.577	People as individuals
110.	6.431	0.864	People in groups
112.	6.490	0.911	Human behavior
113.	6.281	1.189	Mathematics
143.	6.451	1.106	Stories, literature
179.	6.601	0.737	Grades, ratings, standards
187.	6.497	0.867	Effectiveness
203.	6.359	0.848	Creative atmosphere
221.	6.658	0.806	Education
233.	5.490	1.544	Team member
239.	5.294	1.743	Facilitator
254.	6.527	0.953	Comprehend and demonstrate knowledge, communicate understanding
265.	6.261	0.901	Bring to completion, reach objective(s)

Illustration 4. Highest Rated Variables by 87 Instrumental Musicians.

Variable	Mean	Standard Deviation	Description
3.	6.391	0.944	Learning by listening, expressing
4.	6.506	0.874	Learning by doing, trying
24.	6.000	1.161	Plan by setting goals
28.	6.517	1.109	Plan by practicing, getting ready
40.	6.759	1.109	Perform by playing an instrument
88.	6.103	0.903	Knowledge, information
124.	6.034	1.775	Motion, rhythm
125.	6.827	0.614	Sound, music
171.	6.678	0.754	Audiences, viewers, listeners
172.	6.195	1.218	Visibility
180.	6.034	1.602	Finished product(s)
183.	6.207	1.090	Precision, exactness
219.	6.070	1.813	Entertainment
233.	5.782	1.360	Team member
246.	5.713	1.446	Excel, be the best at something
254.	5.835	1.271	Comprehend and demonstrate knowledge
262.	6.046	1.219	Become proficient, demonstrate competence

Illustration 5. Highest Rated JSI Variables by 49 Insurance Sales Agents.

Variable	Mean	Standard Deviation	Description
3.	6.510	0.767	Learning by listening, expressing
4.	6.693	0.742	Learning by doing, trying
6.	6.286	0.935	Investigate by surveying, gathering information
7.	6.755	0.693	Investigate by interviewing, inquiring
24.	6.735	0.785	Plan by setting goals
25.	6.306	0.894	Plan by strategizing, charting course
26.	6.408	0.814	Plan by arranging details, scheduling
64.	6.735	1.056	Influence by selling
65.	6.531	0.793	Influence by motivating, inspiring
66.	6.592	0.761	Influence by convincing. persuading
71.	6.367	1.099	Influence by counseling, advising
73.	6.510	1.023	Influence by promoting, marketing
79.	6.693	0.683	Communicate by articulating, explaining
84.	6.837	0.514	Values, ethics
85.	6.286	1.021	Ideas, theories, concepts
105.	6.633	0.755	Money, financial information
109.	6.735	0.569	People as individuals
139.	6.286	1.080	Personal expertise
146.	6.510	1.023	Needs

Illustration 5 cont. - Insurance Sales Agents

47.	6.265	1.076	Problems
173.	6.449	1.209	Reputation
179.	6.633	0.602	Goals, objectives
186.	6.408	0.814	Profitability, financial gain
187.	6.265	0.974	Effectiveness
188.	6.939	9.242	Customer satisfaction
202.	6.286	1.258	Entrepreneurial effort
212.	6.490	1.192	Self-management
215.	6.694	0.6193	Services
218.	6.612	0.571	Marketing
222.	6.428	1.154	Communications
227.	6.959	0.199	Sales
234.	6.326	1.106	Individualist
254.	6.531	0.868	Comprehend and demonstrate knowledge, communicate understanding
262.	6.265	0.860	Become proficient, demonstrate competence
265.	6.551	0.679	Bring to completion, reach objectives
268.	6.510	0.681	Meet needs, fulfill requirements, satisfy expectations

Illustration 6. Highest Rated JSI Variables by 133 Personnel Managers.

Variable	Mean	Standard Deviation	Description
3.	6.061	1.020	Learn by listening, expressing
6.	6.022	1.018	Investigate by surveying, gathering information
7.	6.218	0.940	Investigate by interviewing, inquiring
10.	6.045	0.936	Evaluate by analyzing
12.	6.158	0.928	Evaluate by deciding pros and cons, judging merits
16.	6.105	0.024	Conceptualize by conceiving ideas, concepts
20.	6.037	0.957	Organize by structuring, providing definition
24.	6.459	0.821	Plan by setting goals
25.	6.248	0.964	Plan by strategizing, charting course
56.	6.007	0.996	Oversee by coordinating the performance of others
60.	6.120	1.023	Oversee by leading, showing the way
63.	6.090	0.874	Influence by initiating, suggesting
65.	6.075	0.974	Influence by motivating, inspiring
66.	6.068	0.986	Influence by convincing, persuading
67.	6.022	1.003	Influence by mediating, arbitrating
70.	6.105	0.791	Influence by involving, getting participation
71.	6.248	0.856	Influence by counseling, advising
79.	6.406	0.675	Communicate by articulating, explaining

Illustration 6 cont. - Personnel Managers

80.	6.308	0.862	Communicate by conferring, discussing
84.	6.511	0.784	Values, ethics
86.	6.090	0.949	Principles, philosophy
88.	6.421	0.676	Knowledge, information
106.	6.114	1.046	Words
107.	6.038	1.152	Language
108.	6.197	0.814	Facts, data
109.	6.644	0.678	People as individuals
110.	6.432	1.042	People in groups
112.	6.477	0.886	Human behavior
139.	6.022	0.900	Personal expertise
161.	6.000	0.865	Pressure, stress
173.	6.241	0.947	Reputation
179.	6.218	0.791	Goals, objectives
185.	6.098	0.886	Quality concern
187.	6.383	0.693	Effectiveness
188.	6.022	1.635	Customer satisfaction
194.	6.000	0.921	Involves a variety of tasks
200.	6.007	0.892	Participative management
212.	6.180	0.842	Self-management
215.	6.398	0.738	Services
222.	6.361	0.791	Communications

Illustration 6 cont. - Personnel Managers

224.	6.158	1.021	Relations
235.	5.714	1.165	Key contributor
242.	5.398	1.446	Team leader
244.	5.519	1.401	Manager
254.	6.421	0.698	Comprehend and demonstrate knowledge. communicate understanding
265.	6.015	0.778	Bring to completion, reach objectives
268.	6.052	0.994	Meets needs, satisfy expectations

Illustration 7. Highest Rated JSI Variables by 59 Secretaries.

Variable	Mean	Standard Deviation	Description
3.	6.117	1.020	Learn by listening, expressing
4.	6.627	0.64	Learn by doing, trying
21.	6.068	1.541	Organize by classifying, categorizing
22.	6.085	1.330	Organize by gathering pieces together, integrating
23.	6.152	1.448	Organize by systematizing, establishing procedures
26.	6.508	0.838	Plan by arranging details, scheduling
29.	6.780	0.457	Do/Act by following directions, implementing
31.	6.085	1.557	Do/Act by operating something, running it
55.	6.237	1.278	Oversee by monitoring, making sure
79.	6.254	0.920	Communicate by articulating, explaining
80.	6.085	1.055	Communicate by conferring, discussing
81.	6.000	1.083	Communicate by reporting, describing
84.	6.305	1.133	Values, ethics
87.	6.086	1.031	Policies
88.	6.678	0.570	Knowledge, information
102.	6.491	0.935	Details, particulars
103.	6.407	1.100	Numbers, figures
107.	6.288	1.415	Language
108.	6.593	0.745	Facts, data

Illustration 7 cont. - Secretaries

109.	6.152	1.284	People as individuals
163.	6.034	1.188	Deadlines
180.	6.288	1.415	Finished product(s)
182.	6.373	1.363	Efficiency
183.	6.305	1.405	Precision, exactness
185.	6.152	1.669	Quality concern
187.	6.069	1.599	Effectiveness
188.	6.237	1.822	Customer satisfaction
215.	6.169	1.416	Services
222.	6.169	1.315	Communications
233.	5.344	1.649	Team member
234.	5.603	1.498	Individualist
254.	6.119	1.261	Comprehend and demonstrate knowledge, communicate understanding
265.	6.000	1.681	Bring to completion, reach objectives
268.	6.135	1.419	Meet needs, satisfy expectations

APPENDIX D

Tables

Table 6

Pseudo t Fusion Coefficients for Ward's Method for the JSI Parts and Total Inventory.

No. of Clusters	Part 1: Abilities	Part 2: Content	Part 3: Context	Part 4: Relations	Part 5: Focus	Total JSI
15	7.92	5.96	2.76	10.17	5.32	4.05
14	5.00	3.58	5.18	12.41	5.95	5.10
13	4.02	6.27	5.26	14.47	9.51	5.32
12	15.04	10.89	5.89	7.69	17.67	4.43
11	11.47	13.68	4.03	11.17	12.17	5.97
10	7.16	8.42	9.43	15.66	4.99	8.40
9	11.28	9.29	7.93	12.48	8.98	5.67
8	14.62	9.57	11.55	11.30	15.51	5.69
7	**8.92**	**9.18**	8.39	18.78	13.02	**6.77**
6	17.34	18.26	**6.48**	**13.49**	**12.88**	12.43
5	11.81	43.19	14.26	29.80	31.68	14.41
4	29.47	37.52	9.92	37.89	18.49	19.26
3	35.99	48.09	21.51	27.14	62.81	18.52
2	44.56	54.65	14.57	54.30	54.31	27.38
1	81.96	165.56	63.15	172.68	180.57	54.62

Note: Number preceding a large jump in the fusion coefficient suggests the optimal cluster solution.

Table 17

Spearman Rank Correlation Estimate Between Holland Occupational Code Rankings and Generalized Squared Distance Rankings of 268 JSI Variables

Occupation	Holland Code	Holland Rank	Squared Distance	Distance Rank	D	D^2
CPA	RCS	1	4.52	1	0	0
SEC	CSE	2	129.97	3	1	1
CE	ISR	3	139.36	4	1	1
IA	ESR	4	173.76	5	1	1
TCH	SEC	5	193.50	6	1	1
PM	AES	6	109.03	2	4	16
MUS	AER	7	346.36	7	0	0
						$\Sigma D^2 = 20$

Formula: $r_{ranks} = 1 - \frac{6 \Sigma D^2}{n(n^2 - 1)} = 1 - \frac{120}{336} = 1 - .357 = .643$

Note: Occupational abbreviations are as follows: CPA = certified public accountant; CE = civil engineer; IA = insurance sales agent; MUS = instrumental musician; PM = personnel manager; SEC = secretary; TCH = elementary teacher.

Table 18

Spearman Rank Correlation Estimate Between ACT Occupational Classification Rankings and Generalized Squared Distance Rankings of 268 JSI Variables

Occupation	ACT Code	ACT Rank	Squared Distance	Distance Rank	D	D^2
CPA	D	1	4.52	1	0	0
SEC	C	2	129.97	3	1	1
PM	B	3	109.03	2	1	1
IA	A	4	173.76	5	1	1
CE	M	5	139.36	4	1	1
TCH	U	6	193.50	6	0	0
MUS	R	7	346.36	7	0	0
					$\Sigma D^2 =$	4

Formula:

$$r_{ranks} = 1 - \frac{6 \Sigma D^2}{n(n^2 - 1)} = 1 - \frac{24}{336} = 1 - .0714 = .929$$

Note: Occupational abbreviations are as follows: CPA = certified public accountant; CE = civil engineer; IA = insurance sales agent; MUS = instrumental musician; PM = personnel manager; SEC = secretary; TCH = elementary teacher.

Table 29

Rank Order of JSI Part Means by Occupations

Rank Order	CPA	CE	IA	MUS	PM	SEC	TCH
1	Focus	Focus	Focus	Focus	Focus	Focus	Skills
2	Context	Context	Context	Relationship	Context	Context	Focus
3	Skills	Skills	Skills	Skills	Skills	Skills	Content
4	Relationship	Content	Content	Context	Relationship	Relationship	Context
5	Content	Relationship	Relationship	Content	Content	Content	Relationship

Note: Column ranks of JSI Parts are based on mean scores. Occupational abbreviations are as follows: CPA = certified public accountant; CE = civil engineer; IA = insurance sales agent; MUS = instrumental musician; PM = personnel manager; SEC = secretary; TCH = elementary teacher.

Table 30

Rank Order of JSI Factors Based on Mean Scores by Occupation

Rank Order	CPA	CE	IA	MUS	PM	SEC	TCH
1	Affective Processes	Task Processes	Relationship Style	Work Context	Work Focus	Affective Processes	Task Processes
2	Relationship Style	Work Focus	Pubic Performance	Work Focus	Relationship Style	Work Context	Cognitive Processes
3	Work Context	Relationship Style	Cognitive Processes	Public Performance	Cognitive Processes	Public Performance	Public Performance
4	Public Performance	Affective Processes	Affective Processes	Task Processes	Affective Processes	Relationship Style	Work Focus
5	Work Focus	Work Context	Work Context	Cognitive Processes	Public Performance	Task Processes	Affective Processes
6	Task Processes	Public Performance	Task Processes	Relationship Style	Task Processes	Cognitive Processes	Work Context
7	Cognitive Processes	Cognitive Processes	Work Focus	Affective Processes	Work Context	Work Focus	Relationship Style

Note: Column ranks of JSI factors are based on mean scores. Occupational abbreviations are as follows: CPA= certified public accountant; CE = civil engineer; IA = insurance sales agent; MUS = instrumental musician; PM = personnel manager; SEC = secretary; TCH = elementary teacher.

Table 31

Rank Order of JSI Part Means by Cluster

JSI Part Rank	Cluster 1 (PM, IA)	Cluster 2 (TCH)	Cluster 3 (PM)	Cluster 4 (CE)	Cluster 5 (TCH)	Cluster 6 (Mixed)	Cluster 7 (MUS)
1	Focus	Skills	Focus	Focus	Focus	Focus	Focus
2	Context	Content	Context	Context	Skills	Context	Relationships
3	Skills	Focus	Skills	Content	Content	Skills	Skills
4	Relationships	Context	Relationships	Skills	Context	Relationships	Context
5	Content	Relationships	Content	Relationships	Relationships	Content	Content

Note: Occupational abbreviations are as follows: CPA = certified public accountant; CE = civil engineer; IA = insurance sales agent; MUS = instrumental musician; PM = personnel manager; SEC = secretary; TCH = elementary teacher, Mixed = CPA, IA, SEC.

Table 32

Rank Order of JSI Factors Means by Cluster

Factor Rank	Cluster 1 (PM, IA)	Cluster 2 (TCH)	Cluster 3 (PM)	Cluster 4 (CE)	Cluster 5 (TCH)	Cluster 6 (Mixed)	Cluster 7 (MUS)
1	Relationship Style	Task Processes	Work Focus	Task Processes	Task Processes	Affective Processes	Work Context
2	Public Performance	Cognitive Processes	Cognitive Processes	Work Focus	Cognitive Processes	Relationship Style	Work Focus
3	Cognitive Processes	Public Performance	Relationship Style	Relationship Style	Public Performance	Work Context	Public Performance
4	Affective Processes	Work Context	Affective Processes	Affective Processes	Work Focus	Public Performance	Cognitive Processes
5	Work Focus	Work Focus	Public Performance	Work Context	Affective Processes	Task Processes	Task Processes
6	Work Context	Affective Processes	Task Processes	Public Performance	Work Context	Cognitive Processes	Relationship Style
7	Task Processes	Relationship Style	Work Context	Cognitive Processes	Relationship Style	Work Focus	Affective Processes

Note: Occupational abbreviations are as follows: CPA = certified public accountant; CE = civil engineer; IA = insurance sales agent; MUS = instrumental musician; PM = personnel manager; SEC = secretary; TCH = elementary teacher; Mixed = CPA, CE, IA, SEC.