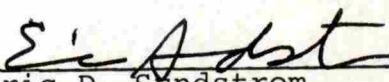
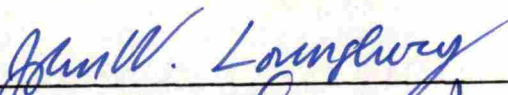
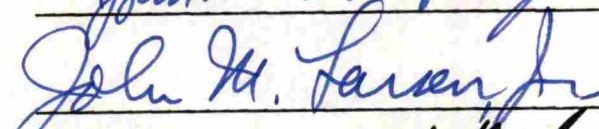
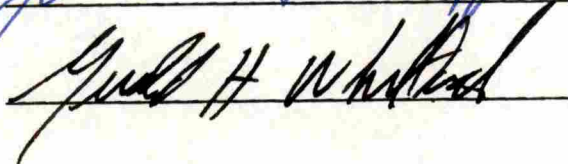


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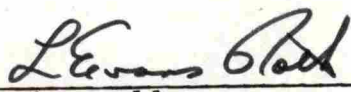
I am submitting herewith a dissertation written by Robert Henry Faley entitled "Behaviorally Oriented Content Validity and Utility of a Training Program." I recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy, with a major in Industrial and Organizational Psychology.

  
Eric D. Sundstrom  
Major Professor

We have read this dissertation  
and recommend its acceptance:

Accepted for the Council:

  
Vice Chancellor  
Graduate Studies and Research

BEHAVIORALLY ORIENTED CONTENT VALIDITY AND UTILITY  
OF A TRAINING PROGRAM

A Dissertation  
Presented for the  
Doctor of Philosophy  
Degree  
The University of Tennessee, Knoxville

Robert Henry Faley

August 1980

**3045032**

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## ABSTRACT

Procedures used in the content validation of tests have been criticized because of problems in measuring the job content universe, sampling from it, and determining the representativeness of the sample. This study used structured job analysis in an attempt to begin to solve these problems. The behaviorally oriented content validity of a police recruit training program was assessed using the Position Analysis Questionnaire (PAQ). Three training officers analyzed the training program and 10 patrol officers analyzed their job using the PAQ. This provided an assessment of the job contents, and allowed an appraisal of the extent to which the training program was representative of the same contents through the similarity of behavioral dimensions in both. A quantified index of content validity was computed for each of 10 "overall" job dimensions of the PAQ, demonstrating that the training program and patrolman's job were amenable to quantifiable assessments of content validity based on the PAQ.

A second phase of the study examined the relationship between the content validity and criterion-related validity of the training program. The hypothesis predicted higher validity coefficients for behavioral dimensions with high "overlap" between training and job behaviors. That is, greater correlations were expected for rating dimensions

which had been established as more content valid. A performance rating scale, comprised of the 10 "overall" PAQ dimensions, was used for ratings of performance during training of 32 police recruits by the three training officers who analysed the training program. Six months later, each recruit's three most immediate supervisors rated their performance on the job with the same rating scale. Results showed there was no relationship between the PAQ-derived indices of content validity and corresponding empirically derived estimates of criterion-related validity. Results, however, may have been due to restriction in the range of either or both sets of validity indices. The PAQ-generated data suggested that restriction occurred in the range of the distribution of absolute difference values (the indices of content validity), and that the range was restricted to values at the lower end of the distribution (i.e., high overlap condition). Under the condition of high overlap, the hypothesis predicted corresponding significant empirically derived validity coefficients. The fact that 8 of 10 criterion-related estimates were significant is consistent with that hypothesis. More research is needed to evaluate the hypothesis under the full range of overlap.

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## CHAPTER I

### INTRODUCTION

The present research was an attempt to assess quantitatively the content validity of a training program using structured job analysis procedures. This method resulted in an index of content validity for each of 10 behavioral job dimensions. A second aim in the research was to relate these indices of content validity to their corresponding criterion-related validity estimates.

The concept of validity occupies a central position in test theory. Simply stated, validity refers to the ability of a test or other selection procedure to measure what it was intended to measure (Magnusson, 1967). Procedures for determining the validity of a test consist of relating either ". . . test content to job content or test scores to work outcomes" (Schwartz, 1976, p. 7). Two major approaches to validation fall within this definition: criterion-related and content validity. Criterion-related validity entails direct measurement of the relationship between test scores and job outcomes. Content validity entails an assessment of the match between test and job content.

Because the magnitude of the relationship between predictor and criterion can be directly estimated by a correlation coefficient (this estimate called the validity

coefficient), the criterion-related approaches to validity have received the most attention in the literature. On the other hand, validation via content has received much less attention until recently.

Current interest in content validity has come mainly from the public sector, where Federal and State laws require personnel decisions based on merit, and where legal scrutiny is now the most likely. Content validity is viewed by many practitioners as the most desirable way of meeting these increased pressures to validate (Ebel, 1975). Because of the vast number of jobs for which valid tests must be developed in the public sector, and because of the lack of sufficient funds and trained personnel, criterion-related validation procedures are often too costly and time consuming. There are also many instances where criterion-related validation is not feasible (e.g., where sample size is too small or where there is no measure of work outcome available). These and the other conditions required to demonstrate criterion-related validity (such as analyses of test fairness or differential validity) can be prohibitive, making content validation an even more desirable procedure.

#### Definition of Content Validity

A general lack of agreement exists within the testing community about the exact nature of content validity, or for

that matter, what constitutes acceptable evidence of content validity (Lawshe, 1975). Content validity has often been called the "rational approach" to validation, as evidenced by the statement, "Content validity is a qualitative evaluation based on some logical analysis and expert judgment rather than on a statistical analysis" (Landy and Trumbo, 1976, p. 63). Content validity has also been considered a special case of logical relevance, equal to what educational test developers have called curricular relevance (Cureton, 1953). When an educational achievement test representatively samples from some carefully defined content universe, it is said to possess curricular relevance. This definition may be misleading, though, because it defines content validity as sampling the subject matter of a course rather than the more important "ultimate objective of instruction" (Ebel, 1956). To Ebel, content validity is established to the extent that the test requires demonstration by the student of the achievements which constitute these objectives.

The definition of content validity used here is ". . . the extent to which a subject's responses to the items of a test may be considered to be a representative sample of his responses to a real or hypothetical universe of situations which together constitute the area of concern to the person interpreting the test" (Lennon, 1956, p. 295). By this definition, the content universe would be the same as the job

performance universe—the extrinsic variable of interest talked so much about in criterion-related validation studies. This definition unites the two major interpretations of content validity. The first addresses content validity as a representative match of the behaviors on the test with those on the job. The second assumes that the behaviors involved on the test and on the job involve the same knowledges, skills, and abilities (KSAs). For example, under the second definition a written test of mechanical ability may be content valid for the job of auto mechanic, even though the behaviors sampled in testing are not representative of those on the job. The first definition limits the use of content validity procedures to tests at the work sample end of a continuum of job simulation, while the second allows for the content validation of a test where the degree of similarity between the behaviors involved in the test and on the job is small. The key area of interest in either definition is the determination of the similarity between two sets of behaviors, or two sets of underlying KSAs.

Disagreement about the type of evidence necessary to establish content validity also exists within the testing community. Guion (1975) was sensitive to this issue when he outlined a series of steps he felt should be followed to adequately establish content validity. According to him, it was necessary to (a) establish the content universe of job

behaviors, (b) determine the degree to which the behaviors in the universe were represented in the sample (i.e., the amount of overlap between sample and universe), (c) determine the weight (importance) of each universe dimension relative to all others, and (d) estimate the degree of correspondence between the weights in the sample and those in the universe.

### Criticisms of Content Validity

The use of content validity as a validation strategy has not been eagerly accepted within the testing or legal communities. The Equal Employment Opportunity Commission Guidelines (1977), although advocating greater latitude for its use, have relegated content validity to "second-class" status, noting that it should only be used in the assessment of achievement, never aptitude, and never when criterion-related validity is feasible. Schwartz (1976) sums this attitude up best when he states that it has resulted in the idea that content validity is ". . . better than nothing but really not as good as the real thing" (p. 3). This thinking may come from the inflated importance placed on numbers by practitioners and the courts (called "quantiphrenia" by Weber, 1975), and the fact that a statement of criterion-related validity can be expressed ". . . by an apparent precision of two or three decimal places" (Guion, 1976,

p. 786). Other beliefs that have not been beneficial are that content validity is considered to be less objective, based on indirect evidence, and procedurally nonempirical.

This last point—the fact that the same scientific rigor applied to criterion-related validity has not been applied to content validity—is the main objection among practitioners to the use of content validity. For example, when the relationship between predictor and criterion scores is assessed in a criterion-related study, the validity is acceptable only if there is a statistically significant nonzero relationship between predictor and criterion. However, a claim of content validity is often considered established a priori, unless proven otherwise; validity is often considered "built into" the content-valid test during its construction (Huddleston, 1956). Thus, the use of "expert judgment," without probability-based statistical tests of the relationships between test and job, may be tantamount to "stacking the deck" in favor of test developers. They would no longer have to prove that their tests were valid—we would have to prove they weren't! The same convoluted logic is present in the old case law "burden of proof" argument for establishing unlawful test-based discrimination. Under that legal argument defendants were considered guilty until they proved themselves innocent.

Perhaps the only way for content validity to achieve status similar to the other types of validity is by the

development of procedures to assess quantitatively the degree of similarity between content sample and content universe that ". . . have the same probability bases as the procedures used in testing the significance of a correlation or factor loading" (Schwartz, 1976, p. 12).

### Quantifying Content Validity

Attempts to quantify content validity have been few. Lawshe (1975) was among the first to attempt a quantitative approach to assess the content validity of a selection device. He used a "Content Evaluation Panel," composed of persons knowledgeable about the job under investigation, to evaluate the item content of a test used to select people for the job. Each panel member evaluated a pool of items on the "essentialness" of the skill or knowledge measured by the item for performance on the job. Lawshe calculated a "content validity ratio" (CVR) for each item, and claimed that any item rated essential by more than half of the panelists had some degree of content validity. The more panelists beyond 50% who rated the item essential the greater its content validity. When all the panelists agreed the item was essential, the CVR was +1.0. When fewer than half of the panelists rated the item essential, the CVR was negative; when the split was 50/50, the CVR was zero. A CVR was computed for each item, and after items had been identified

for inclusion in the final test form, the "content validity index" (CVI) was computed for the whole test. (The CVI was simply the mean of the CVR values of the individual test items.) For example, suppose a "Content Evaluation Panel" evaluated the 100 items comprising a selection instrument, and performance on 75% of the items was rated by the panel to be essential (i.e., more than half the panel perceived the skill or knowledge measured by 75 out of 100 items to be essential for performance on the job). Each of the 75 items had a CVR value of greater than zero, and the remaining 25 items had either zero or negative CVR values. The test's index of content validity, then, was the arithmetic average of the CVR values associated with the 75 essential test items considered for inclusion in the final form.

Although this approach seems attractive for its apparent simplicity and comprehensiveness, it raises several important questions. Lawshe points to the problems associated with achieving proper weighting and a representative content sample. The method also fails to define the boundaries of the content universe, which may be the most important consideration (Guion, 1975). Figure 1 illustrates one of the problems with Lawshe's method. Even though the darkened area may have a CVI of +1.0 (all the panelists agree that all test items are essential), it clearly is not representative of the larger content universe. Even given the degree of content

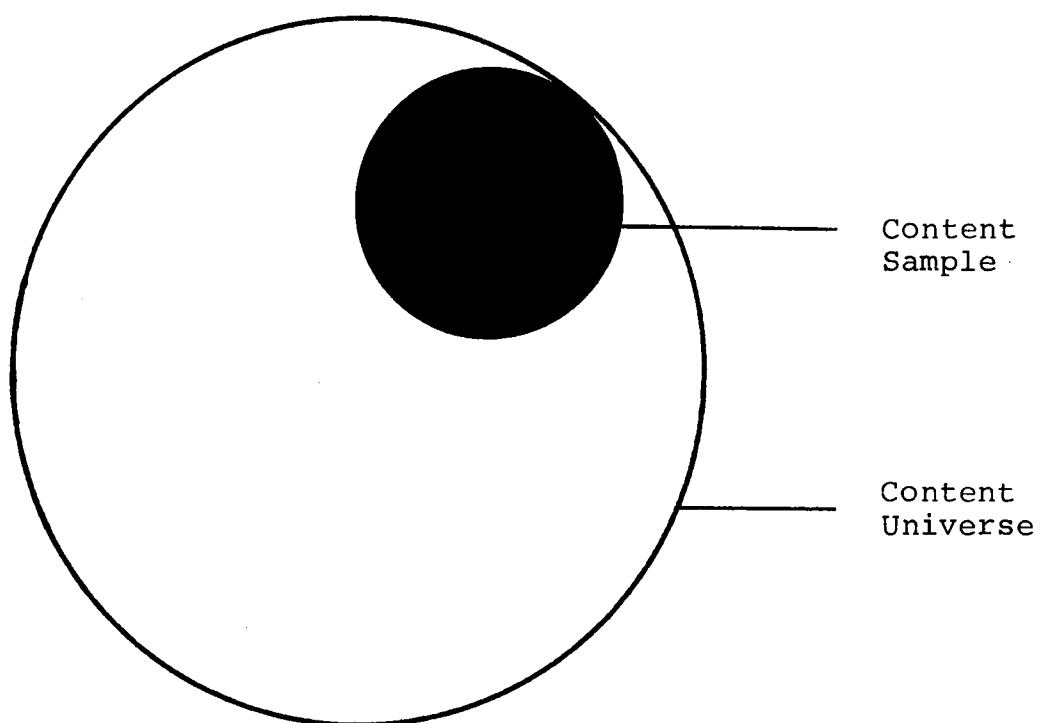


Figure 1. Content sample as unrepresentative of content universe using Lawshe's method.

sample and content universe overlap depicted in Figure 2, Lawshe's method does not indicate the relative weights of the individual content samples. Neither the individual item CVRs nor the averaged CVI values for each content sample area indicates the proper weight to be given each. Clearly, additional information, which can only be obtained through other methods, is needed to determine this. Overall, Lawshe's method is more appropriate for addressing the issues of quality and reliability of expert judgment rather than the more important issues of content universe boundaries, content sample weighting, and representativeness.

Other researchers have suggested alternative strategies for the quantification of content validity. Cronbach (1970) has advocated empirically establishing the content validity of a selection test by comparing independently developed test forms built to the same sampling specifications. Guion (1976) has stated that content validity could be quantitatively established by correlating the percentage weights of the tasks in a test with the similar weights in the job analysis. Both approaches are closely allied to equivalent forms reliability. However, they differ in that their emphasis is on procedural equivalence in content sampling more than on statistical equivalence. They attempt, nevertheless, to address the important issues of representativeness and weighting. Another approach worthy of mention is the

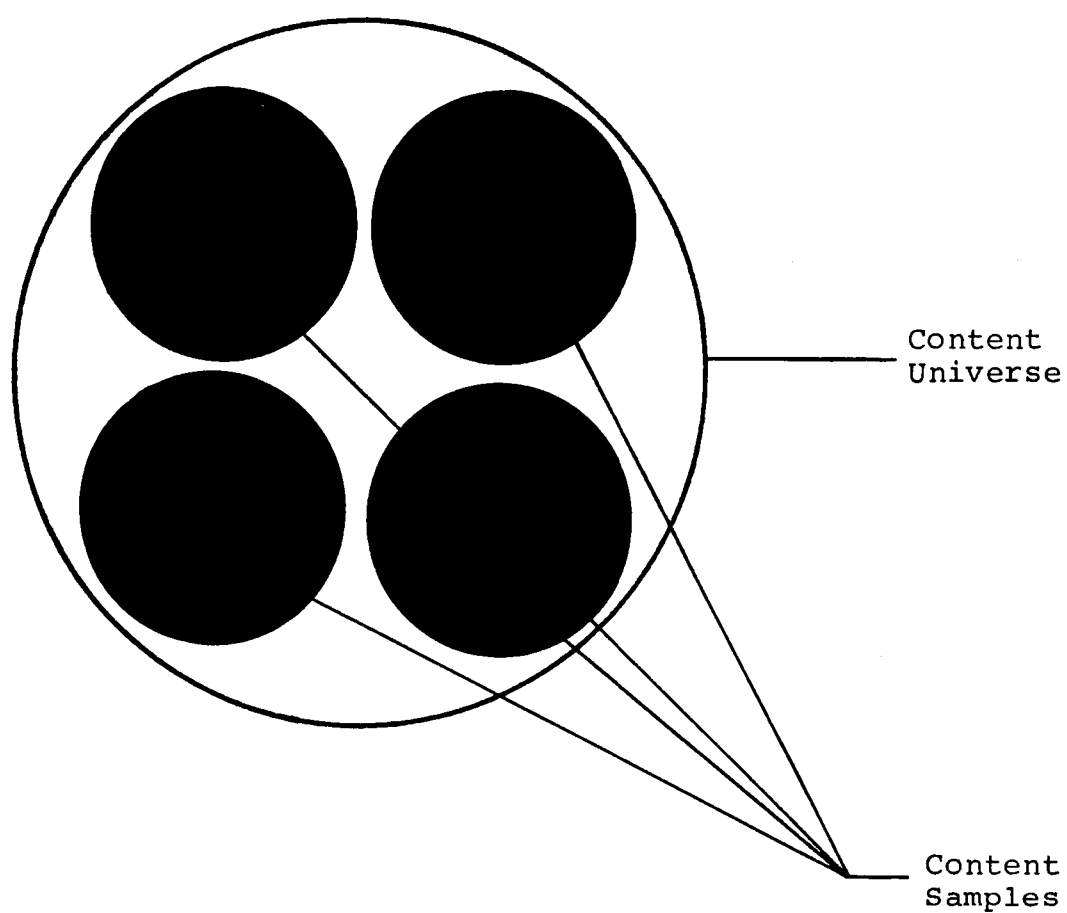


Figure 2. Problems in content sample weighting associated with Lawshe's method.

J-coefficient, which was developed to estimate the synthetic validity of selection instruments (Primoff, 1959). According to Primoff, the J-coefficient is an estimate of the relationship between test performance and job performance directly related to the corresponding criterion-related validity coefficient. However, since this approach deals mainly with synthetic validity, its application to the quantification of content validity in the present research is limited. What it does have in common with the present approach is that they share a common goal—both are attempts to relate estimated indices of validity to corresponding empirically derived criterion-related coefficients.

The three strategies discussed that deal exclusively with the quantification of content validity fail to integrate the relevant issues into a single approach. A single taxonomy could be used to assess simultaneously the behaviors associated with the selection instrument and the job for which it selects. In this way the content universe could be firmly established and the degree of overlap between the universe and sample determined by using the same method. Assuming that the same attributes underlie behaviors, whether they are performed on the job or when taking a selection test (or in training), one would be able to determine the degree to which the selection device and job match, as to either the behaviors performed or the underlying knowledges, skills,

and abilities. "Such a single taxonomy would be useful for the development and content validation of testing programs designed to aid in making personnel decisions about human work performance" (Dunnette, 1976, p. 516).

### Using Job Analysis to Quantify Content Validity

The use of job analysis techniques may be helpful in establishing an empirical foundation for estimating quantitatively the content validity of selection and other measuring devices by treating them as "jobs," and asking qualified judges to analyze them. The structured job analysis questionnaire has been the most useful device for shifting job analysis toward quantification (McCormick and Tiffin, 1974). In the present study, a standardized job analysis questionnaire, the Position Analysis Questionnaire (PAQ), is used to assess quantitatively the commonality between a sample of the contents of a job (the behaviors in a police recruit training program) and the larger universe it samples (the job of police patrol officer).

The PAQ assumes an underlying structure of jobs that can be identified and quantified, and includes the job activities not limited to specific occupation or technology. The job elements of the PAQ characterize the human behaviors (called "worker-oriented") involved in jobs, as contrasted with the technological processes (called "task-oriented") of

jobs, and hence, do not exhaust the entire universe of job behaviors. However, "It is one of the most carefully designed and capably researched job analysis instruments available today" (Smith & Hakel, 1979). A factor analysis of the 194 job elements for 2,200 jobs chosen to represent the general United States work force resulted in the identification of 32 meaningful "divisional" job dimensions, such as, Using Various Sources of Information or Being in a Stressful/Unpleasant Environment. These "divisional" dimensions are correlated with each other to some degree. Also identified by the same factor analysis were 13 independent "overall" job dimensions, including Operating Machines, Equipment/Vehicles and Performing Clerical/Related Activities. (A full list of the 32 "divisional" and 13 "overall" job dimensions appears in Table 1.) Each "divisional" and "overall" dimension score is reported as a z score to allow dimensional comparisons among different jobs on a normative basis. High z score values generally indicate that the particular dimension is important for the job being analyzed. The PAQ has been highly reliable, even with as few as three job analysts. Reported average reliabilities tend to be in the .70 to .80 range (Taylor, 1977).

Considering the police recruit training program a sample of the broader range of activities a police officer performs, content validity may be seen as the representativeness of the

Table 1

32 "Divisional" and 13 "Overall" Job Dimensions of the PAQ

| "Divisional" Dimensions |                                                        | Number | "Overall" Dimensions                                     |
|-------------------------|--------------------------------------------------------|--------|----------------------------------------------------------|
| Information Input       |                                                        |        |                                                          |
| 1.                      | Interpreting What is Sensed                            | 1.     | Decision Making and Communicating                        |
| 2.                      | Using Various Sources of Information                   | 2.     | Operating Machines, Equipment/Vehicles                   |
| 3.                      | Watching Devices/Materials for Information             | 3.     | Performing Clerical/Related Activities                   |
| 4.                      | Evaluating/Judging What is Sensed                      | 4.     | Performing Technical/Related Activities                  |
| 5.                      | Being Aware of Environmental Conditions                | 5.     | Performing Service/Related Activities                    |
| 6.                      | Using Various Senses                                   | 6.     | Performing Routine/Repetitive Activities                 |
|                         | Mental Processes                                       | 7.     | Being Aware of the Work Environment                      |
| 7.                      | Making Decisions                                       | 8.     | Engaging in Physical Activities                          |
| 8.                      | Processing Information                                 | 9.     | Supervising/Directing/Estimating                         |
|                         | Work Output                                            | 10.    | Public/Customer/Related Contacts                         |
| 9.                      | Using Machines/Tools/Equipment                         | 11.    | Other Work Schedules vs. Working Regular Day Schedules   |
| 10.                     | Performing Activities Requiring General Body Movements | 12.    | Working in an Unpleasant/Hazardous/Demanding Environment |
| 11.                     | Controlling Machines/Processes                         | 13.    | Nontypical Work Schedule/Optional Apparel                |
| 12.                     | Performing Skilled/Technical Activities                |        |                                                          |
| 13.                     | Performing Controlled Manual Activities                |        |                                                          |
| 14.                     | Using Miscellaneous Equipment/Devices                  |        |                                                          |
| 15.                     | Performing Handling/Related Manual Activities          |        |                                                          |
| 16.                     | General Physical Coordination                          |        |                                                          |
|                         | Relationships with Other Persons                       |        |                                                          |
| 17.                     | Communicating Judgments/Related Information            |        |                                                          |
| 18.                     | Engaging in General Personal Contacts                  |        |                                                          |
| 19.                     | Performing Supervisory/Coordination/Related Activities |        |                                                          |
| 20.                     | Exchanging Job-Related Information                     |        |                                                          |
| 21.                     | Public/Related Personal Contacts                       |        |                                                          |
|                         | Job Context                                            |        |                                                          |
| 22.                     | Being in a Stressful/Unpleasant Environment            |        |                                                          |
| 23.                     | Engaging in Personally Demanding Situations            |        |                                                          |
| 24.                     | Being in Hazardous Job Situations                      |        |                                                          |
|                         | "Other" Job Characteristics                            |        |                                                          |
| 25.                     | Working Nontypical vs. Day Schedule                    |        |                                                          |
| 26.                     | Working in Businesslike Situations                     |        |                                                          |
| 27.                     | Wearing Specified vs. Optional Apparel                 |        |                                                          |
| 28.                     | Being Paid on a Salary vs. Variable Basis              |        |                                                          |
| 29.                     | Working on an Irregular vs. Regular Schedule           |        |                                                          |
| 30.                     | Working Under Job-Demanding Circumstances              |        |                                                          |
| 31.                     | Performing Unstructured vs. Structured Work            |        |                                                          |
| 32.                     | Being Alert to Changing Conditions                     |        |                                                          |

activities of the training program, or the similarity between the behaviors required in training and those required on the job. The PAQ allows a direct estimate of the job universe and content sample using the same method, as well as a quantitative assessment of the overlap between the two. This assessment would yield a general index of behaviorally oriented content validity, and a specification of the exact areas of overlap. The PAQ comes closest to being the single taxonomy proposed by Dunnette, who wrote, "The PAQ constitutes an excellent first approximation for developing the common taxonomy that is needed" (p. 516).

#### Relationship between Content Validity and Other Validation Strategies

It would not have been enough to establish a quantifiable index of content validity without also examining its relationship to other validation procedures. If a sufficiently strong relationship between test score and work outcome was shown in a criterion-related validity study, a properly done content validity study of the same selection device should also demonstrate job relatedness. The most content valid indices would also be the most empirically valid, if validity were the unitary concept Schwartz proposed. A major contribution of this research, then, was to establish a link between the indices of content validity and corresponding empirically derived measures of the training/job performance

relationship. It was hoped that this would elevate the status of content validity to a level commensurate with that ascribed to the empirical strategies by professionals and the courts.

A review of the literature concerning police officer selection indicated that measures of the relationship between training and job performance have often failed to reach significance. This was also true of most other types of training. Landy and Farr (1975) have found, for instance, that training academy performance does not always correlate highly with job performance. In fact, significant relationships between the two have been found in only three instances (Cohen & Chaiken, 1973; Kleiman, 1978; McKinney, 1973). More often, the relationships have been nonsignificant (Arnold v. Ballard; Leirien, 1973; U.S. v. Jefferson; Van Maanen, 1975; Washington v. Davis).

Without an established relationship between training and performance, the practice of selecting applicants on the basis of their performance in training often resulted in choosing applicants with less than optimal chances of succeeding on the job. Landy and Farr (1975) have noted that the most trainable applicants may not become the best workers. They state, ". . . learning, as demonstrated by classroom examination, does not ensure that the trainee will put his new knowledge to use on the job" (p. 25). It has also become

procedure in recent court cases dealing with police misconduct to use "lack of proper training" as a defense strategy. Plaintiffs now include, in addition to the officer(s) and the chief-of-police, the training officer(s) of the department as defendants in such legal action. When evidence about the relationship between performance in training and later on the job has been absent, court decisions have been less than favorable to the defendants. Litigation of this type has been highly successful in firearms-related cases (see Murim v. Garlotte; Marusa v. District of Columbia; Peer v. City of Newark). For nonfirearms related litigation, see Peters v. Bellinger or Steinhardt v. Town of North Bay Village.

Also relevant to legal matters is the importance of relating measures of performance in training and performance later on the job, especially where measures of performance in training have been used as criteria in validation studies. A number of these studies have been legally challenged (Arnold v. Ballard; Bridgeport Guardians, Inc. v. Commission; Officers for Justice v. San Francisco Civil Service Commission; Smity v. City of East Cleveland; U.S. v. Jefferson; Washington v. Davis). In only one of these cases was the presence of a significant correlation with training measures sufficient evidence to substantiate the validity of the selection device as a predictor of job performance. This

occurred in Washington v. Davis. In this case the Supreme Court ruled that a significant relationship between scores on a selection device and measures of performance in training was sufficient evidence to establish the validity of the selection device as a predictor of job performance. However, the suit in this case was brought on 14th Amendment rather than on Title VII grounds.<sup>1</sup> Since Title VII case law is the precedent-setting basis for most cases involving test validation, the Washington decision will have little, if any, direct bearing on Title VII litigation. In a more recent Title VII ruling (U.S. v. Jefferson), the court ruled that measures of training performance should not be regarded as relevant criteria upon which to validate a selection instrument, unless such measures are predictive of performance later on the job.

There are many reasons why the relationship between training performance and job performance has been difficult to establish. Some are statistical (e.g., poor evaluation instruments), while others often find their basis in incorrect thinking. An important example of the latter may be that researchers have been attempting to measure a relationship where none could logically be expected to exist! For example,

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<sup>1</sup>A suit brought on Title VII grounds involves a showing merely that unlawful discrimination has taken place. When constitutional grounds are the basis for legal action, intent to discriminate must also be proven by the plaintiff.

if a researcher was to collect ratings of performance on a dimension that existed in training but not on the job (a dimension with no content validity), he or she should expect little or no statistical relationship between the measures of performance. Such relationships would only exist for dimensions represented in both training and job—i.e., those with high content validity.

### Objectives

Quantitative index of content validity. The analyses of the training program and patrolman's job using the PAQ should result in quantified indices of content validity based on the degree of overlap between the behavioral dimensions of each. These indices should meet all requirements enumerated by Guion (1975) for adequately establishing content validity.

Testing the overlap hypothesis. Concerning the relationship between performance in the police recruit training program and performance later on the job, it was hypothesized that the correlation between the two would depend on the overlap between the training program and the job, as measured by the PAQ-derived indices of content validity. For dimensions low in content validity, no statistical relationship was expected. For activities well represented in both (dimensions with high content validity),

a strong positive correlation was expected. That is, greater correlations would be found for rating dimensions which had been established as more content valid.

## CHAPTER II

### METHOD

#### Overview

The study involved analysis of the job characteristics of a training program and the corresponding job, which allowed assessment of the "overlap" of the two, or content validity. Performance was assessed in both the training program and the job itself to allow appraisal of the criterion-related validity of the high and low "overlap" dimensions.

A police recruit training program and patrolman's job were both analyzed for job characteristics. Three police training officers analyzed the training program they had developed and administered. Ten police patrol officers analyzed their job using the same structured job analysis questionnaire, the Position Analysis Questionnaire (PAQ). A supervisory rating scale was used to measure recruit performance in training and later on the job. The three training officers rated each recruit's performance at the end of training, and three job supervisors each recruit's job performance six to eight months later. The criterion-related validity of each of the 10 scalable PAQ "overall" training/

job performance dimensions was computed.<sup>1</sup> The degree of the relationship between the measures of overlap and the validity coefficients for each dimension was calculated.

### Research Setting

The research took place in the police department of a Southeastern municipality with over 250,000 inhabitants. The department consisted of more than 300 personnel, of which nearly one half comprised the operations (patrol) unit. The training function was carried out at the department's own police training academy. The recruit training program used in this research was developed in-house and tailored exclusively to meet the needs within the department. The training program consisted of lectures, work samples, and on-the-job experiences, and lasted for 16 weeks.

### Measures

#### Position Analysis Questionnaire

The questionnaire used to analyze the training program and the job of patrolman was Form B of the Position Analysis Questionnaire (McCormick, Jeanneret, & Mecham, 1969).

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<sup>1</sup>Only 10 of the 13 "overall" PAQ job dimensions were scalable using the 7-point performance rating instrument. The three that were not were of a dichotomous nature. They included: Other Work Schedules vs. Working Regular Day Schedules, Working in an Unpleasant/Hazardous/Demanding Environment, and Nontypical Work Schedule/Optional Apparel.

(Appendix A contains a copy.) The PAQ is used to determine the characteristics of jobs, especially the "worker-oriented" behaviors. Examples include: "information input" (where and how the worker gets the information used in performing the job), "mental processes (reasoning, decision making, planning, and information processing activities involved in the job), or "work output" (physical activities performed and tools or devices used).

The PAQ consists of 194 job elements common to all occupations and job technologies. The task of the job analyst is to determine the applicability to the job being analyzed of each PAQ element, using the rating scales provided. Several different scales are used: Extent of Use, Amount of Time, and Special Scales, to name a few. A machine scoreable PAQ Record Form is used to collect this information.

#### Performance Rating Scale

A supervisory rating scale was used to assess recruit performance in training and on the job (see Appendix B). The scale was comprised of the names and definitions of the 10 "overall" job dimensions from the PAQ that were considered scalable. These included:

1. Decision Making and Communicating
2. Operating Machines, Equipment/Vehicles
3. Performing Clerical/Related Activities

4. Performing Technical/Related Activities
5. Performing Service/Related Activities
6. Performing Routine/Repetitive Activities
7. Being Aware of the Work Environment
8. Engaging in Physical Activities
9. Supervising/Directing/Estimating
10. Public/Customer/Related Contacts

A measure of potential (motivation) and an overall performance dimension were also included as part of the scale. Specific, job-related examples, generated by the three training officers, were added to the dimension definitions to increase their clarity.

The scale was designed to measure the rater's global evaluation of each recruit's performance on each rating dimension. The rater's task was to rate each recruit's behavior on each dimension along a 7-point scale, ranging from "inadequate" to "exceptional." In addition to the anchors associated with each scale point value, were brief, generalized behavioral statements associated with every other scale value. A copy of the rating scale is presented in Figure 3.

All instructions were written and included with each scale. To reduce the possibility of rater error typically associated with supervisory rating scales, each scale included in its instructions a discussion of the most common rating

|   |             |                                                                                                                                      |
|---|-------------|--------------------------------------------------------------------------------------------------------------------------------------|
| 1 | INADEQUATE  | -Falls far below the minimum requirements of <u>this dimension</u> .                                                                 |
| 2 | WEAK        |                                                                                                                                      |
| 3 | AVERAGE     | -Meets the minimum requirements of <u>this dimension</u> .                                                                           |
| 4 | GOOD        |                                                                                                                                      |
| 5 | VERY GOOD   | -Exceeds the minimum requirements of <u>this dimension</u> , but falls short of being considered superior.                           |
| 6 | SUPERIOR    |                                                                                                                                      |
| 7 | EXCEPTIONAL | -Greatly exceeds the minimum requirements of <u>this dimension</u> ; one of the best performers on this dimension I have ever known. |

Figure 3. Training and Job Performance Rating Scale.

biases. All raters were asked to rate all their ratees on one dimension, then all of them on another, until all ratees had been rated on all dimensions. The purpose was to insure that the raters would be better able to distinguish between dimensions if forced to consider all of the ratees on one dimension at a time.

### Procedures and Participants

#### Job Analysis of the Training Program

The three male superior officers (a captain and two sergeants) involved in the development and administration of the police recruit training program voluntarily agreed to analyze that program using the PAQ.<sup>2</sup> They had among themselves over 30 years combined service as police officers. Each of the three officers was instructed about the purpose of the study and the use of the job analysis questionnaire. They were instructed to treat the recruit training program as if it were a "job" and then complete, independently of each other, the PAQ. The job analyses were completed privately by each of the job analysts, and picked up several weeks later.

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<sup>2</sup>The final score for the training program was the average of the PAQ analyses completed by the three training officers.

### Job Analysis of the Patrolman's Job

To analyze their jobs, 10 white, male patrol officers (with approximately two to five years patrol-related experience—3.9 average) were selected.<sup>3</sup> They ranged in age from 24 to 38—28 average. Because it was necessary to call these officers away from their patrol areas to complete the job analysis questionnaire, selection was based on availability at the time job analysis data were collected. The 10 officers came from four different detachments.<sup>4</sup> The 10 patrol officers were called in from their patrol areas at the discretion of their supervisors. They were usually brought into the station in pairs or singly to minimize disruption of patrol duties. Each officer was instructed about the purpose of the study and use of the PAQ. All 10 independently completed the PAQ for their jobs, taking as much time as needed. The 10 PAQs were completed within seven days.

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<sup>3</sup>The final score for the job of patrolman was the average of the PAQ analyses completed by the 10 patrol officers.

<sup>4</sup>A detachment was an intact, semi-autonomous unit within the patrol division. There were four such units within the patrol division of this police department. Each detachment either worked one of three, eight-hour daily shifts, or was off duty. These shifts were rotated among the four detachments on a weekly basis.

### Ratings of Performance During Training and on the Job

Thirty-six recruits from the 1978 Police Recruit Training Program participated in this phase of the study. Two recruits left the program for personal reasons and could not provide data on training or job performance. Data were not obtained on the job performance of two other recruits. The final sample size was 32 recruits, two of whom were women. All recruits were white, and ranged in age from 19 to 27—average 23 years.

Each recruit's training performance was assessed by the same three officers who completed the job analysis of the training program. These officers had the greatest opportunity to observe the behavior of the recruits on the rating dimensions. Performance was assessed at the end of the training program. The rating scales were hand delivered to each rater and any procedural questions answered. All rating scales were completed by each rater independently. The ratings were picked up by the researcher several weeks later.

Each recruit's performance on the job was evaluated six to eight months later by the three immediate supervisors with the greatest opportunity to observe their performance on the same dimensions as measured in training. The raters' modal police rank was sergeant, and average job tenure 10.5 years. There were four sets of immediate supervisors (a total of 12 different raters), one set for each detachment. The selection

of these supervisors was left to the discretion of each detachment commander. The recruits were evenly distributed among the four detachments: Detachment 1 had eight of the recruits, Detachment 2 had seven, Detachment 3 had eight, and Detachment 4 had nine recruits. The researcher arranged to meet with each set of immediate supervisors, and the ratings were collected in the researcher's presence. Ratings were done independently.

## CHAPTER III

### RESULTS

Data analysis of the PAQ Record Forms was performed by PAQ User Services in Logan, Utah. All statistical manipulations of the PAQ-generated data were part of the System II software package developed for use with the questionnaire (Mecham, McCormick, & Jeanneret, 1977). This computer analysis assessed the degree of interrater reliability, the similarity of the training program and the patrolman's job, and the overlap between them on the 10 scalable "overall" dimensions.

The psychometric properties of the performance rating scales were analyzed to assess leniency, halo error, and interrater reliability. Correlational analyses were used to assess the relationship between recruit performance in training and later on the job, as well as the relationship between the measures of dimensional overlap and the empirically derived criterion-related validity coefficients.

#### Job Analyses of the Training Program and Job

##### Interrater Reliability

To estimate interrater reliability, the PAQ computer analysis calculated the intercorrelations between every possible analyst pair across elements. These correlations

were converted to z scores (using Fisher's r to z transformation—see Hayes, 1963). They were averaged and this value was reconverted to an average r value. Finally, the Spearman-Brown "Step-Up Formula" (see Hays, 1963) was used to obtain an estimate of the interrater reliability for the three training and ten job analysts. The interrater reliability of the PAQ analysts was quite good for both the training program and patrolman's job. The uncorrected coefficients were .70 for the training program and .60 for the patrolman's job. The "stepped-up" coefficients for the three and ten analysts were .87 and .93, respectively.

#### "Job Family" Analysis of the Training Program and Job

The similarity of the job dimensions from the training program and patrolman's job was used to assess the degree to which the training program and job resembled each other; that is, the probability that they were from the same job "family." This was formed by examining the F distribution for each across dimensions.<sup>1</sup> The probability that the

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<sup>1</sup>The F ratio is produced as follows:

$$F = \frac{MS \text{ jobs}}{MS \text{ Error}}$$

where the Mean Square Jobs is equivalent to the combination of the sum of squares attributable to Jobs plus the Jobs X Dimensions interaction in a two-way ANOVA, divided by the combined degrees of freedom. The Mean Square Error is calculated by averaging an intricately weighted deviation score, divided by degrees of freedom equal to the total number

training program and patrolman's job were from the same "family" was extremely high ( $p < .01$  for the analysis based on the "overall" job dimensions). Another indicator of the extent of the dimensional similarities between jobs was the degree of agreement between the rank orders of the 10 scalable independent "overall" job dimensions for both. A Spearman Rank Order correlation between the rankings of the 10 scalable "overall" dimensions for the training program and job was extremely high ( $r_s = .92$ ,  $p < .01$ ).

#### Profile Analysis of the Training Program and Job

Another indication of the degree of similarity between the training program and patrolman's job was their degree of "profile similarity." Profile similarity concerns both the shape and elevation of each job profile and makes comparisons between profiles based on both simultaneously. The statistic used to make the comparisons was Cattell's Coefficient of Pattern Similarity, which ranges from 1.00 to -1.00, where 1.00 indicates a perfect match of the profiles (Cattell, 1949). Smaller values indicate less similarity in terms of either or both shape and elevation. The coefficient for the "overall" job dimensions was .68. This indicated a good deal

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of individual dimension scores, minus the number of dimensions multiplied by the number of jobs. (For a more detailed analysis of the derivation of these Mean Squares, see the PAQ User's Manual, pp. 51-56.)

of similarity between the characteristics of each profile. Figure 4 illustrates the degree of profile similarity between the analyses of the training program and patrolman's job based on the 10 scalable "overall" job dimension scores.

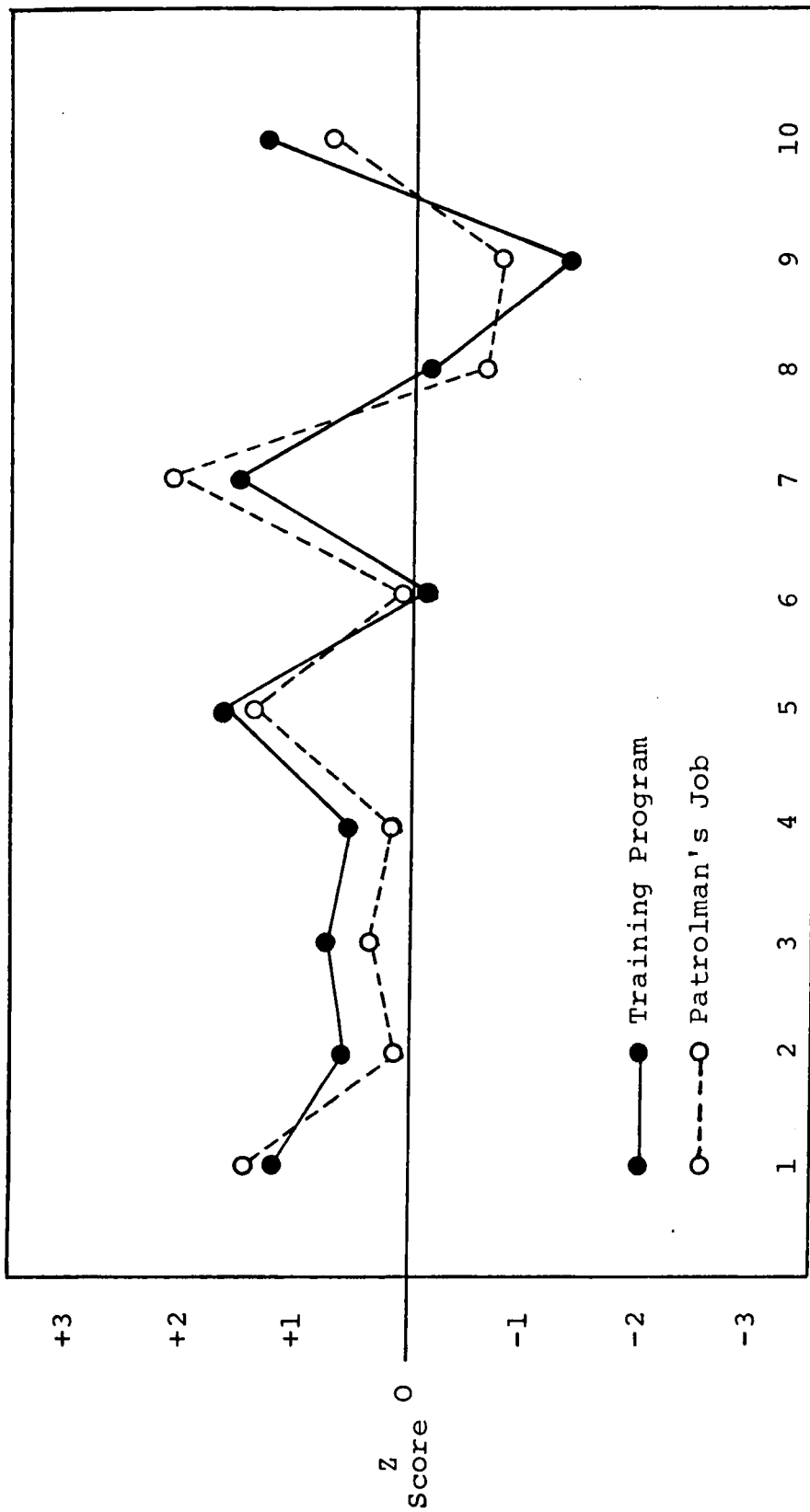
#### Indices of Content Validity Based on Dimensional Overlap

The differences between the training program and patrolman's job  $\bar{z}$  score values for the 10 scalable "overall" job dimensions were used as indices of the content validity of each dimension. Table 2 lists the  $\bar{z}$  score differences between the training program and patrolman's job for the 10 "overall" job dimensions. The figures in the fourth column of Table 2 show the absolute difference score associated with each "overall" dimension (its index of content validity).

#### Analysis of the Training and Job Performance Rating Scales

##### Leniency in Use of the Scales

The raw score means and standard deviations of the 10 training and 10 job performance rating dimensions are shown in Table 3. The average training performance dimension score was 4.3 and the average job performance dimension score 4.1. A Hotelling's T test (see Tatsuoka, 1971) was computed between the mean vectors for each group of dimensions. There was no statistically significant difference between the two vectors ( $F(2.17) = .78, p > .10$ ). Nor were there any significant



Job Dimension (listed by numbers—see pages 24 and 25)

Figure 4. Similarity of the PAQ profiles of the Training Program and Patrolman's Job, based on the dimension Z scores of the 10 scalable "overall" dimensions.

Table 2

Absolute Difference Scores  $|D|$  Associated with the  
10 Scalable "Overall" PAQ Dimensions

| Job Dimension<br>(from PAQ)                 | Z Scores |      |       |
|---------------------------------------------|----------|------|-------|
|                                             | Training | Job  | $ D $ |
| Decision Making/Communicating               | 1.11     | 1.48 | .37   |
| Operating Machines, Equipment/<br>Vehicles  | .66      | .14  | .52   |
| Performing Clerical/Related<br>Activities   | .72      | .45  | .27   |
| Public Contact/Interpersonal<br>Skills      | 1.35     | .75  | .60   |
| Performing Technical/Related<br>Activities  | .51      | .16  | .35   |
| Being Aware of the Work<br>Environment      | 1.53     | 2.06 | .53   |
| Performing Routine/Repetitive<br>Activities | -.11     | .05  | .16   |
| Engaging in Physical Activities             | -.14     | -.61 | .47   |
| Performing Service/Related<br>Activities    | 1.71     | 1.41 | .27   |
| Supervising/Directing/Estimating            | -1.38    | -.83 | .55   |

Note:  $|D| = |[Training\ Z\ Score] - [Job\ Z\ Score]|$ .

Table 3  
Raw Score Means and Standard Deviations of the  
10 Training and Job Performance  
Rating Dimensions

| Job Dimension<br>(from PAQ)                  | Training Program |                       | Job of Patrolman |                       |
|----------------------------------------------|------------------|-----------------------|------------------|-----------------------|
|                                              | Mean             | Standard<br>Deviation | Mean             | Standard<br>Deviation |
| Decision Making/<br>Communicating            | 4.3              | 1.14                  | 3.8              | 1.07                  |
| Operating Machines,<br>Equipment/Vehicles    | 4.4              | .96                   | 4.0              | 1.14                  |
| Performing Clerical/<br>Related Activities   | 4.5              | 1.00                  | 4.3              | .96                   |
| Public Contact/<br>Interpersonal Skills      | 4.6              | 1.13                  | 4.0              | 1.12                  |
| Performing Technical/<br>Related Activities  | 4.9              | 1.02                  | 4.0              | .88                   |
| Being Aware of the<br>Work Environment       | 4.1              | 1.04                  | 4.2              | .91                   |
| Performing Routine/<br>Repetitive Activities | 3.7              | .97                   | 4.2              | .87                   |
| Engaging in Physical<br>Activities           | 4.1              | 1.00                  | 4.7              | .84                   |
| Performing Service/<br>Related Activities    | 4.3              | 1.02                  | 4.5              | .79                   |
| Supervising/Directing/<br>Estimating         | 3.7              | .91                   | 3.7              | 1.06                  |

Note: Multivariate test of differences between mean vectors yielded  $F(2.17) = .78$  ( $p > .10$ ), indicating no significant difference.

differences between either centroid and the performance rating scale midpoint value. The midpoint value (4) fell within the 99% confidence limits of both centroids (for training,  $3.9 < 4.0 < 4.7$  and for job,  $3.8 < 4.0 < 4.4$ ). These findings indicate that there was no scale-based leniency error. (However, the midpoint of the scales designated "above average" performance.)

### Interrater Reliability

Table 4 shows the interrater reliability coefficients of each of the 10 dimensions for training and job performance. The statistic used to calculate these reliabilities was the intraclass correlation.<sup>2</sup> Because the ratings were converted to T scores to equate for conceptual differences among raters in scale usage (a correction for anchoring effects), the

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<sup>2</sup>The formula for calculating the intraclass correlation for a single rater is as follows:

$$r_1 = \frac{Mx - M}{Mx - (k-1)M}$$

where: Mx = Mean Square for Ratees  
 M = Mean Square for Error  
 r = number of raters.

The formula for k raters is:

$$r_k = \frac{Mx - M}{Mx}$$

The Mean Square Error in the present study was calculated by removing the variance due to Ratees and Raters from the Total Sum of Squares, and then dividing by the appropriate degrees of freedom (Ebel, 1951).

Table 4

Uncorrected and "Stepped-Up" Interrater Reliability Coefficients  
of the 10 Training and Job Performance Rating Scale Dimensions

| Job Dimension<br>(from PAQ)                  | Interrater Reliability Coefficient |            |                  |            |
|----------------------------------------------|------------------------------------|------------|------------------|------------|
|                                              | Training Program                   |            | Job of Patrolman |            |
|                                              | Uncorrected                        | Stepped-Up | Uncorrected      | Stepped-Up |
| Decision Making/Communicating                | .66**                              | .86**      | .46*             | .72**      |
| Operating Machines,<br>Equipment/Vehicles    | .37*                               | .64**      | .01              | .04        |
| Performing Clerical/<br>Related Activities   | .59**                              | .81**      | .17              | .38*       |
| Public Contact/<br>Interpersonal Skills      | .55**                              | .79**      | .44*             | .70**      |
| Performing Technical/<br>Related Activities  | .36*                               | .63**      | .28*             | .55**      |
| Being Aware of the<br>Work Environment       | .41*                               | .68**      | .41*             | .67**      |
| Performing Routine/<br>Repetitive Activities | .29*                               | .55**      | .38*             | .64**      |
| Engaging in Physical Activities              | .58**                              | .81**      | .27*             | .53**      |
| Performing Service/<br>Related Activities    | .45**                              | .71**      | .21              | .44*       |
| Supervising/Directing/<br>Estimating         | .45**                              | .71**      | .43*             | .69**      |

\* $p < .05$

\*\* $p < .01$

"between raters" variance was removed from the error term in all calculations (see Ebel, 1951). Also, rather than using a multivariate test, separate coefficients were calculated for each training and job performance dimension. This was done to reduce the possibility of spuriously high coefficients due to the intercorrelations among dimensions (see Cronbach, Gleser, Nanda, & Rajaratnam, 1972).

The average uncorrected coefficients were .47 for training and .31 for the patrolman's job. The average "stepped-up" reliability for three raters was .72 for training performance and .54 for job performance. To test for the differences between the training and job "stepped-up" coefficients, a Fisher  $r$  to  $z$  transformation was calculated between their averages. The average "stepped-up" reliability coefficients for the training and job performance dimensions were not different ( $z = .57$ ,  $p > .10$ ). Of the 20 coefficients, only 1 (a job performance dimensions—Operating Machines, Equipment/Vehicles) was not significant at the .05 level, and only 3 reliabilities for job performance dimensions (Operating Machines, Equipment/Vehicles; Performing Clerical/Related Activities; Performing Service/Related Activities) failed to reach the .01 level. Both sets of reliabilities were adequate. They showed a good deal of agreement among the raters regarding each recruit's performance in training and later on the job.

### Halo Error of the Scales

The intercorrelations among the 12 training performance dimension T scores are shown in Table 5. Similar intercorrelations for the job performance dimensions are shown in Table 6. The average intercorrelations (.50 and .40 for training and job performance, respectively) indicated an acceptable degree of halo error. There was no statistical difference between the averages ( $z = .58$ ,  $p > .10$ ).

### Variance in Overall Ratings Explained by the Dimensions

The multiple correlation between the 10 training dimension scores and the measure of overall training performance was calculated. The multiple correlation coefficient of .87 indicated that this weighted linear combination accounted for over 75% of the explainable variance in the model ( $r^2 = .78$ ). When the multiple correlation between the 10 job performance dimension scores and the measure of overall job performance was calculated, the multiple correlation coefficient of .78 indicated that this weighted linear combination accounted for over 60% of the explainable variance ( $r^2 = .61$ ).

The rating of potential was included (in addition to the 10 performance dimensions) in the multiple regression equations for training and job performance. The rating of potential made the most significant contribution to the

Table 5

## Intercorrelations of Training Performance Dimensions

| Training Dimension                              | Training Dimension (listed by numbers) |     |     |     |     |     |     |     |     |     |     |
|-------------------------------------------------|----------------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
|                                                 | 1                                      | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | 10  | 11  |
| 1. Decision Making/Communicating                |                                        |     |     |     |     |     |     |     |     |     |     |
| 2. Operating Machines,<br>Equipment/Vehicles    | .71                                    |     |     |     |     |     |     |     |     |     |     |
| 3. Performing Clerical/<br>Related Activities   | .54                                    | .38 |     |     |     |     |     |     |     |     |     |
| 4. Public Contact/<br>Interpersonal Skills      | .62                                    | .53 | .60 |     |     |     |     |     |     |     |     |
| 5. Performing Technical/<br>Related Activities  | .56                                    | .56 | .48 | .50 |     |     |     |     |     |     |     |
| 6. Being Aware of the<br>Work Environment       | .74                                    | .56 | .53 | .58 | .58 |     |     |     |     |     |     |
| 7. Performing Routine/<br>Repetitive Activities | .49                                    | .37 | .57 | .41 | .40 | .41 |     |     |     |     |     |
| 8. Engaging in Physical<br>Activities           | .59                                    | .56 | .33 | .34 | .38 | .46 | .42 |     |     |     |     |
| 9. Performing Service/<br>Related Activities    | .50                                    | .46 | .44 | .51 | .36 | .33 | .61 | .35 |     |     |     |
| 10. Supervising/Directing/<br>Estimating        | .63                                    | .60 | .48 | .55 | .46 | .48 | .56 | .44 | .51 |     |     |
| 11. Potential Rating                            | .58                                    | .54 | .61 | .55 | .41 | .68 | .59 | .53 | .49 | .51 |     |
| 12. Overall Rating                              | .70                                    | .54 | .73 | .56 | .56 | .73 | .69 | .53 | .62 | .55 | .74 |

Note: All have  $p < .05$ .

Table 6  
Intercorrelations of Job Performance Dimensions

| Job Dimension                                   | Job Dimensions (listed by numbers) |     |                  |     |     |     |     |                  |     |     |     |
|-------------------------------------------------|------------------------------------|-----|------------------|-----|-----|-----|-----|------------------|-----|-----|-----|
|                                                 | 1                                  | 2   | 3                | 4   | 5   | 6   | 7   | 8                | 9   | 10  | 11  |
| 1. Decision Making/Communicating                |                                    |     |                  |     |     |     |     |                  |     |     |     |
| 2. Operating Machines,<br>Equipment/Vehicles    | .40                                |     |                  |     |     |     |     |                  |     |     |     |
| 3. Performing Clerical/<br>Related Activities   | .48                                | .37 |                  |     |     |     |     |                  |     |     |     |
| 4. Public Contact/<br>Interpersonal Skills      | .46                                | .24 | .42              |     |     |     |     |                  |     |     |     |
| 5. Performing Technical/<br>Related Activities  | .38                                | .23 | .48              | .45 |     |     |     |                  |     |     |     |
| 6. Being Aware of the<br>Work Environment       | .59                                | .22 | .48              | .37 | .39 |     |     |                  |     |     |     |
| 7. Performing Routine/<br>Repetitive Activities | .60                                | .31 | .55              | .48 | .62 | .56 |     |                  |     |     |     |
| 8. Engaging in Physical<br>Activities           | .51                                | .47 | .37              | .24 | .35 | .31 | .42 |                  |     |     |     |
| 9. Performing Service/<br>Related Activities    | .26                                | .32 | .17 <sup>a</sup> | .27 | .21 | .29 | .27 | .18 <sup>a</sup> |     |     |     |
| 10. Supervising/Directing/<br>Estimating        | .61                                | .30 | .34              | .47 | .50 | .63 | .59 | .42              | .26 |     |     |
| 11. Potential Rating                            | .60                                | .43 | .49              | .49 | .50 | .46 | .70 | .40              | .31 | .60 |     |
| 12. Overall Rating                              | .56                                | .33 | .48              | .41 | .50 | .61 | .66 | .40              | .30 | .69 | .58 |

Note: All have  $p < .05$ , except those labeled a.

explanation of overall training variance, yet made no impact whatsoever on the explanation of overall job performance. Tables 7 and 8 report the stepwise multiple regression analyses of the PAQ "overall" training and job performance dimensions.

#### Relating Content Validity to Empirical Validity

Because there were no a priori criteria of what constituted "high" and "low" overlap, the distribution of  $|D|$  values was arbitrarily dichotomized at the median, and high and low overlap groupings established. The mean of the distribution of absolute D values was .41 and the standard deviation .15. The mean value translated into less than one half standard deviation difference, on the average, between the 10 scalable dimensions. The correlations shown in Table 9 are the training/job performance validity coefficients, by overlap group, for each of the 10 "overall" job dimensions. They are shown uncorrected, and also corrected for attenuation in both the predictor and criterion. All except two (Operating Machines, Equipment/Vehicles and Performing Clerical/Related Functions) were significant at the .05 level or better. There was a relationship between performance in training and later on the job on at least eight of the dimensions measured.

The average validities for the high and low overlap groups were .24 and .25, respectively. There was no

Table 7

Stepwise Multiple Regression Analysis of the "Overall"  
Training Performance Dimensions

| Predictor Variable                           | Simple<br>$r$ | Multiple<br>$r$ | Multiple<br>$r^2$ | Changes in<br>Multiple<br>$r^2$ | F <sup>a</sup> |
|----------------------------------------------|---------------|-----------------|-------------------|---------------------------------|----------------|
| Potential Rating                             | .74           | .74             | .54               | .54                             | 73.38**        |
| Performing Clerical/<br>Related Activities   | .73           | .81             | .66               | .12                             | 60.01**        |
| Performing Service/<br>Related Activities    | .62           | .84             | .72               | .06                             | 50.77**        |
| Performing Technical/<br>Related Activities  | .56           | .85             | .73               | .01                             | 40.43**        |
| Decision Making/Communicating                | .70           | .87             | .75               | .02                             | 33.99**        |
| Being Aware of the<br>Work Environment       | .73           | .87             | .75               | .00                             |                |
| Performing Routine/<br>Repetitive Activities | .69           | .87             | .75               | .00                             |                |
| Public Contact/<br>Interpersonal Skills      | .56           | .87             | .75               | .00                             |                |
| Supervising/Directing/<br>Estimating         | .55           | .87             | .75               | .00                             |                |
| Operating Machines,<br>Equipment/Vehicles    | .54           | .87             | .75               | .00                             |                |
| Engaging in Physical<br>Activities           | .53           | .87             | .75               | .00                             |                |

<sup>a</sup>df = 63 for a total of 32 cases (35 observations deleted due to missing values).

\*\* $p < .0001$ .

Table 8

Stepwise Multiple Regression Analysis of the "Overall"  
Job Performance Dimensions

| Predictor Variable                           | Simple<br>$r$ | Multiple<br>$r$ | Multiple<br>$r^2$ | Changes in<br>Multiple<br>$r^2$ | Fa      |
|----------------------------------------------|---------------|-----------------|-------------------|---------------------------------|---------|
| Supervising/Directing/<br>Estimating         | .69           | .69             | .48               | .48                             | 87.67** |
| Performing Routine/<br>Repetitive Activities | .66           | .76             | .58               | .10                             | 64.57** |
| Performing Clerical/<br>Related Activities   | .48           | .77             | .60               | .02                             | 45.72** |
| Being Aware of the<br>Work Environment       | .61           | .78             | .61               | .01                             | 35.28** |
| Potential Rating                             | .58           | .78             | .61               | .00                             |         |
| Decision Making/Communicating                | .56           | .78             | .61               | .00                             |         |
| Performing Technical/<br>Related Activities  | .50           | .78             | .61               | .00                             |         |
| Public Contact/<br>Interpersonal Skills      | .41           | .78             | .61               | .00                             |         |
| Engaging in Physical<br>Activities           | .40           | .78             | .61               | .00                             |         |
| Operating Machines,<br>Equipment/Vehicles    | .33           | .78             | .61               | .00                             |         |
| Performing Service/<br>Related Activities    | .30           | .78             | .61               | .00                             |         |

<sup>a</sup>df = 95 for a total of 32 cases.

\*\* p < .0001.

Table 9  
Corrected<sup>a</sup> and Uncorrected Training/Job Performance  
Validity Coefficients for "High" and "Low"  
Overlap Groups

| Dimensions                                   | Training/Job Performance<br>Validity Coefficients |             |
|----------------------------------------------|---------------------------------------------------|-------------|
|                                              | Corrected                                         | Uncorrected |
| <u>"High" Overlap Group</u>                  |                                                   |             |
| Decision Making/Communicating                | .38*                                              | .29*        |
| Performing Clerical/<br>Related Activities   | .22*                                              | .12         |
| Performing Technical/<br>Related Activities  | .34*                                              | .20*        |
| Performing Routine/<br>Repetitive Activities | .44*                                              | .26*        |
| Performing Service/<br>Related Activities    | .61*                                              | .34*        |
| <u>"Low" Overlap Group</u>                   |                                                   |             |
| Operating Machines,<br>Equipment/Vehicles    | .24*                                              | .04         |
| Public Contact/<br>Interpersonal Skills      | .47*                                              | .35*        |
| Being Aware of the<br>Work Environment       | .45*                                              | .31*        |
| Engaging in Physical<br>Activities           | .34*                                              | .22*        |
| Supervising/Directing/<br>Estimating         | .45*                                              | .32*        |

<sup>a</sup>Corrected for attenuation in both the predictor and criterion.

\* $p < .05$

statistically significant difference between these coefficients. Correcting for attenuation increased the average validities to .40 for the high overlap group and .39 for the low overlap group. These coefficients were not significantly different.

A Pearson Product-Moment correlation was computed between each  $|D|$  value and its respective empirically derived training/job performance validity coefficient, across all 10 dimensions. The coefficient for the uncorrected data was .10 ( $p > .10$ );  $-.02$  ( $p > .10$ ) for the corrected measures ( $df = 8$ ). For the major hypothesis to have been confirmed, it would have been necessary for the relationship between the distance values and their corresponding training/job performance validity coefficients to be statistically significant and negative. It was not.

## CHAPTER IV

### DISCUSSION

The results indicated that the police recruit training program was amenable to an analysis based on the PAQ, which showed that the training program and the patrolman's job were substantially similar in terms of several indices of job behaviors. The implication is that the content validity of a selection device can be quantified using the PAQ. Results did not indicate a significant relationship between the PAQ-derived indices of content validity and corresponding empirically derived estimates of criterion-related validity. This may have been due to restriction in the range of either or both sets of validity indices. The PAQ-generated data (e.g., job family grouping or profile similarity) suggested that restriction occurred in the range of the distribution of absolute difference values (the indices of content validity), and that the range was restricted to values at the lower end of the distribution (i.e., high overlap condition). If so, this restriction would have decreased substantially the possibility of finding a significant relationship between the two sets of validity indices. Under the condition of high overlap, the hypothesis predicted significant criterion-related coefficients. The fact that 8 of 10 of these coefficients were significant is consistent with the

hypothesis. But more research is needed to evaluate the hypothesis under the full range of sample/universe overlap.

When degree of "overlap" between a job and selection device does not vary substantially (i.e., the selection device matches the behaviors in the job) or there is no match at all, it is difficult to assess the relationship between the indices of content validity and criterion-related validity by the present method. Only where there is sufficient variance of overlap, as in a training program where only some of the behaviors match the job, is it possible to test the relationship between the PAQ-derived and criterion-related estimates of validity. To substantiate a relationship between the two sets of validity indices, it may be more practical to systematically vary the degree of overlap within the confines of a laboratory study. However, limitations associated with laboratory studies must be addressed (Runkel & McGrath, 1972).

The method used here meets the requirements for establishing content validity outlined by Guion (1975). The method (a) analyzed both the patrolman's job (content universe) and the training program (content sample) using the PAQ; (b) determined the degree of overlap (similarity) between the behaviors performed in training and on the job by analyzing the PAQ estimates of profile similarity, job families, and the distance between the z score estimates of the 10 scalable "overall" job dimensions; (c) analyzed the

importance of each dimension to the job universe based on an analysis of the "overall" dimension z scores associated with the patrolman's job; and (d) estimated the degree to which the universe and sample rank orders of these dimensional z score values coincided.

The present study used the same probability bases used to assess criterion-related validity (e.g., testing the null hypothesis) to assess the overlap between the training program and job. By attempting to show a statistically significant relationship between training and job behaviors as evidence of their similarity, the present approach began to address what some have considered the major criticism of the use of content validity. Cattell's Coefficient of Profile Similarity, which was used to assess the degree of similarity between test and job, may be a valuable tool here. Because it provides a statistically based similarity comparison between test and job behaviors, it introduces scientific rigor into content validation. Profile analysis may be the key to answering the criticisms of content validity based on its apparent lack of statistical sophistication compared to other validation strategies.

The criticism of content validity regarding the need for variance in test scores was not fully addressed by the present method. For example, some performance dimension may not validly distinguish among individuals, even though the

dimension is represented among the job behaviors. This would result in high content validity but no criterion-related validity. It is possible that certain jobs (e.g., very routine jobs) possess less performance variance than other, more complex jobs. But, even for the most routine jobs, if the performance universe is properly sampled, it ought to include behaviors that differentiate among levels of performance. After all, if there is variance among individuals on a job, there must be at least one relevant performance variable to account for it. The PAQ has been carefully designed and researched to sample the universe of "worker-oriented" behaviors, and is less likely to inadequately define the performance universe than are other behaviorally oriented methods. So, when measuring the human behaviors of jobs, perhaps there is little reason for concern about the possible lack of test score variability associated with content validated tests. This raises the question of the limitations of the PAQ in measuring the complete universe of job behaviors.

A limitation of the present method is that it cannot directly measure the "task-oriented" aspects (technological processes) of jobs. This information must be collected in another way. If the "task-oriented" behaviors best differentiate among individuals, the present method will overlook them. However, the technological processes of jobs (e.g.,

the specific knowledge required to perform a job adequately) have been traditionally the easiest to define. Most tests purported to be content valid tend to overemphasize job knowledge to the exclusion of the human processes of jobs. The implication is that "worker-oriented" job behaviors need to be included in a content valid test to help distinguish among individuals. The "worker-oriented" and "task-oriented" approaches apparently contain separate sets of items. So, multiple methods of analysis may be the only answer, until a taxonomy that encompasses both is developed (Prien, 1977).

Another point of discussion concerns the validity of the analyses of the training program carried out by the three training officers. The question is whether the officers were biasing their analyses by unintentionally analyzing the behaviors associated with the job of a police officer, rather than those associated with the training program. To determine whether this was happening in the present research, it would have been necessary to have the recruits analyze the training program.

Still another concern is the use of the technique presented here with other selection devices not so closely related to the work sample as a training program. Selection instruments that are more signs than samples (see Goodenough, 1949, or Wernimont & Campbell, 1968) may make the inferences between test and job performance more difficult to make. That

is, analyzing the content validity of a training program (a direct sample of job universe behavior) may be possible using the PAQ, while the analysis involved in the content validation of a paper-and-pencil test (a sign of job universe behavior) may not. A crucial question is whether job analysts can treat, say, a multiple choice test as a "job" and analyze the behaviors inferred by it using the PAQ. The leap between test content and job behaviors may be extremely difficult for test analysts to make as the test departs from the operational definition of the job. However, if the leap can be made, it would certainly relieve the burden placed on practitioners by the time, costs, and feasibility of criterion-related validation strategies. It would also make it possible for defendants to support claims of the content validity of their selection instruments before the courts. If a test cannot be treated as a job, the use of the present method may be restricted to situations where the test itself is a good operational definition of the job (e.g., on-the-job training or performance testing).

An interesting subsidiary finding in this research dealt with the contribution of the rating of potential to the explanation of the overall training performance variance. The rating of potential is considered by some to be an indicator of motivational level (Whyte, 1977). In the present study, the potential rating made the largest single

contribution to the explanation of overall training variance among the independent variables entered in the multiple regression equation, but it made no contribution to the explanation of overall job performance variance. Perhaps there is more of a desire to exert extra effort during training because the greater degree of observability by the trainers is seen by trainees as having an impact on their status later on the job. Or perhaps performance in training may be seen as more crucial because there is a perceived greater likelihood of dismissal while still a trainee than there is as a patrolman. Once on the job, the trainee can "relax" somewhat because of increased feelings of job security.

What is the next step? More research is the best answer. Although the present method began to address one of the major criticisms of content validity (i.e., the need for statistically based similarity comparisons between test and job content), it did not adequately answer the problems associated with measuring the complete universe of job behaviors. A valuable point that this research did bring up, though, is that there are human behaviors in jobs which may be very important to an explanation of overall job performance. The fact that the 10 PAQ "overall" human-oriented job behaviors were able to explain more than 60% of the overall job performance variance is significant. So is the fact that

on 8 of 10 of the dimensions it was possible to show a direct linear relationship between training and job performance.

## CHAPTER V

### CONCLUSIONS

The current state of the art of validation via content is not clear. Disagreements exist as to the definition, evidence, and usefulness of content validity (Guion, 1975; Lawsche, 1976; Tenopyr, 1977). Most of the problems, however, seem to stem from the lack of scientific rigor associated with the procedures used to establish content validity. The answer to this problem is not one of developing a new method of test construction, but of applying scientific rigor to the already established method of content validity. There are two key steps in the process of quantifying content validity that will always need to be monitored to insure a sound method.

First, it is important to adequately establish the performance universe of tasks, duties, or behaviors. If the performance universe is defined in terms of the KSAs necessary to perform the job, then it is imperative that clear and concise operational definitions of each knowledge, skill, and/or ability be given, as well as evidence that they are connected to some particular task, duty, or behavior. Second, the basic content validity procedure involves a statistically based similarity comparison between the properly defined corresponding KSAs. The same probability bases used to

establish criterion-related validity must be required to establish content validity.

However, most content validity studies reviewed for this research have not adequately followed the prescribed procedures. They are usually haphazard approximations, with none or few checks on reliability, and little regard for scientific rigor. They tend to end with content validity "built in," rather than content validity established using statistically based sample/universe similarity comparisons.

As the scrutiny of the courts becomes greater, the degree to which practitioners will be able to get away with current practices decreases. In the future, the number of tests that will require validation will multiply, especially if the public sector continues to grow as a source of employment. If the problem cannot be solved by the introduction of scientifically sound, yet simple and fast validation procedures, the only alternative may be a moratorium on testing as we know it. In the past, that has led initially to even more problems, and later to a return to the very methods of testing that were the original culprits. The present research provides a start in the direction of simplicity and quickness. No great sophistication is needed to collect PAQ data; admittedly, somewhat more is needed to interpret the results. The procedure requires only a few job analysts, and many studies can be carried out at once by a single validator.

Costs are certainly less, and feasibility problems fewer, compared to criterion-related procedures. The procedure meets the requirements for establishing content validity outlined by Guion, and, it is hoped, with future research under the full range of sample/universe overlap, may give a direct estimate of validity to substitute for the validity coefficient that is reverred by practitioners and the courts, alike.

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## APPENDICES

## APPENDIX A

### POSITION ANALYSIS QUESTIONNAIRE

# POSITION ANALYSIS QUESTIONNAIRE

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## INTRODUCTION

The Position Analysis Questionnaire (PAQ) is a structured job analysis questionnaire that can be used for analyzing positions or jobs of many different types. On the basis of the analysis of any given position/job with the PAQ it is possible to compute statistically-derived job dimension scores, thus making it possible to relate positions or jobs to each other on the basis of such job dimension scores.

## ORGANIZATION OF THE QUESTIONNAIRE

The questionnaire is divided into the six major divisions listed below. In addition to the division titles, a "question" is included which can be kept in mind when going through each division.

### Divisions:

1. *Information Input* (Where and how does the worker get the information that he uses in performing his job?) Pages 4-7
2. *Mental Processes* (What reasoning, decision-making, planning, and information processing activities are involved in performing the job?) Pages 7-11
3. *Work Output* (What physical activities does the worker perform and what tools or devices does he use?) Pages 11-16
4. *Relationships With Other Persons* (What relationships with other people are required in performing the job?) Pages 16-20
5. *Job Context* (In what physical and social contexts is the work performed?) Pages 20-23
6. *Other Job Characteristics* (What activities, conditions, or characteristics other than those described above are relevant to the job?) Pages 23-28

The six divisions that are listed above are further divided into sections and subsections. Each section or subsection is made up of a group of related job elements (in the questionnaire these are referred to as "items"). Each job element describes some *general* work activity, work condition, or job characteristic. In most cases examples are given to illustrate the "central idea" of the job element. However, these examples are intended *only* to help illustrate the idea and represent only a *few* of the possible examples that could characterize the job element.

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### RATING SCALES FOR JOB ELEMENTS

For each job element, provision is made for using a "rating scale" as the element applies to any given position/job. Several different rating scales are used throughout the questionnaire and are located on those pages to which they pertain, or on preceding pages. In general they look like this:

| Code | Extent of Use (U)       |
|------|-------------------------|
| N    | Does not apply          |
| 1    | Nominal/very infrequent |
| 2    | Occasional              |
| 3    | Moderate                |
| 4    | Considerable            |
| 5    | Very substantial        |

or

| Code | Applicability (A) |
|------|-------------------|
| N    | Does not apply    |
| 1    | Does apply        |

At the beginning of each job element you will find a capital letter indicating the "scale" to be used for that element. For example, the entry for the first job element (no. 1) looks like this: 1U\_\_. The "U" refers to the "Extent of Use (U)" rating scale which is shown above. Rating scales are marked with the letters which follow:

#### Letter Rating Scale

|   |                                                                                                                                                                                                                                                       |
|---|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| U | Extent of Use (shown above)                                                                                                                                                                                                                           |
| T | Amount of Time                                                                                                                                                                                                                                        |
| I | Importance to the Job                                                                                                                                                                                                                                 |
| P | Possibility of Occurrence                                                                                                                                                                                                                             |
| A | Applicability (shown above)                                                                                                                                                                                                                           |
| S | Special Code (When this code is used, it applies only to the job element of which it is a part.) Note that some "Special (S)" rating scales do <i>not</i> have a N (Does not apply) answer because the statement applies in some degree to every job. |

**Caution:** For each job element use *only* the rating scale identified by the capital letter in front of it.

### INSTRUCTIONS FOR JOB ANALYSTS

The person who is to analyze any position/job (the job analyst) should first familiarize himself with the PAQ (including its organization and job elements) and the various rating scales that are used with the individual job elements. The job analyst preferably should be someone who is already acquainted with the particular position/job to be analyzed. If this is not the case he should familiarize himself with it by interviewing the job incumbent and possibly by observing him perform the job. During the interview with the incumbent the job analyst should elicit the information necessary to rate each job element. In doing so, the analyst normally should proceed systematically through the various sections of the PAQ, beginning with general questions relating to each section, and then asking more specific questions relating to the individual job elements. The analyst should always be sure to consider each job element as it might relate to the position/job.

In the rating of any given job element the analyst should select the rating scale value which he considers to be most appropriate for the position/job, considering the *concept* reflected by the job element itself, and the type of *rating scale* that is provided for use with that job element. The examples given for many job elements in the PAQ are intended to be *only* illustrative of the concept of the job element, and *not* as being indicative of the complete range of possible content. The analyst should interpret the "content" of each job element as it relates to the position which he is analyzing. In the case of any position/job there will of course be many job elements that do not apply. In such instances simply mark N (Does not apply). (Formerly DNA).

Use the open-ended job elements (44, 60, 127, and 181) *only* when that which they describe clearly falls outside the realm of the other elements.



## INFORMATION INPUT

### 1 INFORMATION INPUT

#### 1.1 Sources of Job Information

Rate each of the following items in terms of the extent to which it is used by the worker as a source of information in performing his job.

| Code | Extent of Use (U)        |
|------|--------------------------|
| N    | Does not apply           |
| 1    | Nominal: very infrequent |
| 2    | Occasional               |
| 3    | Moderate                 |
| 4    | Considerable             |
| 5    | Very substantial         |

#### 1.1.1 Visual Sources of Job Information

- 1 U Written materials (books, reports, office notes, articles, job instructions, signs, etc.)
- 2 U Quantitative materials (materials which deal with quantities or amounts, such as graphs, accounts, specifications, tables of numbers, etc.)
- 3 U Pictorial materials (pictures or picturelike materials used as *sources* of information, for example, drawings, blueprints, diagrams, maps, tracings, photographic films, x-ray films, TV pictures, etc.)
- 4 U Patterns/related devices (templates, stencils, patterns, etc., used as *sources* of information when *observed* during use; do *not* include here materials described in item 3 above)
- 5 U Visual displays (dials, gauges, signal lights, radarscopes, speedometers, clocks, etc.)
- 6 U Measuring devices (rulers, calipers, tire pressure gauges, scales, thickness gauges, pipettes, thermometers, protractors, etc., used to obtain visual information about physical measurements; do *not* include here devices described in item 5 above)
- 7 U Mechanical devices (tools, equipment, machinery, and other mechanical devices which are *sources* of information when *observed* during use or operation)
- 8 U Materials in process (parts, materials, objects, etc., which are *sources* of information when being modified, worked on, or otherwise processed, such as bread dough being mixed, workpiece being turned in a lathe, fabric being cut, shoe being resoled, etc.)
- 9 U Materials *not* in process (parts, materials, objects, etc., not in the process of being changed or modified, which are *sources* of information when being inspected, handled, packaged, distributed, or selected, etc., such as items or materials in inventory, storage, or distribution channels, items being inspected, etc.)
- 10 U Features of nature (landscapes, fields, geological samples, vegetation, cloud formations, and other features of nature which are observed or inspected to provide information)
- 11 U Man-made features of environment (structures, buildings, dams, highways, bridges, docks, railroads, and other "man-made" or altered aspects of the indoor or outdoor environment which are *observed* or *inspected* to provide job information; do not consider equipment, machines, etc., that an individual uses in his work, as covered by item 7).

## INFORMATION INPUT

- 12 U Behavior (observing the actions of people or animals, for example, in teaching, supervising, sports officiating, etc., where this *behavior* is a source of job information)
- 13 U Events or circumstances (those events the worker *visually* observes and in which he may participate, such as flow of traffic, movement of materials, airport control tower operations, etc.)
- 14 U Art or decor (artistic or decorative objects or arrangements used as *sources* of job information, for example, paintings, sculpture, jewelry, window displays, interior decoration, etc.)

## 1.1.2 Nonvisual Sources of Job Information

- 15 U Verbal sources (verbal instructions, orders, requests, conversations, interviews, discussions, formal meetings, etc.; consider only verbal communication which is relevant to job performance)
- 16 U Nonverbal sounds (for example, noises, engine sounds, sonar, whistles, musical instruments, signals, horns, etc.)
- 17 U Touch (pressure, pain, temperature, moisture, etc.; for example, feeling texture of surface, etc.)
- 18 U Odor (odors which the worker *needs* to smell in order to perform his job; do *not* include odors simply because they happen to exist in the work environment)
- 19 U Taste (bitter, sour, sweet, or salty qualities which are *sources* of job information, for example, wine taster, candy taster, etc.)

## 1.2 Sensory and Perceptual Processes

- 20 S Near-visual differentiation (using the code below, rate the amount of detail the worker must see to adequately obtain job information from objects, events, features, etc. *within arm's reach*)

|      |                  |
|------|------------------|
| Code | Degree of Detail |
|------|------------------|

- |   |                                                                                                                                  |
|---|----------------------------------------------------------------------------------------------------------------------------------|
| N | Does not apply (worker is blind or works in total darkness)                                                                      |
| 1 | Very little detail (for example, that required in moving boxes, dumping trash, opening desk drawers, etc.)                       |
| 2 | Limited detail (for example, that required in bagging groceries, taking tickets, grinding hamburger, etc.)                       |
| 3 | Moderate detail (for example, that required in hammering nails, reading typed letters, reading dials and gauges, etc.)           |
| 4 | Considerable detail (for example, reading small legal print, setting ignition points, etc.)                                      |
| 5 | Extreme detail (for example, that required in diamond cutting, repairing watches, assembling small electrical transistors, etc.) |

## INFORMATION INPUT

### Note on rating "Importance to This Job":

Each of the items in the questionnaire which uses the "Importance to This Job (I)" scale is to be rated in terms of how important the activity described in the item is to the completion of the job. Consider such factors as amount of time spent, the possible influence on overall job performance if the worker does not properly perform this activity, etc.)

| Code | Importance to This Job (I) |
|------|----------------------------|
| N    | Does not apply             |
| 1    | Very minor                 |
| 2    | Low                        |
| 3    | Average                    |
| 4    | High                       |
| 5    | Extreme                    |

- 21 | I Far visual differentiation (seeing differences in the details of objects, events, or features *beyond arm's reach*, for example, operating a vehicle, landscaping, sports officiating, etc.)
- 22 | I Depth perception (judging the distance from the observer to objects, or the distances between objects as they are positioned in space, as in operating a crane, operating a dentist's drill, handling and positioning objects, etc.)
- 23 | I Color perception (differentiating or identifying objects, materials, or details thereof on the basis of color)
- 24 | I Sound pattern recognition (recognizing different patterns, or sequences of sounds, for example, those involved in Morse code, heartbeats, engines not functioning correctly, etc.)
- 25 | I Sound differentiation (recognizing differences or changes in sounds in terms of their loudness, pitch, and/or tone quality, for example, piano tuner, sound-system repairman, etc.)
- 26 | I Body movement sensing (sensing or recognizing changes in the direction or speed at which the body is moving without being able to sense them by sight or hearing, for example, as in flying aircraft, working in a submarine, etc.)
- 27 | I Body balance (sensing the position and balance of the body when body balance is *critical* to job performance, as when walking on I beams, climbing high poles, working on steep roofs, walking on slippery floors, etc.)

| Code | Importance to This Job (I) |
|------|----------------------------|
| N    | Does not apply             |
| 1    | Very minor                 |
| 2    | Low                        |
| 3    | Average                    |
| 4    | High                       |
| 5    | Extreme                    |

### 1.3 Estimation Activities

## INFORMATION INPUT and MENTAL PROCESSES

In this section are various operations involving estimation or judging activities. In each case consider activities in which the worker may use any or all of the senses, for example, sight, hearing, touch, etc.

- 28 | I    Estimating speed of moving parts (estimating the speed of the moving *parts* associated with *stationary* objects, for example, the revolutions per minute of a motor, the speed at which a lathe turns, etc.)
- 29 | I    Estimating speed of moving objects (estimating the speed of moving *objects* or *materials* relative to a fixed point or to other moving objects, for example, the speed of vehicles, materials on a conveyor belt, flow of liquids in transparent pipes, etc.)
- 30 | I    Estimating speed of processes (estimating the speed of ongoing *processes* or a series of events while they are taking place, for example, chemical reactions, assembly operations, timing of food preparation in a cafeteria, etc.)
- 31 | I    Judging condition/quality (estimating the condition, quality, and/or value of objects, for example, antique dealer, appraiser, jeweler, used-car dealer, coin dealer, etc.)
- 32 | I    Inspecting (inspecting products, objects, materials, etc., either one's own workmanship or that of others, in terms of established standards, for example, identifying defects, classifying by grade, etc.; *do not* include here activities described in item 31 above)
- 33 | I    Estimating quantity (estimating the *quantity* of objects *without direct measurement*, including weight, number, volume, etc., for example, estimating the board feet of lumber in a log, the weight of a beam, the number of bacteria in an area by looking through a microscope, etc.)
- 34 | I    Estimating size (estimating the *dimensions* of objects *without direct measurement*, including length, thickness, etc., for example, estimating the height of a tree, judging sizes of boxes or furniture in loading a truck, etc.)
- 35 | I    Estimating time (estimating the time required for past or future events or work activities, for example, judging the amount of time to make a delivery, estimating the time required to service a worn machine part or piece of equipment, judging the length of time required to change a production line procedure, etc.)

## 2 MENTAL PROCESSES

### 2.1 Decision Making, Reasoning, and Planning/Scheduling

- 36 | S    Decision making (indicate, using the code below, the level of decision making typically involved in the job, considering: the number and complexity of the factors that are taken into account; the variety of alternatives available; the consequences and importance of the decisions; the background experience, education, and training required; the precedents available for guidance; and other relevant considerations. The examples given for the following codes are *only* suggestive.)

#### Code      Level of Decision

- 1      Very limited ("decisions" such as those in selecting parts in routine assembly, shelving items in a warehouse, pasting labels on cartons, tending automatic machines, etc.)

(Item 36 continued on next page)

# MENTAL PROCESSES

- |   |                                                                                                                                                                                           |
|---|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2 | Limited ("decisions" such as those in operating a wood planer, dispatching a taxi, lubricating an automobile, etc.)                                                                       |
| 3 | Intermediate ("decisions" such as those in setting up machine tools for operation, diagnosing mechanical disorders of aircraft, ordering office supplies several months in advance, etc.) |
| 4 | Substantial ("decisions" such as those in determining production quotas, making personnel decisions such as promoting and hiring, etc.)                                                   |
| 5 | Very substantial ("decisions" such as those in approving corporation annual budget, recommending major surgery, selecting the location for a new plant, etc.)                             |

37 S Reasoning in problem solving (indicate, using the code below, the level of reasoning that is required of the worker in applying his knowledge, experience, and judgment to problems)

Code      *Level of Reasoning in Problem Solving*

- |   |                                                                                                                                                                                                                                                               |
|---|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | Very limited (use of common sense to carry out simple, or relatively uninvolved instructions, for example, janitor, deliveryman, hod carrier, etc.)                                                                                                           |
| 2 | Limited (use of some training and/or experience to select from a limited number of solutions the most appropriate action or procedure in performing the job, for example, salesclerk, postman, electrician apprentice, keypunch operator, etc.)               |
| 3 | Intermediate (use of relevant principles to solve practical problems and to deal with a variety of concrete variables in situations where only limited standardization exists, for example, draftsman, carpenter, farmer, etc.)                               |
| 4 | Substantial (use of logic or scientific thinking to define problems, collect information, establish facts, and draw valid conclusions, for example, mechanical engineer, personnel director, manager of a "chain" store, etc.)                                |
| 5 | Very substantial (use of <i>principles</i> of logical or scientific thinking to solve a wide range of intellectual and practical problems, for example, research chemist, nuclear engineer, corporate president, or manager of a large branch or plant, etc.) |

38 S Amount of planning/scheduling (indicate, using the code below, the amount of planning/scheduling the worker is required to do which affects his own activities and/or the activities of others)

Code      *Amount of Planning*

- |   |                                                                                                                                                                                        |
|---|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| N | Does not apply (has no opportunity even to plan his own activities; the specific activities of the worker are virtually predetermined for him)                                         |
| 1 | Very limited (has limited opportunity to plan or schedule his own activities, for example, ticket seller at a theater, "typical" assembly line worker, etc.)                           |
| 2 | Limited (some planning is required but not a great deal, for example, the planning that would be done by a milkman, janitor, etc.)                                                     |
| 3 | Moderate (a moderate amount of planning of his own or other activities is required, for example, a carpenter who must plan the best way to build a structure, a taxi dispatcher, etc.) |

(Item 38 continued on next page)

## MENTAL PROCESSES

- |   |                                                                                                                                                                                                                                                                                                      |
|---|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 4 | Considerable (a fairly large amount of planning/scheduling is required, for example, a foreman who must plan the activities of his subordinates, a teacher who must prepare lectures or lesson plans, a material coordinator who must plan/schedule the arrival and distribution of materials, etc.) |
| 5 | Extensive (substantial amount of planning/scheduling is required, for example, a department store manager, an executive who must plan the activities of different work groups, an architect, a scientist who must make comprehensive and detailed plans to perform experiments, etc.)                |

### 2.2 Information Processing Activities

In this section are various human operations involving the "processing" of information or data. Rate each of the following items in terms of how *important* the activity is to the completion of the job.

| Code | Importance to This Job (I) |
|------|----------------------------|
| N    | Does not apply             |
| 1    | Very minor                 |
| 2    | Low                        |
| 3    | Average                    |
| 4    | High                       |
| 5    | Extreme                    |

- |    |   |                                                                                                                                                                                                                                                                                                                                                                                         |
|----|---|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 39 | I | Combining information ( <i>combining</i> , synthesizing, or integrating information or data from two or more sources to establish new facts, hypotheses, theories, or a more complete body of <i>related</i> information, for example, an economist using information from various sources to predict future economic conditions, a pilot flying aircraft, a judge trying a case, etc.) |
| 40 | I | Analyzing information or data (for the purpose of identifying <i>underlying</i> principles or facts by <i>breaking down</i> information into component parts, for example, interpreting financial reports, diagnosing mechanical disorders or medical symptoms, etc.)                                                                                                                   |
| 41 | I | Compiling (gathering, grouping, classifying, or in some other way arranging information or data in some meaningful order or form, for example, preparing reports of various kinds, filing correspondence on the basis of content, selecting particular data to be gathered, etc.)                                                                                                       |
| 42 | I | Coding/decoding (coding information or converting coded information back to its original form, for example, "reading" Morse code, translating foreign languages, or using other coding systems such as shorthand, mathematical symbols, computer languages, drafting symbols, replacement part numbers, etc.)                                                                           |
| 43 | I | Transcribing (copying or posting data of information for later use, for example, copying meter readings in a record book, entering transactions in a ledger, etc.)                                                                                                                                                                                                                      |
| 44 | I | Other information processing activities (specify) _____                                                                                                                                                                                                                                                                                                                                 |

## MENTAL PROCESSES

### 2.3 Use of Learned Information

45 I Short-term memory (learning and retaining job-related information and recalling that information after a brief period of time, for example, waitress, short-order cook, telephone operator, etc.)

46 S Education (indicate, using the code below, the level of education generally or typically needed to perform this job; include education in elementary school, high school, college, etc.; do not include technical or vocational school training — see item 48)

Code Education (given level or equivalent)

- N Does not apply (little or no formal education required)
- 1 Less than high school diploma
- 2 High school diploma
- 3 Some college education (some college but *not* a 4-year college degree)
- 4 College degree (degree requiring 4 years or more to complete, for example, B.A., B.S., etc.)
- 5 Advanced degree (M.S., Ph.D., M.D., LL.D., etc.)

47 S Job-related experience (indicate, using the code below, the amount of *all-previous* job-related experience in other *related* or *lower-level* jobs generally *needed* as background to learn this job; do *not* include formal education as described in item 46)

Code Job-related Experience

- N Does not apply (no experience required)
- 1 Less than 1 month
- 2 Over 1 month up to and including 12 months
- 3 Over 1 year up to and including 3 years
- 4 Over 3 years up to and including 5 years
- 5 Over 5 years

48 S Training (indicate, using the code below, the total amount of training generally *needed* for persons who have had no prior job training to learn to perform adequately on this job; consider all types of required *job-related* training except for education described in item 46; include training at barber schools, technical and vocational schools, business schools, etc., as well as apprentice, on-the-job, off-the-job and orientation training, etc.)

Code Training

- N Does not apply or very limited (no more than one day's training required)
- 1 Over 1 day up to and including 30 days
- 2 Over 30 days up to and including 6 months
- 3 Over 6 months up to and including 1 year
- 4 Over 1 year up to and including 3 years
- 5 Over 3 years

# MENTAL PROCESSES and WORK OUTPUT

49 | S Using mathematics (indicate, using the code below, the highest level of mathematics required by the job)

| Code | Level of Mathematics                                                                                                                                                                |
|------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| N    | Does not apply                                                                                                                                                                      |
| 1    | Simple basic (counting, addition and subtraction of 2-digit numbers or less)                                                                                                        |
| 2    | Basic (addition and subtraction of numbers of 3 digits or more, multiplication, division, etc.)                                                                                     |
| 3    | Intermediate (calculations and concepts involving fractions, decimals, percentages, etc.)                                                                                           |
| 4    | Advanced (algebraic, geometric, trigonometric, and statistical concepts, techniques, and procedures, usually applied in standard practical situations)                              |
| 5    | Very advanced (advanced mathematical and statistical theory, concepts, and techniques, for example, calculus, topology, vector analysis, factor analysis, probability theory, etc.) |

## 3 WORK OUTPUT

### 3.1 Use of Devices and Equipment

#### 3.1.1 Hand-held Tools or Instruments

Consider in this category those devices which are used to move or modify workpieces, materials, products, or objects. Do *not* consider measuring devices here.

| Code | Importance to This Job (I) |
|------|----------------------------|
| N    | Does not apply             |
| 1    | Very minor                 |
| 2    | Low                        |
| 3    | Average                    |
| 4    | High                       |
| 5    | Extreme                    |

#### Manually powered

50 | I Precision tools/instruments (that is, tools or instruments powered by the *user* to perform *very accurate* or *precise* operations, for example, the use of engraver's tools, watchmaker's tools, surgical instruments, etc.)

51 | I Nonprecision tools/instruments (tools or instruments powered by the *user* to perform operations *not* requiring *great* accuracy or precision, for example, hammers, wrenches, trowels, knives, scissors, chisels, putty knives, strainers, hand grease guns, etc.; do *not* include long-handle tools here)

52 | I Long-handle tools (hoes, rakes, shovels, picks, axes, brooms, mops, etc.)

53 | I Handling devices/tools (tongs, ladles, dippers, forceps, etc., used for moving or handling objects and materials; do *not* include here protective gear such as asbestos gloves, etc.)

Powered (manually controlled or directed devices using an energy source such as electricity, compressed air, fuel, hydraulic fluid, etc., in which the component part which accomplishes the modification is hand-held, such as dentist drills, welding equipment, etc., as well as devices small enough to be entirely hand-held)

54 | I Precision tools/instruments (hand-held powered tools or instruments used to perform operations requiring *great* accuracy or precision, such as dentist drills, soldering irons, welding equipment, saws, etc., used for *especially accurate* or *fine* work)

## WORK OUTPUT

- 55 | I Nonprecision tools/instruments (hand-held, energy-powered tools or instruments used to perform operations *not* requiring *great* accuracy or precision, for example, ordinary power saws, drills, sanders, clippers, hedge trimmers, etc., and related devices such as electric soldering irons, spray guns or nozzles, welding equipment, etc.)

### 3.1.2 Other Hand-held Devices

- 56 | I Drawing and related devices (instruments or devices used in lettering, sketching, illustrating, drafting, etc., for example, pens, pencils, drawing instruments, artist's brushes, drafting equipment, etc.; do not include measuring instruments here; see item 58)
- 57 | I Applicators (brushes, rags, paint rollers, etc., which are hand-held and used in applying solutions, materials, etc.; do *not* consider devices covered by items 50-55 above)
- 58 | I Measuring devices (rules, measuring tapes, micrometers, calipers, protractors, squares, thickness gauges, levels, volume measuring devices, tire gauges, etc.)
- 59 | I Technical and related devices (cameras, stopwatches, slide rules, etc.)
- 60 | I Other hand-held tools and devices (specify) \_\_\_\_\_

### 3.1.3 Stationary Devices

- 61 | I Machines/equipment (operating, controlling, adjusting or monitoring machines/equipment used to process, fabricate, or otherwise modify parts, objects, materials, etc.; use this category in addition to indicating the controls used in the subsection which follows)

### 3.1.4 Control Devices (on any equipment operated or used)

| Code | Importance to This Job (I) |
|------|----------------------------|
| N    | Does not apply             |
| 1    | Very minor                 |
| 2    | Low                        |
| 3    | Average                    |
| 4    | High                       |
| 5    | Extreme                    |

- 62 | I Activation controls (hand- or foot-operated devices used to start, stop, or otherwise activate energy-using systems or mechanisms, for example, light switches, electric motor switches, ignition switches, etc.)
- 63 | I Fixed setting controls (hand- or foot-operated devices with distinct positions, detents, or definite settings, for example, TV selector switch, gearshift, etc.)
- 64 | I Variable setting controls (hand- or foot-operated devices that can be set at the beginning of operation, or infrequently, at any position along a scale, for example, TV volume control, room thermostat, rheostat, etc.)
- 65 | I Keyboard devices (typewriters, adding machines, calculators, pianos, keypunch machines, etc.)

Frequent-adjustment controls (used in making *frequent* adjustments of mechanisms)

- 66 | Hand-operated controls (controls operated by hand or arm for making *frequent*, but *not continuous*, adjustments, for example, hand controls on a crane or bulldozer, helm of ship, etc.)
- 67 | Foot-operated controls (controls operated by foot or leg for making *frequent*, but *not continuous*, adjustments, for example, automobile brakes, etc.)

Continuous controls (used *continuously* in operation or use)

- 68 | Hand-operated controls (controls operated by hand and used *continuously* for adjusting to changing, or possible changing, situations, for example, use of steering wheel, controls on a "tracking" device, etc.)
- 69 | Foot-operated controls (controls operated by foot and used *continuously* for adjusting to changing, or possibly changing, situations, for example, accelerator, etc.)

### 3.1.5 Transportation and Mobile Equipment

- 70 | Man-powered vehicles (bicycles, rowboats, canoes, etc.)
- 71 | Powered highway/rail vehicles (vehicles intended primarily for highway or railroad transportation, for example, automobiles, trucks, buses, trains, etc.)
- 72 | Powered mobile equipment (movable vehicles *not* primarily intended for highway use, for example, warehouse trucks, fork lifts, self-propelled lawn mowers, road graders, tractors, combines, etc.)
- 73 | Powered water vehicles (ships, submarines, motorboats, etc.)
- 74 | Air/space vehicles (planes, helicopters, balloons, gliders, rocket ships, etc.)
- 75 | Man-moved mobile equipment (hand-pushed lawn mowers with or without powered blades, hand trucks, wheelbarrows, floor polishers and buffers, etc.)
- 76 | Operating equipment (cranes, hoists, elevators, etc.)
- 77 | Remote-controlled equipment (conveyor systems, etc.)

### 3.2 Manual Activities

This section describes manual activities in which tools may or may not be used.

- 78 | Setting up/adjusting (adjusting, calibrating, aligning and/or setting up of machines or equipment, for example, setting up a lathe or drill press, adjusting an engine carburetor, adjusting, calibrating, and aligning electric circuitry, etc.)
- 79 | Manually modifying (using hands *directly* to form or otherwise modify materials or products, for example, kneading dough by hand, folding letters, massaging, etc.)

## WORK OUTPUT

- 80 | I Material controlling (manually controlling or guiding materials being processed, for example, in operating sewing machine, jig saws, etc.)
- 81 | I Assembling/disassembling (either manually or with the use of hand tools putting parts or components together to form more complete items, or taking apart or disassembling items into their component parts)
- 82 | I Arranging/positioning (manually placing objects, materials, persons, animals, etc., in a specific position or arrangement, for example, arranging library books, window displays, stocking shelves, positioning patients for certain medical and dental procedures, etc.; do *not* include here arranging/positioning which is a part of the operations listed in items 78-81)
- 83 | I Feeding/off-bearing (manually inserting, throwing, dumping, or placing materials into or removing them from *machines or processing equipment*; this category is *not* to be used in describing operations in which the worker manually *guides or controls* the materials or parts during processing, as in item 80)
- 84 | I Physical handling (physically handling objects, materials, animals, human beings, etc., either manually or with nominal use of aiding devices, for example, in certain warehousing activities, loading/unloading conveyor belts or trucks, packaging, farming activities, hospital procedures, etc.; typically there is little requirement for careful positioning or arrangement of objects; include here relatively uninvolved handling operations *not* provided for in items 78-83)

## 3.3 Activities of the Entire Body

| Code | Importance to This Job (I) |
|------|----------------------------|
| N    | Does not apply             |
| 1    | Very minor                 |
| 2    | Low                        |
| 3    | Average                    |
| 4    | High                       |
| 5    | Extreme                    |

- 85 | I Highly skilled body coordination (activities involving extensive, and often highly learned coordination activities of the whole body, for example, athletics, dancing, etc.)
- 86 | I Balancing (maintaining body balance or equilibrium to prevent falling when standing, walking, running, crouching, etc., on narrow, slippery, steeply inclined, or erratically moving surfaces, for example, walking on narrow elevated beam, working on steep roof, etc.)

## 3.4 Level of Physical Exertion

- 87 | S Level of physical exertion (indicate, using the code below, the general level of body activity, considering the *frequency* and *effort* required to perform job tasks involving pushing, pulling, carrying, lifting, etc., during an average work day)

Code      Level of Physical Exertion

- 1      Very light (occasionally walking or standing and/or occasionally moving light

(Item 87 continued on next page)

## WORK OUTPUT

- objects, materials, etc., such as secretary, draftsman, watchmaker, telephone operator, etc.)
- 2 Light (frequently walking or standing and/or frequently exerting force equivalent to lifting up to approximately 10 pounds and/or occasionally exerting force equivalent to lifting about 20 pounds, for example, sales clerk, bank teller, etc.)
- 3 Moderate (frequently exerting forces equivalent to lifting up to approximately 25 pounds and/or occasionally exerting forces equivalent to lifting up to approximately 50 pounds, for example, auto mechanic, coin vending machine serviceman, bus driver, etc.)
- 4 Heavy (frequently exerting forces equivalent to lifting up to approximately 50 pounds and/or occasionally exerting forces equivalent to lifting up to approximately 100 pounds, for example, general laborer, millwright, bulldozer operator, baggage porter, etc.)
- 5 Very heavy (frequently exerting forces equivalent to lifting *over* 50 pounds and/or occasionally exerting forces *over* that required to lift 100 pounds, for example, hod carrier, quarry miner, etc.)

## 3.5 Body Positions/Postures

Indicate by code the approximate *proportion of working time* the worker is engaged in the following activities (88-92)

| Code | Amount of Time (T)                     |
|------|----------------------------------------|
| N    | Does not apply (or is very incidental) |
| 1    | Under 1/10 of the time                 |
| 2    | Between 1/10 and 1/3 of the time       |
| 3    | Between 1/3 and 2/3 of the time        |
| 4    | Over 2/3 of the time                   |
| 5    | Almost continually                     |

- 88 ☐ T Sitting
- 89 ☐ T Standing (do *not* include walking)
- 90 ☐ T Walking/running
- 91 ☐ T Climbing (for example, house painter, telephone lineman, etc.)
- 92 ☐ T Kneeling/stooping (kneeling, stooping, crawling, crouching, and other related body positions which may be uncomfortable or awkward)

## 3.6 Manipulation/Coordination Activities

Rate the following items in terms of how *important* the activity is to completion of the job.

| Code | Importance to This Job (I) |
|------|----------------------------|
| N    | Does not apply             |
| 1    | Very minor                 |
| 2    | Low                        |
| 3    | Average                    |
| 4    | High                       |
| 5    | Extreme                    |

- 93 ☐ I Finger manipulation (making careful finger movements in various types of activities, for example, fine assembly, use of precision tools, repairing watches, use of writing and

(Item 93 continued on next page)

## WORK OUTPUT and RELATIONSHIPS WITH OTHER PERSONS

- drawing instruments, operating keyboard devices, etc.; usually the hand and arm are *not* involved to any great extent)
- 94 I Hand-arm manipulation (the manual control or manipulation of objects through hand and/or arm movements, which may or may not require continuous visual control, for example, repairing automobiles, packaging products, etc.)
- 95 I Hand-arm steadiness (maintaining a uniform, controlled hand-arm posture or movement, for example, using a welding torch, performing surgery, etc.)
- 96 I Eye-hand/foot coordination (the *coordination* of hand and/or foot movements where the movement *must* be coordinated with what is seen, for example, driving a vehicle, operating a sewing machine, etc.)
- 97 I Limb movement without visual control (movement of body limbs from one position to another without the use of vision, for example, reaching for controls without looking, playing a musical instrument, touch typing, etc.)
- 98 I Hand-ear coordination (the coordination of hand movements with sounds or instructions that are heard, for example, tuning radio receivers, tuning musical instruments by ear, piloting aircraft by control tower instructions, etc.)

### 4 RELATIONSHIPS WITH OTHER PERSONS

This section deals with different aspects of interaction between people involved in various kinds of work.

| Code | Importance to This Job (I) |
|------|----------------------------|
| N    | Does not apply             |
| 1    | Very minor                 |
| 2    | Low                        |
| 3    | Average                    |
| 4    | High                       |
| 5    | Extreme                    |

#### 4.1 Communications

Rate the following in terms of how *important* the activity is to the completion of the job. Some jobs may involve several or all of the items in this section.

##### 4.1.1 Oral (communicating by speaking)

- 99 I Advising (dealing with individuals in order to counsel and/or guide them with regard to problems that may be resolved by legal, financial, scientific, technical, clinical, spiritual, and/or other professional principles)
- 100 I Negotiating (dealing with others in order to reach an agreement or solution, for example, labor bargaining, diplomatic relations, etc.)
- 101 I Persuading (dealing with others in order to influence them toward some action or point of view, for example, selling, political campaigning, etc.)
- 102 I Instructing (the teaching of knowledge or skills, in either an informal or a formal manner, to others, for example a public school teacher, a journeyman teaching an apprentice, etc.)
- 103 I Interviewing (conducting interviews directed toward some specific objective, for example, interviewing job applicants, census taking, etc.)

## RELATIONSHIPS WITH OTHER PERSONS

- 104 | I Routine information exchange (the giving and/or receiving of information of a routine or simple nature, for example, ticket agent, taxicab dispatcher, receptionist, etc.)
- 105 | I Nonroutine information exchange (the giving and/or receiving of information of a non-routine or complex nature, for example, professional committee meetings, engineers discussing product design, etc.)
- 106 | I Public speaking (making speeches or formal presentations before relatively large audiences, for example, political addresses, radio/TV broadcasting, delivering a sermon, etc.)

### 4.1.2 Written (communicating by written/printed material)

- 107 | I Writing (for example, writing or dictating letters, reports, etc., writing copy for ads, writing newspaper articles, etc.; do *not* include transcribing activities described in item 43)

### 4.1.3 Other Communications

- 108 | I Signaling (communicating by some type of signal, for example, hand signals, semaphore, whistles, horns, bells, lights, etc.)
- 109 | I Code communications (telegraph, cryptography, shorthand, etc.)

| Code | Importance to This Job (I) |
|------|----------------------------|
| N    | Does not apply             |
| 1    | Very minor                 |
| 2    | Low                        |
| 3    | Average                    |
| 4    | High                       |
| 5    | Extreme                    |

## 4.2 Miscellaneous Interpersonal Relationships

- 110 | I Entertaining (performing to amuse or entertain others, for example, on stage, TV, nightclubs, etc.)
- 111 | I Serving/catering (attending to the needs of, or performing personal services for, others, for example, waiting on tables, hairdressing, etc.)

### 4.3 Amount of Job-required Personal Contact

- 112 | S Job-required personal contact (indicate, using the code below, the extent of job-required contact with others, individually or in groups, for example, contact with customers, patients, students, the public, superiors, subordinates, fellow employees, prospective employees, official visitors, etc.; consider *only* personal contact which is definitely *part* of the job)

| Code | Extent of Required Personal Contact                              |
|------|------------------------------------------------------------------|
| 1    | Very infrequent (almost no contact with others is required)      |
| 2    | Infrequent (limited contact with others is required)             |
| 3    | Occasional (moderate contact with others is required)            |
| 4    | Frequent (considerable contact with others is required)          |
| 5    | Very frequent (almost continual contact with others is required) |

## RELATIONSHIPS WITH OTHER PERSONS

### 4.4 Types of Job-required Personal Contact

This section lists types of individuals with whom the worker must have personal contact in order to perform his job. Indicate by code the *importance* of contact with each of the types of individuals listed below. Consider personal contact not only with personnel within the organization or company, but also with personnel from other organizations, if contact with them is *part* of the job.

- 113 | I Executives/officials (corporation vice-presidents, government administrators, plant superintendents, etc.)
- 114 | I Middle management/staff personnel
- 115 | I Supervisors (those personnel who have *immediate* responsibility for a work group, for example, foremen, office managers, etc.)
- 116 | I Professional personnel (doctors, lawyers, scientists, engineers, professors, teachers, consultants, etc.)
- 117 | I Semiprofessional personnel (technicians, draftsmen, designers, photographers, surveyors, and other personnel who are engaged in activities requiring fairly extensive education or practical experience but which typically involve a more restricted area of operation than that of professional personnel)
- 118 | I Clerical personnel (personnel engaged in office work, such as clerks, bookkeepers, receptionists, etc.)
- 119 | I Manual and service workers (personnel in skilled, semiskilled, unskilled, agricultural, fishing, forestry, service, and related types of occupations, etc.)
- 120 | I Sales personnel
- 121 | I Buyers (purchasing agents, *not* public customers)
- 122 | I Public customers (as in stores, restaurants, etc.)
- 123 | I The public (*not* including customers or persons in other specified categories; include the "public" as contacted by, for example, park attendants, police officers, etc.)
- 124 | I Students/trainees/apprentices
- 125 | I Clients/patients/counselees
- 126 | I Special interest groups (stockholders, lobbyists, fraternal organizations, property owners, etc.)
- 127 | I Other individuals (include here types of persons *not* described in items 113-126 above, but, whenever possible, use one of the above categories)  
(Specify) \_\_\_\_\_

4.5 Supervision and Coordination

4.5.1 Supervision/Direction Given

128 S Supervision of nonsupervisory personnel (indicate, using the code below, the number of persons *directly* supervised who are *actually* involved in the production of goods and services and *do not* supervise others; this item would apply, for example, to most "first line" supervisors, most foremen and section heads, service managers in garages, head butchers in meat departments of grocery stores, head pharmacists, plumbers with assistants, etc.)

Code Number of Nonsupervisory Personnel Supervised

- N Does not apply
- 1 1 or 2 workers
- 2 3 to 5 workers
- 3 6 to 8 workers
- 4 9 to 12 workers
- 5 13 or more workers

129 S Direction of supervisory personnel (indicate, using the code below, the number of supervisory personnel—those who have responsibility for the supervision or direction of others—who report *directly* to the person holding *this* position; this item would apply to many middle and upper managers, but would also apply to managers of many small businesses or other activities who delegate supervisory authority to others, etc.)

Code Number of Supervisory Personnel Directed

- N Does not apply (does not direct supervisors)
- 1 1 or 2 supervisory personnel
- 2 3 to 5 supervisory personnel
- 3 6 to 8 supervisory personnel
- 4 9 to 12 supervisory personnel
- 5 13 or more supervisory personnel

130 S Total number of personnel for whom responsible (indicate, using the code below, the total number of personnel for whom the person holding this job is either *directly* or *indirectly* responsible, for example, the president of a corporation would be responsible for all corporation employees, the branch manager would be responsible for personnel in his branch, a foreman for personnel he supervises, a plumber for his assistant, etc.; use this item *in addition* to 128 and/or 129)

Code Total number of personnel for whom responsible

- N Does not apply (not responsible for other personnel)
- 1 10 or fewer workers
- 2 11 to 50 workers
- 3 51 to 250 workers
- 4 251 to 750 workers
- 5 751 or more workers

## RELATIONSHIPS WITH OTHER PERSONS and JOB CONTEXT

### 4.5.2 Other Organizational Activities

This subsection includes activities of a coordinating, staff, or supervisory nature.

| Code | Importance to This Job (I) |
|------|----------------------------|
| N    | Does not apply             |
| 1    | Very minor                 |
| 2    | Low                        |
| 3    | Average                    |
| 4    | High                       |
| 5    | Extreme                    |

- 131 | I Supervises nonemployees (students, patients, campers, etc.)
- 132 | I Coordinates activities (coordinates, monitors, or organizes the activities of others to achieve certain objectives, but *does not* have line management authority, for example, social director, committee chairman, etc.)
- 133 | I Staff functions (advises, consults, or gives other types of assistance to line management personnel, for example, legal adviser, administrative assistant, etc.)

### 4.5.3 Supervision Received

- 134 | S Supervision received (indicate, using the code below, the level of supervision the worker typically receives)

| Code | Level of Supervision Received                                                                                                                                                                                                                                                                                                                                                                   |
|------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | Immediate supervision (receives close supervision relating to specific work activities, including assignments, methods, etc.; usually receives frequent surveillance over job activities)                                                                                                                                                                                                       |
| 2    | General supervision (receives general supervision relating to work activities)                                                                                                                                                                                                                                                                                                                  |
| 3    | General direction (receives only very general guidance relating to job activities, primarily guidance with respect to general objectives; has rather broad latitude for determining methods, work scheduling, how to achieve objectives, etc., for example, first-line supervisors, lower-management individuals, most staff personnel, people whose work is quite independent of others, etc.) |
| 4    | Nominal direction (receives only nominal direction or guidance in job, as in the case of a manager of an organization or a major subdivision thereof, and is therefore subject only to very broad policy guidelines, for example, some research scientists who are given virtually free rein, many plant superintendents, etc.)                                                                 |
| 5    | No supervision (this category is applicable to those personnel who function independently, for example, owner-managers of stores, independent physicians, independent consultants, etc.)                                                                                                                                                                                                        |

## 5 JOB CONTEXT

### 5.1 Physical Working Conditions

This section lists various working conditions. Rate the *average* amount of time the worker is exposed to each condition during a *typical* work period.

| Code | Amount of Time (T)                     |
|------|----------------------------------------|
| N    | Does not apply (or is very incidental) |
| 1    | Under 1/10 of the time                 |
| 2    | Between 1/10 and 1/3 of the time       |
| 3    | Between 1/3 and 2/3 of the time        |
| 4    | Over 2/3 of the time                   |
| 5    | Almost continually                     |

## JOB CONTEXT

## 5.1.1 Outdoor environment

135 T Out-of-door environment (subject to changing weather conditions)

5.1.2 Indoor temperatures (do not consider indoor temperature conditions that are simply a function of the weather, for example, heat in summer; consider only those conditions which are associated with this job regardless of the natural climate in which it might be performed)

136 T High temperature (conditions in which the worker might experience severe discomfort or heat stress, such as in boiler rooms, around furnaces, etc.; typically this would occur in a dry atmosphere at about 90° F. and in a humid atmosphere at about 80° F. or 85° F.)

137 T Low temperature (conditions in which the worker is exposed to low temperatures which are definitely uncomfortable even though clothing appropriate for the conditions may be worn, such as in refrigerated rooms, etc.)

## 5.1.3 Other physical working conditions

138 T Air contamination (dust, fumes, smoke, toxic conditions, disagreeable odors, etc.; consider here air contamination or pollution which is an irritating or undesirable aspect of the job)

139 T Vibration (vibration of whole body or body limbs, for example, driving a tractor or truck, operating an air hammer, etc.)

140 T Improper illumination (inadequate lighting, excessive glare, etc.)

141 T Dirty environment (an environment in which the worker and/or his clothing easily becomes dirty, greasy, etc., for example, environments often associated with garages, foundries, coal mines, highway construction, furnace cleaning, etc.)

142 T Awkward or confining work space (conditions in which the body is cramped or uncomfortable)

143 S Noise intensity (indicate, using the code below, the typical noise level to which the worker is exposed)

| Code | Noise Intensity                                                                                         |
|------|---------------------------------------------------------------------------------------------------------|
| 1    | Very quiet (intensive care ward in hospital, greenhouse, photo lab, etc.)                               |
| 2    | Quiet (many private offices, libraries, etc.)                                                           |
| 3    | Moderate (business office where typewriters are used, light automobile traffic, department store, etc.) |
| 4    | Loud (many factories, heavy traffic, machine shops, carpenter shops, etc.)                              |
| 5    | Very loud (close to jet engines, large earth-moving equipment, riveting, etc.)                          |

## JOB CONTEXT

## 5.2 Physical Hazards

| Code | Possibility of Occurrence (P) |
|------|-------------------------------|
| N    | No possibility                |
| 1    | Very limited                  |
| 2    | Limited                       |
| 3    | Moderate                      |
| 4    | Fairly high                   |
| 5    | High                          |

The four items which follow describe accidents or illnesses which may result from exposure to hazards. Rate the *possibility* of the occurrence of each of the types of accidents/illnesses to the *typical worker on this job*. In making the ratings consider the safety/accident record of employees on this job, and/or the possibility of accidents due to such factors as: traveling at high speeds, being in high places, working with machinery, sharp tools, hot or very cold materials, exposure to falling objects, dangerous chemicals, explosives, toxic fumes, radiation, etc.

- 144 P First-aid cases (minor injuries or illnesses which typically result in a day or less of "lost" time and are usually remedied with first-aid procedures)
- 145 P Temporary disability (temporary injuries or illnesses which prevent the worker from performing his job from one full day up to extended periods of time but which do not result in permanent disability or impairment)
- 146 P Permanent partial impairment (injuries or illnesses resulting in the amputation or permanent loss of use of any body member or part thereof, or permanent impairment of certain body functions)
- 147 P Permanent total disability/death (injuries or illnesses which totally disable the worker and permanently prevent his further gainful employment, for example, loss of life, sight, limbs, hands, or radiation sickness, etc.)

## 5.3 Personal and Social Aspects

This section includes various personal and social aspects of jobs. Indicate by code the *importance* of these aspects as part of the job.

| Code | Importance to This Job (I) |
|------|----------------------------|
| N    | Does not apply             |
| 1    | Very minor                 |
| 2    | Low                        |
| 3    | Average                    |
| 4    | High                       |
| 5    | Extreme                    |

- 148 I Civic obligations (because of the job the worker assumes, or is expected to assume, certain civic obligations or responsibilities)
- 149 I Frustrating situations (job situations in which attempts to deal with problems or to achieve job objectives are obstructed or hindered, and may thus contribute to frustration on the part of the worker)
- 150 I Strained personal contacts (dealing with individuals or groups in "unpleasant" or "strained" situations, for example, certain aspects of police work, certain types of negotiations, handling certain mental patients, etc.)

## JOB CONTEXT and OTHER JOB CHARACTERISTICS

- 151 I Personal sacrifice (being willing to make certain personal sacrifices while being of service to other people or the objectives of an organization, for example, policemen, ministry, social work, etc.; do not consider physical hazards here)
- 152 I Interpersonal conflict situations (job situations in which there are virtually inevitable differences in objectives, opinions, or viewpoints between the worker and other persons or groups of persons, and which may "set the stage" for conflict, for example, persons involved in labor negotiations, supervisors who must enforce an unpopular policy, etc.)
- 153 S Non-job-required social contact (indicate, using the code below, the *opportunity* to engage in *informal, non-job-required* conversation, social interaction, etc., with others while on the job, for example, barber, taxi driver, receptionist, journeyman and apprentice, etc.; do *not* include here the personal contacts *required* by the job as described in item 112)

Code Opportunity for Non-job-required Social Contact

- 1 Very infrequent (almost no opportunity)
- 2 Infrequent (limited opportunity)
- 3 Occasional (moderate opportunity)
- 4 Frequent (considerable opportunity)
- 5 Very frequent (almost continual opportunity)

## 6 OTHER JOB CHARACTERISTICS

## 6.1 Apparel Worn

| Code | Applicability (A) |
|------|-------------------|
| N    | Does not apply    |
| 1    | Does apply        |

For each item mark DNA (Does not apply) if the item does *not* apply, a one (1) if the item applies. Note: one or more items in this section may be applicable.

- 154 A Business suit or dress (expected to wear presentable clothing such as tie and jacket, street dress, etc., as customary in offices, stores, etc.)
- 155 A Specific uniform/apparel (nurse, doorman, bus driver, etc.)
- 156 A Work clothing ("blue collar" apparel worn in factories, construction work, etc.)
- 157 A Protective clothing or gear (clothing or equipment worn as a regular part of the job to protect the worker, for example, safety helmets, goggles, noise suppressors, safety shoes, insulated gloves or clothing, protective masks, etc.; this item does *not* apply if worn only occasionally or rarely)
- 158 A Informal attire (sportswear, etc.)
- 159 A Apparel style optional

## 6.2 Licensing

- 160 A Licensing/certification required

## OTHER JOB CHARACTERISTICS

## 6.3 Work Schedule

| Code | Applicability (A) |
|------|-------------------|
| N    | Does not apply    |
| 1    | Does apply        |

In *each* of the three groups of items (in boxes) below: mark a one (1) for the item in each boxed group that most nearly applies; mark N for *all other* items in the same boxed group.

## 6.3.1 Continuity of work (as relevant to total year)

- 161 ☐ A Regular work
- 162 ☐ A Irregular work (depending on weather, season, production changes, etc.)

## 6.3.2 Regularity of working hours

- 163 ☐ A Regular hours (same basic work schedule every week)
- 164 ☐ A Variable shift work (work shift varies from time to time)
- 165 ☐ A Irregular hours (works variable or irregular hours, depending on requirements of employer, convenience of customers, etc., for example, insurance agents, etc.)

## 6.3.3 Day-night schedule

- 166 ☐ A Typical day hours
- 167 ☐ A Typical night hours (including evening work)
- 168 ☐ A Typical day and night hours (works some days and some nights, depending on work shifts, job demands, schedules, or other job factors, for example, some policemen, some truck drivers, some steelworkers, etc.)

## 6.4 Job Demands

This section lists various types of demands that the job situation may impose upon the worker, usually requiring that he adapt to these in order to perform his work satisfactorily. Rate the following items in terms of how *important* they are on the job.

| Code | Importance to This Job (I) |
|------|----------------------------|
| N    | Does not apply             |
| 1    | Very minor                 |
| 2    | Low                        |
| 3    | Average                    |
| 4    | High                       |
| 5    | Extreme                    |

- 169 ☐ I Specified work pace (on continuous assembly line, etc.)
- 170 ☐ I Repetitive activities (performance of the same physical or mental activities, repeatedly, without interruption, for periods of time)

## OTHER JOB CHARACTERISTICS

- 171 | Cycled work activities (performance of a sequence or schedule of work activities which typically occurs on a weekly, daily, or hourly basis and which typically allows the worker some freedom of action so long as he meets a schedule, for example, a postman or milkman making rounds on his route, a security guard patrolling his beat, etc.; do *not* include here activities more nearly described as repetitive activities in item 170 above)
- 172 | Following set procedures (need to follow specific set procedures or routines in order to obtain satisfactory outcomes, for example, following check-out list to inspect equipment or vehicles, following procedures for changing a tire, performing specified laboratory tests, etc.)
- 173 | Time pressure of situation (rush hours in a restaurant, urgent time deadlines, rush jobs, etc.)
- 174 | Precision (need to be more than normally precise and accurate)
- 175 | Attention to detail (need to give careful attention to various details of one's work, being sure that nothing is left undone)
- 176 | Recognition (need to identify, recognize, or "perceive" certain objects, events, processes, behavior, etc., or aspects, features, or properties thereof; this item is primarily concerned with "recognition" of that which is "sensed" by vision, hearing touch, etc.)
- 177 | Vigilance: infrequent events (need to continually search for *very infrequently* occurring but relevant events in the job situation, for example, forest lookout watching for forest fires, worker observing instrument panel to identify infrequent change from "normal," etc.)
- 178 | Vigilance: continually changing events (need to be continually aware of variations in a continually or frequently changing situation, for example, driving in traffic, controlling aircraft traffic, continually watching frequently changing dials and gauges, etc.)
- 179 | Working under distractions (telephone calls, interruptions, disturbances from others, etc.)
- 180 | Updating job knowledge (need to keep job knowledge current, being informed of new developments related to the job)

## OTHER JOB CHARACTERISTICS

- 181 | A Special talent (using the code below indicate if a job requires some *particularly* unique talent or skill that is not covered by other items; typically this item would apply to jobs in which the very unique skill or characteristic of the worker is clearly dominant, as in certain entertainment activities; the item may be used, however, in certain other kinds of situations, but *only* where there is some distinctly unique or special skill or talent involved)

Special talent: \_\_\_\_\_

| Code | Applicability (A) |
|------|-------------------|
| N    | Does not apply    |
| 1    | Does apply        |

| Code | Amount of Time (T)                     |
|------|----------------------------------------|
| N    | Does not apply (or is very incidental) |
| 1    | Under 1/10 of the time                 |
| 2    | Between 1/10 and 1/3 of the time       |
| 3    | Between 1/3 and 2/3 of the time        |
| 4    | Over 2/3 of the time                   |
| 5    | Almost continually                     |

- 182 | T Travel (indicate by code the proportion of *time* the worker is required to travel because of the job)

## 6.5 Responsibility

This section includes types of responsibility which may be associated with the decisions and actions of the worker. Indicate by code the degree of each type of responsibility involved in the job.

- 183 | S Responsibility for the safety of others (indicate, using the code below, the degree to which the work requires diligence and effort to prevent injury to others; do *not* include hazards beyond the control of the individual concerned with the job)

Code Degree of Responsibility for the Safety of Others

- N Does not apply
- 1 Very limited (worker has minimum responsibility for the safety of others, for example, he may only use small hand tools, nonhazardous machines, etc.)
- 2 Limited (worker must exercise *reasonable* care in order to avoid injury to others, for example, operating lathes, punch presses, and other industrial machines, etc.)
- 3 Intermediate (worker must be *especially* careful in order to avoid injury to others, for example, operating overhead cranes, driving vehicles, etc.)
- 4 Substantial (worker must exercise *constant* and *substantial* care in order to prevent serious injury to others, for example, handling dangerous chemicals, using explosives, etc.)
- 5 Very substantial (the safety of others depends almost *entirely* on the correct action of the employee, for example, piloting an aircraft, performing major surgery, etc.)

- 184 | S Responsibility for material assets (indicate, using the code below, the degree to which the worker is *directly* responsible for waste, damage, defects, or other loss of value to material assets or property, such as materials, products, parts, equipment, cash, live-stock, etc., that might be caused by inattention or inadequate job performance)

Code Degree of Responsibility for Material Assets

- 1 Very limited (for example, a few dollars)

(Item 184 continued on next page)

## OTHER JOB CHARACTERISTICS

|     |             |                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|-----|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|     | 2           | Limited (for example, up to about one hundred dollars)                                                                                                                                                                                                                                                                                                                                                                                              |
|     | 3           | Intermediate (for example, a few hundred dollars)                                                                                                                                                                                                                                                                                                                                                                                                   |
|     | 4           | Substantial (for example, one or two thousand dollars)                                                                                                                                                                                                                                                                                                                                                                                              |
|     | 5           | Very substantial (for example, more than two thousand dollars)                                                                                                                                                                                                                                                                                                                                                                                      |
| 185 | S           | General responsibility (indicate, using the code below, the degree of "general" or overall responsibility associated with whatever activities are involved in the job, including consideration of the possible effects of the person's work activities on the organization, on other people, on the work output, etc., excluding consideration of responsibility for the safety of others or for material assets as described in item 183 and 184 ) |
|     | <b>Code</b> | <b>Degree of General responsibility</b>                                                                                                                                                                                                                                                                                                                                                                                                             |
|     | 1           | Very limited                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|     | 2           | Limited                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|     | 3           | Intermediate                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|     | 4           | Substantial                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|     | 5           | Very substantial                                                                                                                                                                                                                                                                                                                                                                                                                                    |

## 6.6 Job Structure

|     |             |                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|-----|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 186 | S           | Job structure (indicate, using the code below, the amount of "structure" of the job, that is, the degree to which the job activities are "predetermined" for the worker by the nature of the work, the procedures, or other job characteristics; the more highly structured jobs permit less deviation from predetermined patterns, and little if any need for innovation, decision making, or adaptation to changing situations) |
|     | <b>Code</b> | <b>Amount of Job Structure</b>                                                                                                                                                                                                                                                                                                                                                                                                    |
|     | 1           | Very high structure (virtually no deviation from a predetermined job "routine," for example, routine assembly work, etc.)                                                                                                                                                                                                                                                                                                         |
|     | 2           | Considerable structure (only moderate deviation from predetermined work "routine" is possible, for example, bookkeeper, stock handler, etc.)                                                                                                                                                                                                                                                                                      |
|     | 3           | Intermediate structure (considerable change from a "routine" is possible; work activities change considerably from day to day or even from hour to hour, but usually within some reasonable and expected bounds, for example, carpenter, automobile mechanic, machinist, etc.)                                                                                                                                                    |
|     | 4           | Limited structure (relatively little routine work; the job is characterized by considerable opportunity for improving methods, devices, etc. and the necessity for making decisions, for example, store manager, industrial engineer, etc.)                                                                                                                                                                                       |
|     | 5           | Very low structure (virtually no established "routine" of activities; the position involves a wide variety of problems which must be dealt with; the solutions to these problems allow for unlimited resourcefulness and initiative, for example, research chemist, corporation vice-president, college professors, etc.)                                                                                                         |

## 6.7 Criticality of Position

|     |   |                                                                                                                                                                                                                                                                                                                                                             |
|-----|---|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 187 | S | Criticality of position (indicate, using the code below, the degree to which the performance of activities associated with this job are critical in terms of their possible effects on the organizational operations, assets, reputation, etc., or on the public or other people. In rating a job, consider particularly the possible detrimental effect of |
|-----|---|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

## OTHER JOB CHARACTERISTICS

↑ inadequate job performance; consider the duration of such consequences, whether immediate or long-term, their seriousness, and the extent to which they have restricted or wide-spread effects)

| Code | Degree of Criticality of Position |
|------|-----------------------------------|
| 1    | Very low                          |
| 2    | Low                               |
| 3    | Moderate                          |
| 4    | High                              |
| 5    | Very high                         |

## 6.8 Pay/Income

The following items are used to describe the typical method or way in which the worker receives pay/income and the amount he receives.

## Method of Receiving Pay/Income

For each item on this side, mark N if the item does *not* apply, and a one (1) if it *does* apply.

| Code | Applicability (A) |
|------|-------------------|
| N    | Does not apply    |
| 1    | Does apply        |

## Amount of Pay/Income (optional)

For each method of receiving pay/income listed at the left, that applies, write in the approximate amount of pay/income. This need only be reported for *one* time period in each case. (If this information is reported, it will be used *only* for research purposes, and will be held in *strictest confidence*.)

|     |                                                                                                                |     |                             |    |     |
|-----|----------------------------------------------------------------------------------------------------------------|-----|-----------------------------|----|-----|
| 188 | A Salary                                                                                                       | 188 | a. Weekly salary, or        | \$ | ___ |
|     |                                                                                                                |     | b. Salary every 2 weeks, or | \$ | ___ |
|     |                                                                                                                |     | c. Monthly salary, or       | \$ | ___ |
|     |                                                                                                                |     | d. Yearly salary            | \$ | ___ |
| 189 | A Hourly wage                                                                                                  | 189 | a. Wage per hour            | \$ | ___ |
| 190 | A Incentive pay (individual or group)                                                                          | 190 | a. Weekly average, or       | \$ | ___ |
|     |                                                                                                                |     | b. Monthly average          | \$ | ___ |
| 191 | A Commission                                                                                                   | 191 | a. Weekly average, or       | \$ | ___ |
|     |                                                                                                                |     | b. Monthly average, or      | \$ | ___ |
|     |                                                                                                                |     | c. Yearly average           | \$ | ___ |
| 192 | A Tips                                                                                                         | 192 | a. Weekly average, or       | \$ | ___ |
|     |                                                                                                                |     | b. Monthly average, or      | \$ | ___ |
|     |                                                                                                                |     | c. Yearly average           | \$ | ___ |
| 193 | A Supplementary compensation (for example, stocks, profit sharing, dividends, bonuses, donations, gifts, etc.) | 193 | a. Yearly average           | \$ | ___ |
| 194 | A Self-employed                                                                                                | 194 | a. Yearly average           | \$ | ___ |

APPENDIX B

PERFORMANCE RATING SCALE

## POLICE OFFICER RATING FORM

The Knoxville Police Department is currently evaluating the effectiveness of its recruit training program. In order to accomplish this task, it is necessary to obtain an accurate appraisal of each recruit's \_\_\_\_\_ performance. We are asking you to provide us with this information. As you complete this form, please bear in mind that the ratings will be used for research purposes only. Information pertaining to individual recruits will not be disclosed to anyone employed by the police department. Rather, the findings of the study will be disclosed in general terms, without reference to any individuals.

In order to help ensure the accuracy of the ratings, we have included below for your information a listing of "errors" which often occur in rating tasks of this nature. It has been found in the past that an awareness of these errors leads to a reduction in their occurrence.

1. HALO ERROR—This is a tendency of a rater to carry over a generalized impression of a person from one rating dimension to the next.

Each dimension should be rated independently in order to show the recruit's strengths and weaknesses. For example, you may feel that the recruit is an excellent worker overall, yet if he/she is deficient in a particular area, this deficiency should be reflected in the rating.

2. LENIENCY ERROR—This is the tendency of a rater to say only good things about everyone, whether warranted or not.

Remember that these ratings are for research purposes only, and will thus have no effect upon the standing of the recruit.

3. CENTRAL TENDENCY ERROR—This is the tendency of a rater to avoid making extreme judgments and to assign individuals to moderate categories.

Do not hesitate to assign extreme ratings if you feel they are warranted.

Please complete the following questions.

1. Your name: \_\_\_\_\_
2. Your relationship to the recruit being rated:

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#### INSTRUCTIONS ON COMPLETING RATING FORM

Please rate each of the recruits listed on the rating forms that follow. A list of all recruits follows each rating dimension. Finish rating all recruits on each dimension before proceeding to the next dimension. This is a way of helping further to reduce rater error due to halo.

There are a total of 10 rating dimensions. Your job will be to place in the space next to each recruit's name the scale value (from 1-7) most representative of that recruit's performance on the dimension to be rated.

If you feel that you cannot accurately rate a recruit on any one of the dimensions because you may not have had time to observe his/her performance on that dimension, give the rating you feel the recruit most likely would receive had you had sufficient time to observe his/her behavior. Place a checkmark after the rating to indicate that this is an "expected rating."

## DIMENSION 1

Decision-Making and Communicating Responsibility

This dimension reflects activities involving considerable amounts of responsibility for decision-making and communicating. Such activities might include interviewing, processing information, reasoning in problem solving, etc.

Using the following scale, rate each recruit's communications and decision-making skills.

|   |             |                                                                                                                                      |
|---|-------------|--------------------------------------------------------------------------------------------------------------------------------------|
| 1 | INADEQUATE  | -Falls far below the minimum requirements of <u>this dimension</u> .                                                                 |
| 2 | WEAK        |                                                                                                                                      |
| 3 | AVERAGE     | -Meets the minimum requirements of <u>this dimension</u> .                                                                           |
| 4 | GOOD        |                                                                                                                                      |
| 5 | VERY GOOD   | -Exceeds the minimum requirements of <u>this dimension</u> , but falls short of being considered superior.                           |
| 6 | SUPERIOR    |                                                                                                                                      |
| 7 | EXCEPTIONAL | -Greatly exceeds the minimum requirements of <u>this dimension</u> ; one of the best performers on this dimension I have ever known. |

## DIMENSION 2

Operating Machines, Equipment and/or Vehicles

This dimension characterizes activities in which officers are responsible for the operation of machines, equipment, vehicles or other types of related mechanical devices. For example, these may include motor vehicles, emergency apparatus, monitoring instruments, to name a few.

Using the following scale, assess the performance of each recruit as it relates to the operation of the mechanical devices he/she uses on the job.

|   |             |                                                                                                                                      |
|---|-------------|--------------------------------------------------------------------------------------------------------------------------------------|
| 1 | INADEQUATE  | -Falls far below the minimum requirements of <u>this dimension</u> .                                                                 |
| 2 | WEAK        |                                                                                                                                      |
| 3 | AVERAGE     | -Meets the minimum requirements of <u>this dimension</u> .                                                                           |
| 4 | GOOD        |                                                                                                                                      |
| 5 | VERY GOOD   | -Exceeds the minimum requirements of <u>this dimension</u> , but falls short of being considered superior.                           |
| 6 | SUPERIOR    |                                                                                                                                      |
| 7 | EXCEPTIONAL | -Greatly exceeds the minimum requirements of <u>this dimension</u> ; one of the best performers on this dimension I have ever known. |

## DIMENSION 3

Performing Clerical and/or Related Activities

The dominant feature of this dimension is involvement in the performance of typical clerical, office, and related types of activities. These may include gathering information, following set procedures, filling out reports, attending to detail, etc.

Using the following scale, assess each recruit's clerical and related skills.

|   |             |                                                                                                                                       |
|---|-------------|---------------------------------------------------------------------------------------------------------------------------------------|
| 1 | INADEQUATE  | -Falls far below the minimum requirements of <u>this dimension</u> .                                                                  |
| 2 | WEAK        |                                                                                                                                       |
| 3 | AVERAGE     | -Meets the minimum requirements of <u>this dimension</u> .                                                                            |
| 4 | GOOD        |                                                                                                                                       |
| 5 | VERY GOOD   | -Exceeds the minimum requirements of <u>this dimension</u> , but falls short of being considered superior.                            |
| 6 | SUPERIOR    |                                                                                                                                       |
| 7 | EXCEPTIONAL | -Greatly exceeds the minimum requirements of <u>this dimension</u> ; one of the best performers on this dimension I have every known. |

## DIMENSION 4

Public Contact/Interpersonal Skills

This dimension involves activities in which personal contact is made with the public, or public customers, such as the types of personal contact made at motor vehicle accidents, while walking on foot patrol, while answering a distress call, over the phone, etc.

Using the following rating scale, assess each recruit's interpersonal skills needed for close contact with the public.

|   |             |                                                                                                                                      |
|---|-------------|--------------------------------------------------------------------------------------------------------------------------------------|
| 1 | INADEQUATE  | -Falls far below the minimum requirements of <u>this dimension</u> .                                                                 |
| 2 | WEAK        |                                                                                                                                      |
| 3 | AVERAGE     | -Meets the minimum requirements of <u>this dimension</u> .                                                                           |
| 4 | GOOD        |                                                                                                                                      |
| 5 | VERY GOOD   | -Exceeds the minimum requirements of <u>this dimension</u> , but falls short of being considered superior.                           |
| 6 | SUPERIOR    |                                                                                                                                      |
| 7 | EXCEPTIONAL | -Greatly exceeds the minimum requirements of <u>this dimension</u> ; one of the best performers on this dimension I have ever known. |

## DIMENSION 5

Performing Technical and/or Related Activities

This dimension covers a variety of activities of a skilled nature in which devices or tools of a technical or precision quality tend to be used. They include devices such as measuring instruments, testing devices and/or tools which require the recruit to place an emphasis on precision of measurement, recognizing differences, and manual control and operation.

Using the following scale, rate each recruit's behavior when it comes to performing such technical and/or related activities.

|   |             |                                                                                                                                      |
|---|-------------|--------------------------------------------------------------------------------------------------------------------------------------|
| 1 | INADEQUATE  | -Falls far below the minimum requirements of <u>this dimension</u> .                                                                 |
| 2 | WEAK        |                                                                                                                                      |
| 3 | AVERAGE     | -Meets the minimum requirements of <u>this dimension</u> .                                                                           |
| 4 | GOOD        |                                                                                                                                      |
| 5 | VERY GOOD   | -Exceeds the minimum requirements of <u>this dimension</u> , but falls short of being considered superior.                           |
| 6 | SUPERIOR    |                                                                                                                                      |
| 7 | EXCEPTIONAL | -Greatly exceeds the minimum requirements of <u>this dimension</u> ; one of the best performers on this dimension I have ever known. |

## DIMENSION 6

Being Aware of the Work Environment

This dimension typically involves continual awareness of the environment within which the recruit is working, especially awareness of various types of events or circumstances. Such awareness is generally based on the use of the various senses, such as vision, hearing, etc.

Using the following scale, rate each recruit's ability to be aware of and monitor their working environment, regardless of the type of duty they are assigned.

|   |             |                                                                                                                                      |
|---|-------------|--------------------------------------------------------------------------------------------------------------------------------------|
| 1 | INADEQUATE  | -Falls far below the minimum requirements of <u>this dimension</u> .                                                                 |
| 2 | WEAK        |                                                                                                                                      |
| 3 | AVERAGE     | -Meets the minimum requirements of <u>this dimension</u> .                                                                           |
| 4 | GOOD        |                                                                                                                                      |
| 5 | VERY GOOD   | -Exceeds the minimum requirements of <u>this dimension</u> , but falls short of being considered superior.                           |
| 6 | SUPERIOR    |                                                                                                                                      |
| 7 | EXCEPTIONAL | -Greatly exceeds the minimum requirements of <u>this dimension</u> ; one of the best performers on this dimension I have ever known. |

## DIMENSION 7

Performing Routine or Repetitive Activities

This dimension is characterized by the performance of routine, repetitive work activities, in some instances at predetermined work paces. Such activities might include adhering to daily or weekly routine schedules of operation, performing the same activities over and over at a set pace, etc.

Using the following rating scale, assess each recruit's ability to perform routinized or repetitive work activities.

|   |             |                                                                                                                                      |
|---|-------------|--------------------------------------------------------------------------------------------------------------------------------------|
| 1 | INADEQUATE  | -Falls far below the minimum requirements of <u>this dimension</u> .                                                                 |
| 2 | WEAK        |                                                                                                                                      |
| 3 | AVERAGE     | -Meets the minimum requirements of <u>this dimension</u> .                                                                           |
| 4 | GOOD        |                                                                                                                                      |
| 5 | VERY GOOD   | -Exceeds the minimum requirements of <u>this dimension</u> , but falls short of being considered superior.                           |
| 6 | SUPERIOR    |                                                                                                                                      |
| 7 | EXCEPTIONAL | -Greatly exceeds the minimum requirements of <u>this dimension</u> ; one of the best performers on this dimension I have ever known. |

## DIMENSION 8

Engaging in Physical Activities

The dominant feature of this dimension is involvement in general body or physical activities, such as walking, stooping, standing, climbing, balancing, etc.

Using the following rating scale, assess each recruit's ability to perform physical activities requiring general body movement.

|   |             |                                                                                                                                      |
|---|-------------|--------------------------------------------------------------------------------------------------------------------------------------|
| 1 | INADEQUATE  | -Falls far below the minimum requirements of <u>this dimension</u> .                                                                 |
| 2 | WEAK        |                                                                                                                                      |
| 3 | AVERAGE     | -Meets the minimum requirements of <u>this dimension</u> .                                                                           |
| 4 | GOOD        |                                                                                                                                      |
| 5 | VERY GOOD   | -Exceeds the minimum requirements of <u>this dimension</u> , but falls short of being considered superior.                           |
| 6 | SUPERIOR    |                                                                                                                                      |
| 7 | EXCEPTIONAL | -Greatly exceeds the minimum requirements of <u>this dimension</u> ; one of the best performers on this dimension I have ever known. |

## DIMENSION 9

Performing Service and/or Related Activities

The common theme of the job activities covered by this dimension is that associated with performing some type of service, generally for others. Activities such as offering help or assistance are characteristic of this dimension.

Using the following scale, rate each recruit's ability to perform service-oriented functions for others.

|   |             |                                                                                                                                      |
|---|-------------|--------------------------------------------------------------------------------------------------------------------------------------|
| 1 | INADEQUATE  | -Falls far below the minimum requirements of <u>this dimension</u> .                                                                 |
| 2 | WEAK        |                                                                                                                                      |
| 3 | AVERAGE     | -Meets the minimum requirements of <u>this dimension</u> .                                                                           |
| 4 | GOOD        |                                                                                                                                      |
| 5 | VERY GOOD   | -Exceeds the minimum requirements of <u>this dimension</u> , but falls short of being considered superior.                           |
| 6 | SUPERIOR    |                                                                                                                                      |
| 7 | EXCEPTIONAL | -Greatly exceeds the minimum requirements of <u>this dimension</u> ; one of the best performers on this dimension I have ever known. |

## DIMENSION 10

Supervising, Directing, and Estimating

This dimension involves several often related coordinating and directing functions, frequently but not always associated with supervisory practices. It may involve activities such as instructing or advising others, or taking a leadership role in an otherwise leaderless situation.

Using the following scale, rate each recruit's ability to coordinate and/or direct the activities of others.

|   |             |                                                                                                                                      |
|---|-------------|--------------------------------------------------------------------------------------------------------------------------------------|
| 1 | INADEQUATE  | -Falls far below the minimum requirements of <u>this dimension</u> .                                                                 |
| 2 | WEAK        |                                                                                                                                      |
| 3 | AVERAGE     | -Meets the minimum requirements of <u>this dimension</u> .                                                                           |
| 4 | GOOD        |                                                                                                                                      |
| 5 | VERY GOOD   | -Exceeds the minimum requirements of <u>this dimension</u> , but falls short of being considered superior.                           |
| 6 | SUPERIOR    |                                                                                                                                      |
| 7 | EXCEPTIONAL | -Greatly exceeds the minimum requirements of <u>this dimension</u> ; one of the best performers on this dimension I have ever known. |

### OVERALL AND POTENTIAL RATINGS

There are two additional sets of ratings we would like to collect.

I'm sure that as you filled out the set of ratings you may have thought to yourself that the 10 dimensions did not cover all the possible ones that could have been included for a comprehensive rating of each recruit. This is the basis for an OVERALL rating. It will give you the chance to give a global rating to each recruit, taking into consideration the recruit's performance on each of the 10 initial dimensions plus his/her performance on any other dimensions you think might have been excluded (but shouldn't have) from the original ten. In your OVERALL rating of each recruit's present performance, take into consideration all the factors that contributed to the recruit's performance on the job.

The second additional rating that we are asking you to give will be based on the POTENTIAL of each recruit. As you must realize, each recruit has a certain "potential" that he/she can be expected to attain. This will vary from recruit to recruit. Some recruits will work up completely to their potential, others will never reach their true potentials. Your rating of a recruit's POTENTIAL should be based on how hard he/she worked towards achieving that potential.

When you give your OVERALL rating, refer to the same scales that you used for the initial 10 ratings. However, to rate each recruit's POTENTIAL, use the scale especially designed for this purpose. It is similar to the other rating scales as far as its usage, and only different in format.

Your Name: \_\_\_\_\_

OVERALL RATING

Taking into consideration the 10 dimensions on which you previously rated each recruit's performance, plus all other dimensions you feel may have been overlooked, rate the OVERALL performance of each recruit \_\_\_\_\_.

For this evaluation, use the same rating scale as before.

Your Name: \_\_\_\_\_

POTENTIAL RATING

On a scale of from 1 to 7 (1 being far below potential and 7 being far above potential), how hard did this recruit work \_\_\_\_\_ to fulfill his/her potential?

|                           |   |   |   |   |                           |
|---------------------------|---|---|---|---|---------------------------|
| 1                         | 2 | 3 | 4 | 6 | 7                         |
| /                         | / | / | / | / | /                         |
| far<br>below<br>potential |   |   |   |   | far<br>above<br>potential |

## VITA

Robert Henry Faley was born in Trenton, New Jersey, on September 27, 1948. He attended elementary schools in that city. He graduated from Holy Ghost Preparatory School in June 1966. The following September, he entered Fairfield University, and in June 1970, he received a Bachelor of Arts degree in psychology.

For the next two years he worked as a Personnel Staff Analyst for the Metropolitan Life Insurance Company in New York City. At about that time, he began study towards a Master's degree in psychology at the New School for Social Research. This degree was awarded in May 1973.

He spent the following two years working for the New Jersey Department of Civil Services as a Test Validation and Staff Development Specialist. In the fall of 1975, he left that position to enter the Graduate School of The University of Tennessee, Knoxville. He received the Doctor of Philosophy degree with a major in industrial/organizational psychology in August 1980.

He is married to Susan Grace Hoagland from Titusville, New Jersey. He has two sons, Ryan Christopher and Justin Barrett. He loves all three very much.