

CHAPTER 3

Job Analysis in Human Resource Selection

LEARNING OBJECTIVES

After studying this chapter, you will be able to:

1. Understand what job analysis is and its importance in human resource (HR) selection.
2. Describe several common job analysis methods.
3. Explain how job analysis results are implemented in choosing and developing HR selection procedures.

When we come to this section of the book, we have become accustomed to hearing a common refrain from many students (and, for that matter, even from some academic colleagues). That refrain goes something like this: “*Job analysis! Ugh!* That is the most boring topic in human resource selection. Can’t we do something that’s more interesting, like watching paint dry or grass grow?” We have to admit that our discussion of job analysis may not be a life-changing event for you. Warning: If you think it might put you to sleep, do not read this chapter while lying down, before driving a car, or before operating heavy equipment. The chapter is a cure for insomnia, however. Seriously, trust us, job analysis plays a critical role in human resource (HR) selection. We hope to persuade you of its importance in this chapter. So, hang in there; the fun is just beginning! Now, tighten your safety belt so you don’t fall out of your chair, and let’s get started.

JOB ANALYSIS: A DEFINITION AND ROLE IN HR SELECTION

There are probably as many definitions of **job analysis** as there are writings on the topic. For our purposes, though, when we refer to job analysis, we simply mean *a purposeful, systematic process for collecting information on the important work-related aspects of a job*. Some aspects of work-related information collected include the following:

1. Work activities, that is, what a worker does; how, why, and when these activities are conducted

job analysis

Study of what, how, why, and when work activities are performed, including various equipment employed while working in a particular environment(s) and requiring specific characteristics (for example, knowledge, skills, and abilities) needed to perform the job.

2. Tools and equipment used in performing work activities
3. Context of the work environment, such as work schedule or physical working conditions
4. Requirements of personnel performing the job, such as knowledge, skills, abilities, personality characteristics, or other specifications (we refer to these various requirements as work-related characteristics, or WRCs)¹

Job analysis information serves a wide variety of purposes. For example, over 70 years ago Joseph Zerga identified more than 20 uses of job analysis data.² More recently, job analysis data have been used in such HR areas as recruitment, compensation, training, and performance appraisal among others. Of particular interest to us is the application of job analysis data in HR selection.

Broadly speaking in the context of HR selection, job analysis data help to

1. Identify employee specifications or WRCs necessary for success on a job,
2. Select or develop selection procedures that assess these important applicant WRCs to forecast those job candidates who are likely to succeed on the job, and
3. Develop criteria or standards of job performance that represent employee job success.

By examining factors, such as the tasks performed on a job and the employee specifications needed to successfully perform these tasks, one can obtain an idea of what ought to be measured by selection procedures or *predictors* used in employment screening. As an example, consider the job of a bank teller. An analysis of bank tellers' jobs might identify a number of tasks critical to successful work performance. Examination of these tasks as well as the specifications needed to perform them might reveal some important findings. For instance, a job analysis may show that balancing receipts and disbursements of cash, performing arithmetic operations on numbers involving dollars and cents, and entering transaction information into a computer are critical teller tasks. Conversely, notarizing legal documents, opening savings accounts, and handling applications for customer loans are tasks that tellers typically do not perform. Further analysis of such job information may indicate that one of several important *criteria* of successful teller performance is the dollar balance of tellers' receipts and disbursements for a workday. That is, tellers should not take in more dollars (an "overage") or fewer dollars (a "shortage") than they have disbursed. An examination of the WRCs associated with tellers' balancing of receipts and disbursements might show that the ability to use an electronic calculator to add, subtract, multiply, and divide monetary numbers involving decimals is one important requirement. In searching for a predictor of teller success, one would consider using a selection procedure that provides information about tellers' ability to use a calculator to perform arithmetic operations on monetary values.

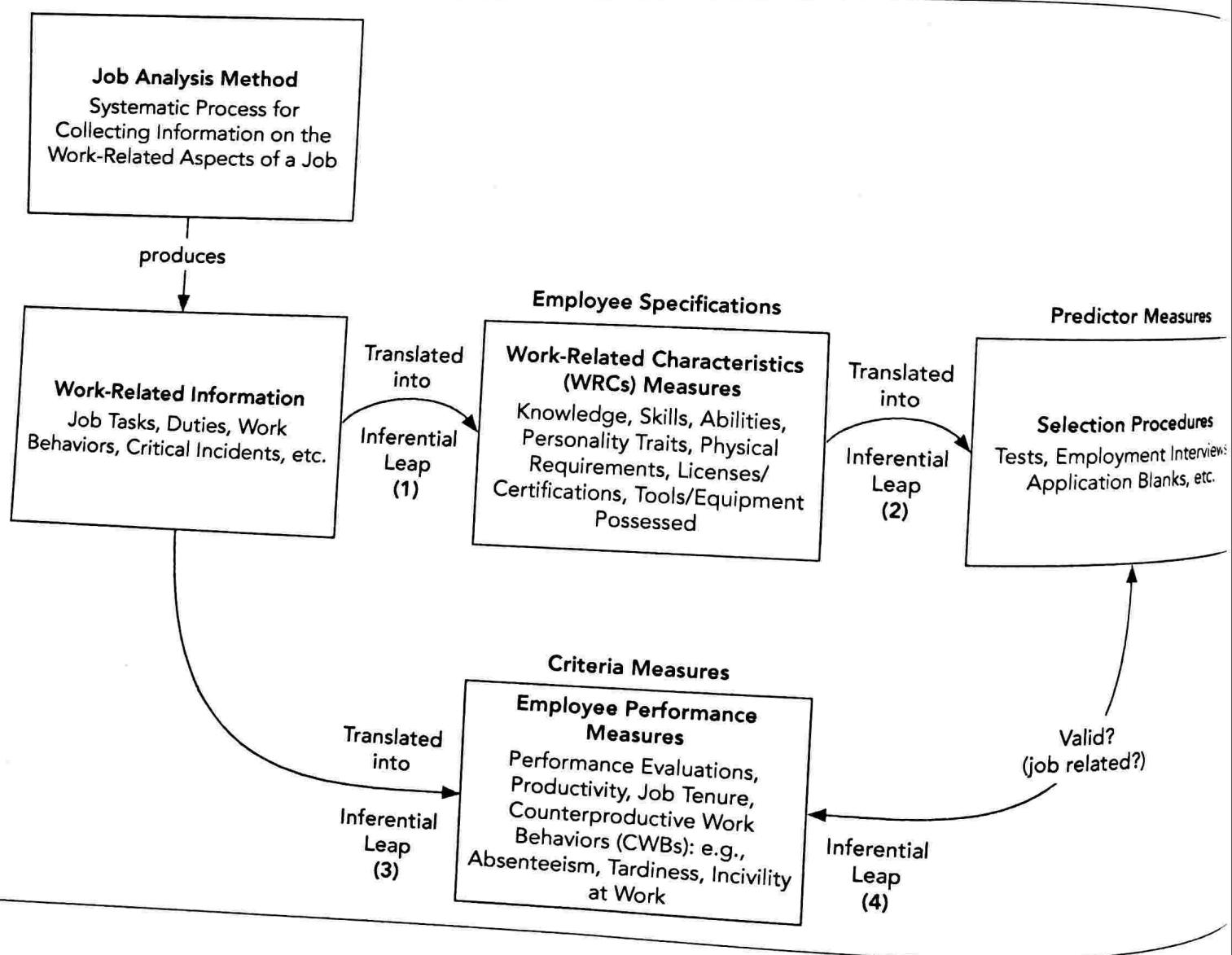
When predictors and criteria are identified from job analysis results, developing a selection system that is job-related is feasible. As we suggest in Chapter 4, by using

a job-related selection system, we are in a much better position to predict who can and who cannot adequately perform a job. With a job-related selection system, we are far more likely to have an employment system viewed by job applicants as well as the courts as being "fair."

Figure 3.1 outlines a general framework for the application of a job analysis in the context of HR selection. However, for other HR functions, such as designing a recruitment strategy, additional job analysis information is needed. Initially, numerous methods are available to make an analysis. Most often, two important pieces of information are obtained from the analysis. The first involves information on the critical job tasks, duties, or work behaviors performed on the job under study as well as the WRCs required to perform them. The second piece of job information gathered is that related to what represents successful job performance (criteria).

Identification of critical job tasks and information on what represents successful job performance help produce two important products that underpin a selection program. First, criteria measures (for example, performance evaluations, job tenure,

FIGURE 3.1 Role of Job Analysis in Human Resource Selection



and counterproductive work behaviors, such as absenteeism and tardiness) represent what we are interested in predicting about applicants' future work behavior if hired. Second, selection procedures or predictors (such as tests, application forms, employment interviews) reflect the WRCs needed for job success and used in making predictions regarding future work performance (our criteria). Scores on predictors serve as employment decision-making tools.

Often, criterion measures result from job analysis information or are identified from existing organizational data. The development of predictors, however, typically requires some intermediate steps. For example, job task information helps in identifying employee specifications (WRCs) needed to perform the critical job tasks. This step usually involves using job experts (such as supervisors and key job incumbents) to infer the necessary employee specifications. Once WRCs are uncovered, it is possible to develop or purchase predictors of these employee requirements; job-related predictors serve as job applicant screening tools.

If selection procedure and job performance measures flow from a sound job analysis, we expect that job applicants' performance on these procedures will relate to their performance on the job (as represented by the criterion measures). As we will learn in Chapter 8, a validation study tests this hypothesized relationship. Important here is the recognition that it is the job analysis process that is the foundation of the effectiveness of any HR selection system. Where job analysis is incomplete, inaccurate, or simply not conducted, a selection system may be nothing more than a game of chance—a game that employer, employee, and job applicants alike may very well lose.

Growth in Job Analysis

Within the past four decades or so, employers have given considerable attention to job analysis. This attention has focused on the use of job analysis not only in the basic personnel areas we mentioned earlier, but also in HR selection specifically. At least three interrelated reasons account for this renewed interest. First, many have realized that jobs are not static entities; that is, the nature of jobs change for any number of reasons, such as technological advancements, seasonal variations, or the initiatives of incumbents.³ Thus, as managers have recognized the importance of job information in HR decision making, there has been an accompanying recognition of the need for up-to-date information on the jobs themselves.

In addition to the need for current, accurate job data, two other factors have influenced the role of job analysis in selection. Federal guidelines (namely, the *Uniform Guidelines on Employee Selection Procedures*⁴) have had a significant effect.⁵ In addition, professional standards (for example, the *Principles for the Validation and Use of Personnel Selection Procedures*⁶) produced by the Society for Industrial and Organizational Psychology also have emphasized the important role of job analysis in HR selection programs. The *Uniform Guidelines* and the *Principles* have advocated that job analysis is part of the development, application, and validation of selection procedures. Each of these documents has elevated the legal as well as the practical importance of job analysis.

Third, court cases involving employment discrimination in selection have underlined the significance of job analysis.⁷ We briefly discuss selected cases in the section that follows. You will read additional material related to legal cases and job analysis in Chapter 4. Rulings in various cases have held that job analysis *must* play an integral role in any research that attempts to show a relationship between how job applicants perform or respond on selection procedures and, if employed, their subsequent job performance.

Legal Issues in Job Analysis

Job analysis has become a focal point in the legal context of HR selection. One major source for this development can be traced to the passage of Title VII of the 1964 Civil Rights Act. Title VII makes it illegal for an organization to refuse to select an individual or to discriminate against a person with respect to compensation, terms, conditions, or privileges of employment because of the person's race, sex, color, religion, or national origin. Because many Title VII cases have concerned the role of discrimination in selection for employment, job analysis has emerged as critical to the prosecution or defense of a discrimination case. Thus, job analysis and its associated methodologies have become intertwined with the law. Within this legal vein, two developments, in particular, amplified the importance of job analysis in selection research: (a) adoption of the *Uniform Guidelines on Employee Selection Procedures* by the federal government and (b) litigation involving discrimination in selection, arising under Title VII, the Fifth, and Fourteenth Amendments to the U.S. Constitution.

Key Court Cases Involving Job Analysis

Although a number of cases involving job analysis have been heard in the courts, two early Supreme Court cases are particularly important. Perhaps the seminal one with respect to job analysis is *Griggs v. Duke Power Co.*⁸ Even though the term *job analysis* is not mentioned per se, *Griggs* gave the legal impetus to job analysis. The case implies that an important legal requirement in a selection procedure validation program is an analysis of the job for which the procedure is used.

In *Griggs*, Duke Power was employing a written test and a high school diploma as requirements for entry into a supervisory position. The Court concluded that these selection standards were used "without meaningful study of their relationship to job-performance ability. Rather, a vice president of the company testified, the requirements were instituted on the company's judgment that they generally would improve the overall quality of the work force."⁹ The Court ruled "What Congress has commanded is that any test used must measure the person *for the job* and not the person in the abstract."¹⁰ The ruling in *Griggs* implied that for employers to attempt to meet this job-relatedness standard, they must first examine the job. Examination of the job involves job analysis.

Albemarle Paper Co. v. Moody is equally important.¹¹ In *Albemarle*, the Court, for the first time, expressly criticized the lack of a job analysis in a validation study. The Court

Uniform Guidelines on Employee Selection Procedures

Published by the federal government broadly describing essential requirements for developing and administering an HR selection program.

found that "no attempt was made to analyze the jobs in terms of the particular skills they might require."¹² As with *Griggs*, the Court gave significant weight to the requirement of job analysis.

Albemarle is noteworthy for its support of job analysis. Like *Griggs*, its predecessor, *Albemarle* was a U.S. Supreme Court case. Plaintiffs and lower courts look for guidance from rulings of the Supreme Court. Thus, the Court's insistence on job analysis in selection cases encouraged other courts to look for the presence (or lack) of a job analysis.

This case is significant for a second reason. The Court supported the Equal Employment Opportunity Commission (EEOC) *Guidelines on Employee Selection Procedures*,¹³ which required that a job analysis be performed in a validation study. As we see in the next section, the Court's endorsement of these guidelines, as well as the subsequently issued *Uniform Guidelines*, emphasized the role of job analysis in HR selection.

Numerous court cases could be cited in addition to *Griggs* and *Albemarle*. On the whole, decisions and remedies in these cases emphasize the importance of job analysis. An examination of these cases would be helpful in isolating the standards used by the courts in evaluating job analysis in validation research. In this light, Duane Thompson and Toni Thompson reviewed 26 selected federal court cases to determine the standards the courts apparently used in evaluating job analyses conducted in the development and validation of tests. Their review produced a set of job analysis characteristics, which they suggest are capable of withstanding legal scrutiny. Although these characteristics, as well as others, will often vary depending on such issues as type of job analysis, type of validation strategy, and purpose of the analysis, the standards serve as a useful guide for understanding the judicial view. The legal standards identified by Thompson and Thompson involved the following:

1. Job analysis is mandatory and must be for the job for which selection procedures are used.
2. Analysis of the job should be in writing.
3. Job analysts should describe in detail the job analysis procedures used.
4. Knowledgeable job analysts should collect job data from a variety of current sources.
5. Sample size of individuals serving as **subject matter experts (SMEs)** should be large and representative of the jobs for which the selection procedures are used.
6. Tasks, duties, and activities should be included in the analysis.
7. The most important tasks should be represented in the selection procedures.
8. Competency levels of work performance for entry-level jobs should be specified.
9. WRCs including knowledge, skills, and abilities should be specified, particularly if a content validation strategy is used.¹⁴

subject matter experts (SMEs)

Individuals knowledgeable about the nature (tasks and work-related characteristics) of a specific job.

Federal Guidelines on Employee Selection

From 1966 to 1978, the government issued various sets of federal regulations on employee selection.¹⁵ The EEOC, the Office of Federal Contract Compliance (OFCC), and the Civil Service Commission (currently the U.S. Office of Personnel Management), and the Department of Justice offered guidelines for employers to follow in their selection procedures. Although some employers treated these guidelines as nothing more than a guide, the *Albemarle* case enhanced their role. As noted earlier, the Court gave deference to the *EEOC Guidelines*, at least to the portion that discussed job analysis. The impact of the Court's opinion made it mandatory for HR selection practitioners to be intimately familiar with the *Guidelines'* content.

Current federal regulations state the *Uniform Guidelines* supersede previous regulations (a previous version referred to as the *Guidelines*) and represent a joint agreement among the EEOC, Department of Justice, Department of Labor, and Civil Service Commission. Given the substantial weight accorded to the *Uniform Guidelines* in legal cases, the courts likely will continue to emphasize the importance of job analysis in the near future.

Many of the legal issues surrounding job analysis concern the necessity for employing these methods when developing and implementing a selection program. Since the early 1980s, however, another set of legal questions has arisen concerning the actual application of job analysis procedures. Because most of these methods involve some degree of human judgment, cases have been appearing in the courts involving technical aspects of job analysis implementation. In many instances, the issue has been to determine whether the inferences made from job analysis data based largely on human judgments have a discriminatory impact on protected classes of job applicants. Returning to Figure 3.1, you will see four points at which judgment occurs using job analysis information. These judgments represent "inferential leaps." For instance, at inference point (1) in Figure 3.1, WRCs are inferred from the tasks performed on a job. Because humans are involved in the process of inferring human attributes from work-related information, there is the possibility of error. The greater the role of human judgment, the larger the inferential leap, and, therefore, the greater the opportunity for discriminatory impact. In particular, inference points (1) and (2) represent areas where much equal opportunity litigation has centered when job analysis issues are in question.

Of course, the extent of inferential leaps made in any job analysis application depends on the particular situation. Factors such as the validation strategy used (for example, content versus criterion), the type of job (for example, hourly versus managerial), the job analysis method used, and the WRCs assessed (for example, a physical skill versus a personality trait) affect the degree of inferential leaps made.

Although convenient, it is simply impossible to specify one clear, suitable, standard means for meeting *all* technical and legal considerations of a job analysis. Situations, problems, and technical issues are so varied that proper conduct of a job analysis is a complex, resource-consuming process. No one way is standard.

Collecting Job Information

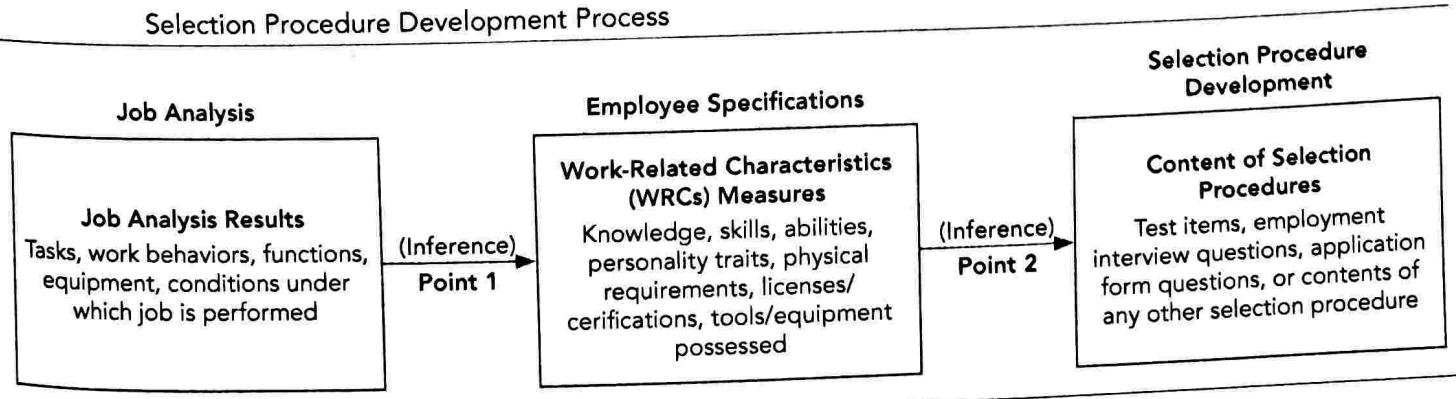
Earlier we said that one principal role of job analysis in HR selection is to assess job content so that requisite WRCs are identified. We translate these WRCs into selection procedures' content, such as tests, interviews, and the like. Assuming our selection procedures are job related or valid, they, in turn, are usable for selection decision-making purposes. The process of developing job-related selection procedures that assess employee specifications requires judgments or inferences at several points. Figure 3.2 summarizes these inference points.

At the first inference point (1), data collected from a job analysis are used to infer relevant employee specifications. A second inference point (2) then is reached concerning the content of selection procedures that reflect these identified specifications. An important goal is to minimize the chance of error at each inference point. Our resulting specifications will be useful only to the extent that our inferences are accurate and complete. Frederick Morgeson and Michael Campion found that a number of social and cognitive sources of inaccuracy can contaminate job analysis results (for example, loss of participant motivation, information overload among participants).¹⁶ To the extent such sources of inaccuracy plague our inferences from job analysis data, the effectiveness of our selection measures for predicting successful work performance likely will fall.

Obviously, the entire process depends on the data derived initially from the job analysis. If these data are incomplete, inaccurate, or otherwise faulty, subsequent judgments based on these data will be incorrect. In the end, we likely will have inappropriate, ineffective, perhaps illegal selection procedures. Thus, we must be careful in our choice and implementation of methods for collecting job information.

At this point, we should note that many of the methods we review and discuss tend to focus on the tasks performed by job incumbents. Other researchers in the field of HR selection do not necessarily agree with using these detailed job-task approaches

FIGURE 3.2 Points of Inference in the Job Analysis → Employee Specifications → Selection Procedure Development Process



for HR selection applications. In particular, writers in the area of validity generalization have tended to support more holistic methods of job analysis.¹⁷ Their argument is that task-oriented job analysis is not of much value for selection when measures of employee ability or worker competencies are concerned. On the other hand, when noncognitive attributes of applicants are being assessed or content validation strategies are being used with job knowledge or work sample tests, task-oriented job analysis is needed.¹⁸

A SURVEY OF JOB ANALYSIS METHODS

We divide our review of specific job analysis methods into two parts. The first part of the chapter reviews the following job analysis methods: (a) job analysis interviews, (b) job analysis questionnaires (including task analysis inventories), (c) Critical Incidents Technique, and (d) SME or job expert workshops. We describe each technique, its application, and its advantages and disadvantages. We do not advocate one particular method to the exclusion of others. Many methods are available to the user; do not view our omission of a specific method as a condemnation of it. This chapter concentrates on those methods that seem most popular in current HR selection practice. However, because most of the methods depend on interviews, questionnaires, or a combination of the two for collecting job information, we begin with and focus our discussion on these methods. Finally, in the last section of the chapter, we illustrate one method of using job analysis information for HR selection purposes.

JOB ANALYSIS INTERVIEWS

Description

The interview is one of the most frequently used methods of job analysis, capable of meeting a wide array of purposes. Essentially, a job analysis interview consists of a trained analyst asking questions about the duties and responsibilities, WRCs required, and conditions of employment for a job or class of jobs.

Job analysis data collected through interviews typically involve group or individual interviews with incumbents and supervisors. Because of their familiarity with job content, we often refer to such participants as SMEs (subject matter experts). Large groups (15–20) of incumbents can participate when it is certain that all incumbents are performing the same major activities. In a separate meeting apart from employees, supervisors often verify incumbent information and provide information unavailable to employees in the job. In other cases, supervisors (versus incumbents) participate because they may feel less threatened in discussing incumbents' job activities with a stranger, or they may be better able to comment on the necessary WRCs required to perform job activities successfully.

With regard to job incumbents and supervisors as sources of job information, each of these sources may differentially experience psychological processes that affect the accuracy of job information they provide. Fred Morgeson and Michael Campion theorized that job incumbents are more vulnerable to social effects that affect their behavior in providing job information, such as social desirability or loss of motivation effects. On the other hand, supervisors are more likely to be predisposed to information-processing effects, such as information overload or having inadequate job-related information. For this reason, Morgeson and Campion¹⁹ and other authors²⁰ have suggested combining both sources of information in a job analysis. Morgeson and Campion's recommendation applies not only to the job analysis interview but also to other job analysis methods.

A job analysis interview may be structured or unstructured. For selection purposes, a structured interview in which predetermined questions are asked and means are available for recording answers to these questions (such as rating scales or interview answer forms) is essential. Moreover, a structured interview is also standardized. In this sense, a standardized interview means that all interviewees are asked the same questions, in the same manner, under the same conditions, and interviewees' answers scored in the same way. An unstructured interview consists of a job analyst collecting information about a job without a specific list of questions developed before the interview. Because of the technical and legal issues involved in job analysis, a structured standardized job analysis interview is much more likely than an unstructured one to provide the job analysis data useful in selection applications. When we speak of a job analysis interview, we are referring to one that is structured and standardized.

In the context of HR selection, a job analysis interview typically is performed for one or more of the following reasons:

1. To collect job information—for example, information on job tasks—that will serve as a basis for developing other job analysis measures, such as a job analysis questionnaire
2. To clarify or verify information collected previously through other job analysis methods
3. To provide a method, preferably as one of several used, for collecting relevant job data for developing a selection system

Considerations on Applicability

The interview is applicable to a variety of jobs, from those composed of physical activities, such as a laborer's, to those composed of functions and activities that are primarily mental, such as an executive's. When used with knowledgeable respondents, the interview makes it possible to identify activities that may go unobserved or occur over long periods.

An important step toward effective application of an interview is to plan the interview itself. Detailed plans are preferred. Plans should state the objectives of the inter-

view (for example, identification and rating of job tasks); individuals to be interviewed (for example, incumbents representative of work shift, gender, or racial groups; incumbents with six months or more of job experience); questions and means for recording answers (for example, an interview schedule listing the questions and forms for recording responses); and who will conduct the interviews (for example, consultants). Numerous approaches can be

With regard to the interview questions themselves, numerous approaches can be taken in phrasing and posing questions. Figure 3.3 presents a sample job interview schedule for use with a single job incumbent. The schedule shown illustrates only some of the types of questions possible. Supplementary forms provide a means to systematically record job incumbents' responses to the questions.

FIGURE 3.3 An Example of a Job Analysis Interview Schedule for Use with a Job Incumbent

Name of Employee _____	Payroll Title _____
Job Analyst _____	Department _____
Date _____	Work Location _____

Important Job Tasks

1. Describe your job in terms of what you do.
2. How do you do your job? Do you use special tools, equipment, or other sources of aid? If so, list the names of the principal tools, equipment, or sources of aid you use.
3. Of the major tasks in your job, how much time does it take to do each one? How often do you perform each task in a day, week, or month?

Work-Related Characteristics Required

What does it take to perform each task in terms of the following:

1. Knowledge required
 - a. What subject matter areas are covered by each task?
 - b. What facts or principles must you have an acquaintance with or understand in these subject matter areas?
 - c. Describe the level, degree, and breadth of knowledge required in these areas or subjects.
2. Skills required
 - a. What activities must you perform with ease and precision?
 - b. What are the manual skills that are required to operate machines, vehicles, and equipment, or to use tools?
3. Abilities required
 - a. What is the nature and level of language ability, written or oral, required of you on the job? Are complex oral or written ideas involved in performing the task, or do you use simple instructional materials?
 - b. What mathematical ability must you have?
 - c. What reasoning or problem-solving ability must you have?
 - d. What instructions must you follow? Are they simple, detailed, involved, abstract?
 - e. What interpersonal abilities are required? What supervisory or managing abilities are required?
 - f. What physical abilities such as strength, coordination, or visual acuity must you have?

Physical Activities

Describe the frequency and degree to which you are engaged in such activities as pulling, pushing, throwing, carrying, kneeling, sitting, running, crawling, reaching, climbing.

Environmental Conditions

Describe the frequency and degree to which you will encounter working conditions such as these: cramped quarters, moving objects, vibration, inadequate ventilation.

FIGURE 3.3 An Example of a Job Analysis Interview Schedule for Use with a Job Incumbent (continued)**Typical Working Incidents**

Describe the frequency and degree to which you do the following:

1. Work in situations involving interpretation of feelings, ideas, or facts in terms of personal viewpoint.
2. Influence people in their opinions, attitudes, or judgments about ideas or things.
3. Work with people beyond giving and receiving instructions.
4. Perform repetitive work, or continuously perform the same work.
5. Perform under stress when confronted with emergency, critical, unusual, or dangerous situations or situations in which work speed and sustained attention are make-or-break aspects of the job.
6. Perform a variety of duties, often changing from one task to another of a different nature, without loss of efficiency or composure.
7. Work under hazardous conditions that may result in violence, loss of body parts, burns, bruises, cuts, impairment of the senses, collapse, fractures, or electric shock.

Records and Reports

What records or reports do you prepare as part of your job?

Source of Job Information

What is the principal source for instructions you receive on how to do your job (for example, oral directions or written specifications)?

Supervisory Responsibilities

1. How many employees are directly under your supervision?
2. Do you have full authority to assign work; correct and discipline; and recommend pay increases, transfers, promotions, and discharge for these employees?

Other

Are there any additional elements about your job that would help me better understand what you do? If so, please describe them.

An Example

An approach adopted by the U.S. Office of Personnel Management is one possibility when a job analysis interview is used.²¹ The key initial step in characterizing a job with this interview procedure is identification of critical job tasks. Once identified, each task is described in terms of factors, such as WRCs required for task performance and environmental conditions surrounding task performance. Because of the task's importance to the interview method, we will review how job tasks are analyzed and structured with this method. After all, WRCs ultimately are developed from the task statement.

Task statements are written so that each shows the following:

1. What the worker does, by using a specific action verb that introduces the task statement
2. To whom or what he or she does it, by stating the object of the verb
3. What is produced, by expressing the expected output of the action
4. What materials, tools, procedures, or equipment are used²²

Using these task characteristics, let's see how they are applied in an actual interview context for the purpose of developing appropriate task statements.

Suppose, for example, an analyst is reviewing the job of welfare eligibility examiner

in a state human services agency. Assume further that background and supplementary data have been obtained from a job incumbent. The interviewer asks each respondent to describe their job in terms of what is done—and how, for what purpose, and using what equipment or tools. The interviewee then describes the job as follows:

I interview applicants for food stamps—ask the applicants all the pertinent questions that will help to determine their eligibility. For example, are they working part time, receiving other assistance, and so on. To carry out the job, I have to interpret regulations, policies, and actually make decisions about eligibility. Some applicants are referred to other assistance units. Some applicants need detailed explanations of policies at a level they can understand, to avoid an unpleasant reaction over a decision. They also get advice about their appeal rights from me. I visit homes to evaluate a client's circumstances and make determinations. I verify what the client has said on the application: household composition, shelter arrangements, income, and so on. This helps me determine whether the food stamp costs have been determined correctly or incorrectly.

At times, I work in outreach centers and homes of applicants to make determinations. I make personal appearances at high schools, colleges, and civic organizations to outline and explain the food stamp program.²³

Following these comments, the analyst uses the task statement criteria listed earlier to produce task statements representing important task activities. Table 3.1 summarizes the classification of content for one important task. Once classified, the content is rewritten to produce an easy-to-read, understandable statement. The goal of the rewriting process is to produce task statements that people unfamiliar with the job will understand. For example, the task content classified in Table 3.1 is rewritten as follows:

1. Asks client questions, listens, and records answers on standard eligibility form, using knowledge of interviewing techniques and eligibility criteria to gather information from which client's eligibility for food stamps can be determined.²⁴

If the analyst follows through with the process just described, 10 to 20 important task statements typically are identified. From the interviewee description given earlier, additional tasks might include the following:

2. Determines eligibility of applicant (using regulatory policies as a guide) to complete client's application for food stamps.
3. Decides on and describes other agencies available to assist and refer client to appropriate community resources using worker's knowledge of resources available and knowledge of client's needs.
4. Explains policies and regulations appropriate to applicant's case to inform applicants of their status.

TABLE 3.1 Classification of Interview Content for the Purpose of Developing a Task Statement

Performs What Action? (Verb)	To Whom or What? (Object or Verb)	To Produce What? (Expected Outcome)	Using What Tools, Equipment, Work Aids, Processes?
Asks questions, listens, records answers	To / of client on eligibility form	In order to determine eligibility	Eligibility form; eligibility criteria in manual; interviewing techniques

Source: U.S. Civil Service Commission, *Job Analysis: Developing and Documenting Data* (Washington, DC: U.S. Government Printing Office, 1973), p. 6.

5. Evaluates information gained from home visit, interview, and observation to decide whether home conditions are consistent with original application, using original application and agency's housing standards as a guide.
6. Meets with, talks to, answers the questions of, and has discussions with members of high schools, colleges, and civic organizations to outline and explain food stamp program using knowledge and experience of food stamp program.²⁵

After capturing the important job tasks, the analyst then characterizes each statement with regard to frequency of performance, WRCs required, physical activities required, environmental conditions, and other factors important to task performance.

Questions such as those in the sample interview schedule shown in Figure 3.3 help make these determinations for each task. An illustration may help clarify the task characterization process. For the moment, reexamine the second task identified in the study of welfare eligibility examiner. The task was stated as follows: "Determines eligibility of applicant (using regulatory policies as a guide) to complete client's application for food stamps." Figure 3.4 shows a description of the task using the interview schedule. In addition to those characteristics illustrated in Figure 3.4, additional task data, such as ratings of task importance or task frequency, also are obtained. Job incumbents make ratings, using rating scales, to further describe the job task. (We discuss such scales later in the chapter.) This same process proceeds for each task statement. In the end, we should have a clearer picture of the job's demands, activities, and conditions of employment.

The success of the interview as a job analysis technique depends, to a large extent, on the skill of the interviewer. A successful interviewer must possess several important skills—the ability to listen, put individuals at ease, probe and prompt for answers from reluctant interviewees, and control the direction of an interview—all vital to a successful job analysis.²⁶ With such skills, an interviewer can tease out job information that might go undetected by other forms of analysis. To enhance the likelihood of success in using the technique, certain guidelines need to be followed. Suggestions for improving the chance of success in using job analysis interviews are in Figure 3.5.

FIGURE 3.4 Example Characterization of a Selected Job Task: The Job of Welfare Eligibility Examiner

Task 2: Determines eligibility of applicant (use regulatory policies as a guide) in order to complete client's application for food stamps.

Task Characterization**Knowledge Required**

1. Knowledge of content and meaning of items on standard application form
2. Knowledge of Social-Health Services food stamp regulatory policies
3. Knowledge of statutes relating to Social-Health Services food stamp program

Skills Required

None

Abilities Required

1. Ability to read and understand complex instructions such as regulatory policies
2. Ability to read and understand a variety of procedural instructions, written and oral, and convert these to proper actions
3. Ability to use simple arithmetic—addition and subtraction
4. Ability to translate requirements into language appropriate to laypersons

Physical Activities

Sedentary

Environmental Conditions

None

Typical Working Incidents

Working with people beyond giving and receiving instructions

Interest Areas

1. Communication of data
2. Business contact with people
3. Working for the (presumed) good of people

Source: U.S. Civil Service Commission, *Job Analysis: Developing and Documenting Data* (Washington, DC: U.S. Government Printing Office, 1973), pp. 13-14.

Limitations of the Job Analysis Interview

The job analysis interview is one option for collecting job data; however, it has its limitations. The interview often suffers from a lack of standardization and has limited possibilities for covering large numbers of respondents, particularly if they are spread over a wide geographic area. If thorough documentation is missing as the interview is conducted, important legal requirements of job analysis information likely will go unmet. The skills and procedures used by the individual analyst principally determine the utility of the interview.

In addition, the job analysis interview has other limitations. Unless group interviews are possible, the technique requires a great deal of time and labor and is not cost efficient if many jobs need to be studied or job incumbents and supervisors interviewed.

FIGURE 3.5 Guidelines for Conducting a Job Analysis Interview**Opening the Interview**

1. Put the worker at ease by learning his or her name in advance, introducing yourself, and discussing general and pleasant topics long enough to establish rapport. Be at ease.
2. Make the purpose of the interview clear by explaining why the interview was scheduled, what is expected to be accomplished, and how the worker's cooperation will help in the production of tools for use in personnel selection.
3. Encourage the worker to talk by always being courteous and showing a sincere interest in what he or she says.

Steering the Interview

1. Help the worker to think and talk according to the logical sequence of the duties performed. If duties are not performed in a regular order, ask the worker to describe the functional aspects of the duties by taking the most important activity first, the second-most important next, and so forth. Request the worker to describe the infrequent duties of his or her job—duties that are not part of the worker's regular activities, such as the occasional setup of a machine, occasional repairs, or infrequent reports.
2. Allow the worker sufficient time to answer each question and to formulate an answer.
3. Phrase questions carefully, so that the answers will be more than "yes" or "no."
4. Avoid the use of leading questions.
5. Conduct the interview in plain, easily understood language.
6. Control the interview with respect to the economic use of time and adherence to subject matter. For example, when the interviewee strays from the subject, a good technique for bringing him or her back to the point is to summarize the data collected up to that point.

Closing the Interview

1. Summarize the information obtained from the worker, indicating the major duties performed and the details concerning each of the duties.
2. Close the interview on a friendly note.

Miscellaneous Dos and Don'ts for Interviews

1. Do not take issue with the worker's statements.
2. Do not show any partiality to grievances or conflicts concerning the employer-employee relations.
3. Do not show any interest in the wage classification of the job.
4. Do not talk down to the worker.
5. Do not permit yourself to be influenced by your personal likes and dislikes.
6. Be impersonal. Do not be critical or attempt to suggest any changes or improvements in the organization or methods of work.
7. Talk to the worker only with permission of her or his supervisor.
8. Verify completed job analysis interview with an appropriate individual—such as a supervisor.

Source: U.S. Civil Service Commission, *Job Analysis: Developing and Documenting Data* (Washington, DC: U.S. Government Printing Office, 1973), pp. 12-13.

Depending on the interviewee and the type of job reviewed, an interviewer may have to track through an entire job in specific detail. Such a process not only is expensive but also requires a highly skilled interviewer to build rapport, develop trust, and maintain respondents' motivation to identify the needed content.

Another major problem is that the technique may be plagued with a distortion of information. If interviewees believe conveying certain information is beneficial for them (for example, a perceived wage increase), they may exaggerate their activities and responsibilities to reflect a more complex job. Sometimes, it is difficult to identify

distorted job information. Verification from a supervisor or other incumbents can serve as a check. Comparisons among subjective data, however, are difficult and expensive to make.

JOB ANALYSIS QUESTIONNAIRES

Description

The job analysis questionnaire or survey is one way to handle some of the problems of the job analysis interview. This method consists of a questionnaire distributed to respondents through various means—in person, by a job analyst, by mail, or via an e-mail sent to participants, including a link to the questionnaire online. The questionnaire lists job information, such as activities or tasks, tools and equipment used to perform the job, working conditions in which the job is performed, and WRCs incumbents must possess to perform the job successfully. Participants make some form of judgment about job information presented on the questionnaire. Respondents often use a rating scale to indicate the degree to which various aspects of job information listed on the questionnaire apply to their jobs.

Numerous forms of job analysis questionnaires are available, but most fall into one of two classes: (a) *tailored* questionnaires developed for a specific purpose or a specific job, or (b) *prefabricated* or existing questionnaires. An organization (or its consultants) typically prepares tailored job analysis questionnaires for application to a specific job. Like prefabricated instruments, these questionnaires also include tasks or other aspects of jobs (for example, WRCs) about which respondents make judgments. Because the focus of tailored questionnaires is usually on one job, the aspects of the job listed on the questionnaire are more specific than job aspects given on an existing measure.

Prefabricated questionnaires are usually generic measures developed for use with a variety of jobs. These inventories usually consist of a preestablished set of items describing aspects of a job that respondents (incumbents, supervisors, observers) judge using rating scales. Frequently, the aspects of a job that respondents rate deal with job activities or functions performed. Because these questionnaires are already developed, knowledgeable users can take them “off-the-shelf” and apply them. Here are some examples of prefabricated job analysis questionnaires:

1. *Common Metric Questionnaire*²⁷ (www.cmqonline.com)
2. *Professional and Managerial Position Questionnaire*²⁸
3. *Management Position Description Questionnaire*²⁹
4. *Managerial and Professional Job Functions Inventory*³⁰ (www.creativeorgdesign.com)
5. *Position Analysis Questionnaire*³¹ (www.paq.com)
6. *Threshold Traits Analysis System*³² (www.flopez-associates.com)

7. Occupation Analysis Inventory³³

8. Personality-Related Position Requirements Form³⁴

We turn our attention now to one popular type of tailored job analysis questionnaire employed in HR selection, the task analysis inventory.

The Task Analysis Inventory

A task analysis inventory is a questionnaire or survey that includes a listing of job tasks on which respondents make some form of judgment. Usually these judgments are ratings given by respondents using a task rating scale, such as frequency of task performance.

Because many different tasks exist in any job, this type of job analysis questionnaire usually concerns only one job or a class of very similar jobs. Most often, job incumbents complete a task analysis inventory. Supervisors can complete it—assuming they have current knowledge about the job studied.

Historically, the method has been widely used in military settings, in particular by the U.S. Air Force.³⁵ Although the origin of task inventories is traceable to the military, their use for selection purposes by both public and private employers has grown substantially. One reason for increasing use of these inventories is that many employers have adopted a content validation strategy for selection measures, for which task inventories are particularly helpful.

The Nature of Task Inventories

A **task inventory** often contains three major categories of information: (a) background information on respondents, (b) a listing of job tasks with associated rating scales, and (c) other or miscellaneous information. Background information on respondents such as name, gender, ethnicity, tenure on the job rated, tenure with the employing organization, job location, work shift, and title of the job rated compose the task inventory. Identifying information is useful should the need arise to contact respondents (for example, for clarifying responses), and demographic information is valuable for performing analyses—such as a comparison of how different types of respondents view the job rated. In addition, respondent demographic information is important in dealing with any legal questions that arise about a job regarding who served as SMEs. With rater demographic information, it is possible to show that respondents to the task inventory are representative of minority or other protected groups or that the respondents have the necessary qualifications to serve as SMEs. The second part of a task analysis inventory includes the job tasks and their rating scales. Figure 3.6 presents a condensed example of this portion of a task analysis inventory.

The inventory shown analyzes various tasks associated with the job of personnel analyst. Because most inventories are similar to the one exhibited, we use it to point out two important characteristics: (a) *phrasing of tasks* rated and (b) using *rating scales* for judging the tasks.

task inventory

Questionnaire used by respondents to rate their tasks performed on a job.

FIGURE 3.6 A Condensed Example of a Task Analysis Inventory for the Job of Personnel Analyst

Directions: We are interested in knowing more about your job. Below we have listed a number of tasks you might perform on your job. Using the rating scales given below, rate each task as to (a) how frequently you perform it and (b) how important it is for newly hired workers in a job like yours to be able to perform this task when they first begin work. Read each task and then place your rating in the two spaces to the right of each task.

Frequency of Performance	Importance for Newly Hired Employees	
0 = Not performed at all	0 = Not important at all	
1 = Seldom	1 = Somewhat important	
2 = Occasionally	2 = Important	
3 = Frequently	3 = Very Important	
4 = Almost all of the time	4 = Extremely Important	
<hr/>		
Job Tasks	Frequency of Performance	Importance for Newly Hired Employees
1. Prepare job descriptions for secretarial jobs	<input type="checkbox"/>	<input type="checkbox"/>
2. Check file folders for disposition of medical and dental records	<input type="checkbox"/>	<input type="checkbox"/>
3. Initiate requests for identification cards from terminated personnel	<input type="checkbox"/>	<input type="checkbox"/>
4. Describe company policies to newly hired employees	<input type="checkbox"/>	<input type="checkbox"/>
5. Write computer programs using SPSS in order to analyze personnel absenteeism and turnover data	<input type="checkbox"/>	<input type="checkbox"/>
•	•	•
•	•	•
•	•	•
105. Plan and develop training programs for newly hired clerical personnel	<input type="checkbox"/>	<input type="checkbox"/>

First, we see that respondents make judgments regarding job tasks. If we compare the phrasing of the tasks shown in Figure 3.6 with those developed by the Office of Personnel Management interview procedure discussed earlier, we find that the two sets of tasks differ. From our comparison, we see that the task statements developed previously appear to be more complex. Tasks identified under the interview procedure described what the tasks consisted of, materials and equipment used in task performance, and the results of those tasks. In contrast, in our task inventory example, the tasks are not as fully developed. Most statements on a task analysis inventory are concerned with *what* gets done. Numerous tasks (more than 50 tasks is not unusual) listed on some inventories provide no information about the situation surrounding the activity. Tasks developed by other job analysis methods (for example, the Office of Personnel Management interview) usually provide information on what, how, and why and typically are fewer in number than tasks listed on a task analysis inventory.

Some task analysis inventories, however, incorporate on the survey the kinds of detailed task statements we saw with the Office of Personnel Management inter-

view procedure. Because of the detail provided in these statements, inventories with detailed statements can be particularly helpful in selection applications. For instance, they are useful in planning and developing the actual content of specific selection procedures, such as in work sample tests or knowledge tests.

Another important characteristic of any task inventory is the *rating scale* used by the respondent for judging the given tasks. A rating scale provides a continuum or range of options (most often consisting of five to seven steps) that respondents use to express their perceptions of a task. Numbers define various degrees of respondents' views. For example, *Relative Time Spent on Task Performance* is one example task rating scale³⁶ and looks as follows:

Relative to the time you spend in your job doing other tasks, how much time do you spend on this job task?

0 = This task is not performed

4 = About average

1 = Much below average

5 = Slightly above average

2 = Below average

6 = Above average

3 = Slightly below average

7 = Much above average

This illustration is just one way of phrasing the rating scale for time spent on task performance. Other variations of the scale are possible. Regardless of the rating scale, the objective is to identify the degree to which a task is viewed as possessing a rated characteristic.

Quite often, respondents use more than one rating scale to assess job tasks. Some task analysis inventories used for selection purposes contain as many as 3 to 5 different rating scales. The scales chosen depend on any number of issues, such as the number of tasks rated, the time available, the capabilities of incumbents (for example, reading ability), the complexity of the job (the more complex, the more scales needed to assess the job adequately), and the purpose of the task analysis. For example, the following task-rating categories are important to consider when undertaking a content validation strategy (see Chapter 8):

1. Frequency of task performance
2. Task importance or criticality
3. Task difficulty
4. Whether the task can be learned on the job relatively quickly³⁷

The third portion of the task inventory may focus on parts of the job, other than tasks, that also account for work performance. For instance, this last section sometimes assesses factors like the physical working conditions of the job (degree of heating and cooling; presence of dust or other allergens, amount of lifting, standing, sitting, walking, and so on; degree of job stress; or equipment and tools used for performing the job).

Development of Task Inventories

Because many task inventories involve a specific job, the user will likely have to develop the inventory. This process is time-consuming and often expensive. Access to previous inventories or analyses of the job in question—as well as use of technical experts in job analysis and questionnaire development—are important determinants of the cost and success of the method. For those organizations committed to the development and administration of a task inventory, a number of steps are needed.³⁸ Table 3.2 shows some of the major steps and guidelines for developing task inventories. Basically, task inventory development follows a sequential fashion such as that one outlined in the

TABLE 3.2 Summary of Steps and Guidelines for Developing Task Analysis Inventories

Sequential Steps for Developing Content of Task Inventories

1. Technical manuals, previous job analyses, and other job-related reports are reviewed for possible task-item content.
2. Technical job experts (consultants, selected incumbents/supervisors) prepare lists of job tasks known to be performed.
3. Interviews are held with job incumbents and supervisors in order to identify additional tasks.
4. Tasks identified are reviewed for duplication, edited, and incorporated into an initial version of the inventory. Tasks are described according to task-writing guidelines.
5. First draft is prepared and submitted to a panel of experts (or incumbents and/or supervisors) for review.
6. Panel of reviewers adds, deletes, or modifies tasks for the development of another draft of the inventory.
7. Steps 5 and 6 are repeated, using the same or a similar panel, until an acceptable draft has been developed.
8. Task inventory is then pilot-tested on a sample of respondents to whom the final version will be given.
9. Appropriate modifications are made as needed.
10. Steps 8 and 9 are repeated until a final, acceptable version is developed.

Guidelines for Writing Task Statements

When task statements are identified, they should:

1. Characterize activities, not skills or knowledge.
2. Have an identifiable beginning and ending.
3. Represent activities performed by an individual worker, not activities performed by different individuals.
4. Have an identifiable output or consequence.
5. Avoid extremes in the phrasing of activities; statements should not be too broad or too specific.
6. Be developed by full-time inventory writers (preferably); supervisors/incumbents should serve as technical advisers.

When task statements are written, they should:

1. Mean the same thing to all respondents.
2. Be stated so that the rating scale to be used makes sense.
example "(I) number all card boxes."
3. Be stated so that the incumbent is understood to be the subject of the statement. The pronoun "I" should be implied. For example "I" number all card boxes."
4. Be stated so that an action verb is in the present tense.
5. Be stated so that the action verb has an object.
6. Use terms that are specific, familiar, and unambiguous.

Source: Based on Ernest J. McCormick, "Job Information: Its Development and Applications," *ASPA Handbook of Personnel and Industrial Relations*, eds. Dale Yoder and Herbert G. Heneman (Washington, DC: BNA, 1979), 4–66; and Joseph E. Morsch and Wayne B. Archer, *Procedural Guide for Conducting Occupational Surveys in the United States Air Force (PRL-TR-67-11, AD-664 036)* (Lackland Air Force Base, TX: Personnel Research Laboratory, Aerospace Medical Division, 1967), 8–11.

table. There is no one best way. However, suggestions like those mentioned increase the chances that the resulting questionnaire will meet its purposes and objectives.

Once developed, the inventory is ready for application. In using task analysis inventories, consider several issues. First, include respondents' names and other identifying information on the inventory. Using identifying information (a) helps ensure higher quality information, (b) is necessary if follow-up studies occur, and (c) is useful when combined with personnel file data (such as respondents' scores on performance measures and demographic characteristics). Second, distribute the inventory to a large number of representative job incumbents, which generally improves generalizability and data reliability. Finally, when possible, use optical scanning sheets to minimize time, cost, and errors in coding and data entry. In some cases, it is possible to administer the inventories by accessing the Internet.

Application of Task Analysis in Selection

Results of a task analysis inventory define the most important tasks or activities that compose incumbents' jobs. This core group of job tasks is the basis for inferring employee characteristics needed to perform the job successfully. Because jobs we are interested in studying are quite likely complex, lists of task statements and accompanying rating scales are one of the principal means used for assessing job tasks. Once collected, subsequent statistical analyses of the rating data help identify the most important or most critical aspects of the job.

To identify important job tasks, any of several statistical techniques are useful for rating data.³⁹ In many cases, these techniques involve calculating simple descriptive statistics (such as means, standard deviations, and percentages) and applying predetermined decision rules for defining critical job tasks. Let's look at a simple example: Assume for a moment that we have given a task analysis inventory to a large sample of bank clerks. Among other judgments, the clerks used a seven-point rating scale (1 = Of No Importance to 7 = Of Major Importance) to judge each task. Data analyses provided descriptive information on the ratings. We use two of the rated tasks to illustrate our point. Figure 3.7 shows the two example tasks and some associated descriptive statistics computed on the task ratings.

FIGURE 3.7 Example Task Statements and Associated Descriptive Statistics Used in Identifying Important Job Tasks

Task Statement	Mean Importance*	Standard Deviation	% Employees Performing Task
9. Use basic arithmetic to add, subtract, divide, and multiply monetary amounts with decimals	6.74	0.68	99.2
•	•	•	•
•	•	•	•
•	•	•	•
67. Recommend to customers investment account options for investing savings	1.21	1.56	8.9

*The ratings of task importance were made using a rating scale ranging from 0 = Of No Importance to 7 = Of Major Importance.

In deciding which tasks are important to the job, we employed some minimum statistical criteria to define a critical job task. We set the following (in this example, arbitrary) cutoff points:

1. A task must receive a mean rating of 4.00 or higher (the higher the mean, the more important the task).
2. A task rating must have a standard deviation of 1.00 or lower (the lower the standard deviation, the higher the degree of agreement among employees in their task ratings).
3. Most employees (75 percent or more) must perform the task.

Using these standards, we choose Task 9 and omit Task 67 (see Figure 3.7). The task, "Use basic arithmetic to add, subtract, divide, and multiply monetary figures with decimals" is one among other tasks that pass our evaluation criteria. These are the most important tasks that compose the job. Inferences concerning the content of selection measures come from the pool of tasks derived from application of these criteria to the task ratings.

As we pointed out earlier, raters judging job tasks often employ several different rating scales. When multiple rating scales are used, some researchers simply sum all of the rating scores for each task.⁴⁰ As in our previous example, the results of these arithmetic procedures determine task importance. Others use the individual rating screens in a multiple-hurdle fashion. That is, a task must pass each sequential screen to be an important task.

Whatever the analyses used, the most important tasks are the basis on which inferences regarding the content of our selection procedures rest. The major idea behind the application of task analysis inventories is to define *important* job content. That determination serves as the source for WRCs used to develop or find selection procedures for choosing among job applicants. In addition, the defined job content serves as one basis for applying specific validation strategies such as content or criterion-related validity (see Chapter 8).

Advantages and Disadvantages of Task Analysis

Any job analysis technique will have unique assets and limitations; task analysis is no different. On the positive side, task inventories offer an efficient means for collecting data from large numbers of incumbents in geographically dispersed locations. Additionally, task inventories lend themselves to quantifying job analysis data. Quantitative data are most valuable in analyzing jobs and determining core job requirements.

Development of task inventories is time-consuming and somewhat expensive. Motivation problems often become significant when inventories are long or complex. Ambiguities and questions that arise during administration of the inventory may go unanswered, whereas in a method such as the interview, problems can be resolved as they come up. As these difficulties multiply, one can expect respondents to become less cooperative, with a concomitant decline in the quality of data collected.⁴¹

With regard to data quality, a problem that can plague the use of task inventories, as well as other job analysis methods involving respondents who voluntarily participate, is respondent representativeness of the desired employee population. When actual respondents to a job analysis survey are not representative of the desired employee population (for example, in terms of work shift, gender, race, age), the results may not be generalizable. Potential for bias in job analysis studies can undermine job analysis results and content of selection procedures. Obviously, any source of bias can lead to legal as well as practical concerns regarding the validity of selection procedure content. Specific steps often are taken to encourage participation in job analysis surveys—for example, requiring names on surveys and conducting follow-up contacts with nonrespondents.⁴²

CRITICAL INCIDENT TECHNIQUE

Description

Critical Incident Technique

Behavioral statements descriptive of good or poor work behaviors

The **Critical Incident Technique** involves the development of a series of behavioral statements developed by supervisors and other subject matter experts (SMEs), such as job incumbents. The SMEs develop these behavioral statements based on direct observation or memory, describing incidents of good and poor work behaviors. These statements are important because they describe those behaviors that differentiate successful from unsuccessful work performance. Critical incidents provide valuable information about important components of the job. These components serve as a basis for developing descriptive information about a job.

The Critical Incident Technique was originally developed to gather information to determine training needs and develop performance appraisal forms.⁴³ Application of the technique generates a list of especially good and especially poor examples of performance (incidents) that job incumbents exhibit. The object of the Critical Incident Technique is to gather information regarding specific behaviors that actually have been observed, not judgmental or trait-oriented descriptions of performance. These behaviors then are grouped into job dimensions. The final list of job dimensions and respective critical incidents provides a great deal of qualitative information about a job and the behaviors associated with job success or failure. The basic elements of information collected are job behaviors rather than personal traits. Each critical incident consists of (a) a description of a situation, (b) the effective or ineffective behavior performed by a job incumbent, and (c) the consequences of that behavior. The result of the Critical Incident Technique is a list of events for which employees performed tasks poorly or exceptionally well. A representative sample of all job tasks may not be in the list, but the range of incidents provides information from which performance dimensions and worker specifications can be inferred.

Application of Critical Incidents

The Critical Incident Technique can serve a variety of selection purposes. Here, we examine the use of the technique to generate a list of job-related behaviors from which inferences are based regarding worker specifications. Job information collected from critical incidents is helpful in developing the content of task analysis surveys. In addition, critical incidents are particularly helpful in developing selection procedure content, such as situational interviews, behavioral description interviews, assessment center tasks, and situational judgment tests.⁴⁴ Information derived from critical incidents also facilitate the development of content comprising employee performance evaluations that often serve as measures of job success. Implementing the method involves the following steps:

1. *Selecting the Method for Critical Incidents Collection.* Job analysts work with SMEs to facilitate the SMEs' generation of critical incidents (a) in a group setting, (b) in individual interviews, or (c) by completing a questionnaire. The most efficient method of gathering critical incidents is by working with a group of SMEs. The SMEs write as many critical incidents as they can. This approach entails less time for the participants, and upon discussion, participants can help jog each other's memories and subsequently generate a greater number of critical incidents.

At times, it is not possible to gather the information in a group setting. For example, participants may not be skilled at writing. In this case, individual or group interviews are held, and incidents are recorded as the SMEs remember them. Individual interviews take place when the information is confidential, embarrassing, or not appropriate in a group setting. In addition, if the SMEs are managers or executives, it is often difficult to find a common time to meet as a group. The final incident-collection method, the questionnaire, is only applicable with individuals skilled at expressing themselves in writing and interested in participating in the process. Otherwise, the resulting critical incidents obtained may be insufficient in content and number.

2. *Selecting a Panel of Job Experts.* The Critical Incident Technique is applied by a job analyst working with SMEs. With this particular procedure, it is important to think carefully about the job experts chosen to participate in the process. Job incumbents and supervisors likely will provide different types of information. Individuals should include those who have had the opportunity to observe others' performance on the job. Normally, this would include supervisors and job incumbents who have been in the position for some time (four to five years).⁴⁵
3. *Gathering Critical Incidents.* Use of a structured format for generating critical incident statements is best whether an interview or a questionnaire is being conducted. Job experts are asked to recall actions workers have taken while performing the job that illustrates unusually effective or ineffective performance. Then,

job experts write statements describing effective and ineffective performance that meet the following four characteristics of a well-written critical incident:

- a. It is specific (a single behavior).
- b. It focuses on observable behaviors that have been, or could be, exhibited on the job.
- c. It briefly describes the context in which the behavior occurred.
- d. It indicates the consequences of the behavior.⁴⁶

A resulting critical incident should be detailed enough to convey the same image of performance to at least two individuals who are knowledgeable about the job. The following is an example of a critical incident for a supervisory job:

A disposal company was picking up nontoxic waste. The order ticket was in error and read that the waste was toxic and to be disposed in a manner only suitable for nontoxic waste. The supervisor signed the disposal order without taking time to read it. As a consequence, the Environmental Protection Agency fined the company \$5,000 for improper disposal of waste.

In this incident, the supervisor exhibits only one critical behavior: *signing the disposal ticket without reading it*. It is an observable behavior that could be exhibited on the job. It is also phrased in behavioral terms, not in reference to any personal traits of the supervisor (for example, careless, lacks attention to detail, hasty, trusting). There is enough detail for the reader to understand the situation, and the consequences of this behavior are clear.

4. *Rating and Classifying Critical Incidents into Job Dimensions.* Ratings of the developed incidents are typically made by SMEs. The goal of the ratings is to identify those behaviors most relevant in differentiating among behaviors leading to job success or failure. Those incidents passing various rating screens are sorted into job dimensions. Judges analyzing the content of the critical incidents and identifying common themes among the incidents determine the job dimensions. One way to do this is to write each critical incident on a separate card. A judge sorts these cards into piles representing common themes. The sorting continues until all incidents are in piles and all piles are of a reasonable size. (Piles too big may be representative of more than one theme, and those with only one or two incidents may not really be a theme.) After sorting the incidents by theme, each theme is given a label that names the dimension. To help establish confidence in clustering incidents into dimensions, another group of job experts re-sorts the incidents into the dimensions. If there is not agreement about the dimension to which a critical incident belongs, it is prudent to drop that critical incident.

Advantages and Disadvantages of Critical Incidents

The Critical Incident Technique clearly results in a great deal of interesting, specific, job-related information. This information is behavioral in nature, not trait based. The described behaviors are “critical” incidents, so the information most likely represents important aspects of the job. On the other hand, it is not clear that the incidents reported represent the *full scope* of the job.⁴⁷ The process is labor intensive, and results often are situation specific. Considerable effort is required for each new endeavor, as it is doubtful that the information is transferrable from one setting to another. These disadvantages raise the question: Is the Critical Incident Technique really worth the time it requires as a result of the limited focus on a job it may have? If one is interested in behavioral data, the incidents certainly provide such data. But, how can one expand the focus of the technique to, perhaps, uncover aspects of the job that might have been overlooked by a select sample of SMEs?

In the following section, we suggest an option to consider. We intermix two job analysis methods (the Task Analysis Inventory along with the Critical Incidents Technique) to leverage the assets of both methods while limiting, to a degree, some of the disadvantages of each.

Integrating a Task Analysis Inventory with Critical Incidents: A Suggestion

Figure 3.8 illustrates the results of a hybrid form of the Critical Incident Technique used to develop one job-related, selection interview question with an associated scoring key. Additional interview questions would be developed similarly. We will return to this example shortly.

As we have seen, use of the Critical Incident Technique is time and labor intensive. Moreover, because subject matter experts have free reign in incident development, there is a possibility that coverage of important aspects or dimensions of the job might be overlooked depending on the sample (for example, size, representativeness) of SMEs participating. However, critical incidents do translate into behavioral data, which are useful in developing selection procedures, such as an employment interview. In contrast, a task analysis inventory offers the possibility of wider coverage of the job domain. Importantly, once defined, the job domain facilitates identification of WRCs required for performance of the important job tasks. (In the next section of this chapter, we explain how important job tasks facilitate identification of essential WRCs.)

Our suggestion involves integrating the Task Analysis Inventory with the Critical Incidents Technique. We suggest our hybrid version of Critical Incidents might save WRCs into behaviors that are measurable by selection procedures. For instance, this approach is particularly appropriate when developing behaviorally oriented selection interviews or situational judgment tests.

Below, we summarize the basic steps involved. We present these steps in the context of the example shown in Figure 3.8. Before we walk you through the general process, it might be helpful to understand the organizational context we are using. In this example, a state public assistance agency has the responsibility of delivering prompt services to citizens eligible for and needing public assistance. The agency has been having problems with their clerical personnel who come into daily contact with these citizens in giving appropriate and timely service to deserving clients. The agency wants to add a behaviorally oriented selection interview to its battery of selection procedures to see whether they can improve on this personnel problem. Listed below are the steps involved in developing the interview:

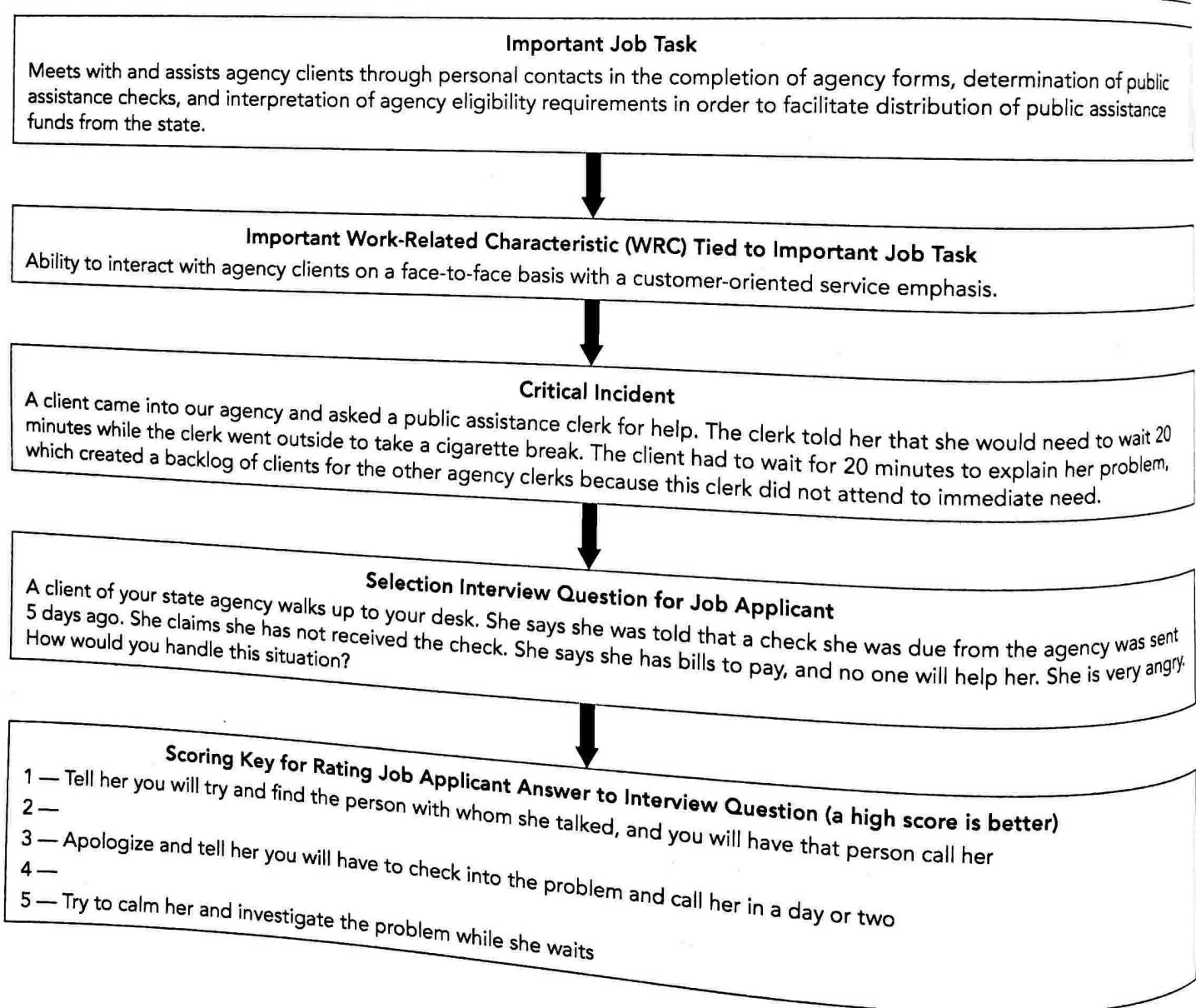
1. *Identify Important Job Tasks.* Initially, employees and knowledgeable supervisors complete a task analysis inventory. As we explained earlier, participants rate the tasks on a series of rating scales. In turn, data from the ratings determine the critical job tasks. In Figure 3.8, we have listed one critical job task that resulted from the analysis.
2. *Identify Important WRCs.* In the next section of Figure 3.8, WRCs flow from critical job tasks. SMEs identify these WRCs and, like job tasks, they use rating scales to judge WRC importance. Analyses of these ratings help identify WRCs required for successfully performing the critical job tasks.
3. *Show Critical Job Task and WRC Information to SMEs.* At this point, SMEs review the identified critical tasks and essential WRCs. They use this information as stimuli for writing critical incidents using the guidelines we discussed earlier concerning the Critical Incident Technique. The one critical incident written in the present case is shown next in Figure 3.8.
4. *Rewrite the Critical Incident into a Selection Interview Question.* Then, using a bit of literary license (creative writing), the critical incident is rewritten in the form of an interview question. This is one strong point of critical incidents: They lend themselves to defining critical WRCs linked to critical job tasks in terms of behaviors. Perhaps, the most difficult part is writing the narrative of the interview question so that the desired response is not transparent.
5. *Develop a Key for Scoring Responses to the Interview Question.* SMEs use their expertise to develop a scale for rating applicant responses to the interview question. Initially, they generate a range of behaviors that are representative of the range of responses to the interview question. Once a response pool is identified, they independently rate these response behaviors on a rating scale where the poorest behavioral response = 1 and the best response = 5. Using means and standard deviations of the ratings, a behavioral response description is assigned to the points along the scoring key. Alternatively, supervisors serving as SMEs also might scale the behaviors in terms of those least to those most desired in a public assistance clerk. Notice in Figure 3.8, we have blank spaces for scores 2 and 4.

These spaces are for the interviewer to slot an applicant's answer that seems to fit in between the two defined response categories. Usually, a rating scale similar to the one shown in Figure 3.8 is sufficient. Notice that higher score points represent more desirable answers given by job applicants.

SME Workshops

The SME workshop, our final job analysis method, is not really a distinct job analysis method per se. Many different job analysis formats and methods, such as task analysis inventories and group interviews, lend themselves to SME workshops. Because of their use, particularly in content validation studies, we briefly outline how SME workshops produce job analysis data.

FIGURE 3.8 Use of a Critical Incident for Developing an Interview Question and Scoring Key for Selecting Public Assistance Clerks



Description

SME workshops consist of groups or panels of 10 to 20 job incumbents per workshop session who work with a group leader to produce a job analysis. Because participants have current knowledge of their job, they are referred to as SMEs.

Although there is no one particular format for conducting the workshops, the following general steps seem to characterize most workshops: (a) selecting and preparing SMEs to participate, (b) identifying and rating job tasks, and (c) identifying and rating employee specifications (WRCs) associated with these job tasks. When a content validation strategy is undertaken, a fourth step is added. The fourth step requires that the SMEs judge the relevance of a selection measure's content (for example, items on an employment test, or selection interview questions) to the content of the job. In carrying out these steps, questionnaires and group interviews often are used to collect relevant job data. The steps are as follows:

1. *Selecting and Preparing SMEs.* SME workshop panelists should possess several important characteristics—a willingness to participate in the workshop, a minimum period of tenure in the job, a position representative of the employees on the job under study, reading, writing, and speaking skills, and so forth. From a legal perspective, particular care is necessary in choosing SMEs who are representative of legally protected groups. Lack of employee representativeness on SME panels can undermine any job analysis study. Once SMEs are chosen, the panelists are oriented and trained in the workshop's purpose and procedures.

[Technical Note: SME panelists make importance ratings of both tasks and WRCs. Often, mean ratings (for example, SMEs' average ratings of the importance of a particular ability to performing a job) are calculated. Mean ratings, however, are subject to sampling error—that is, the error associated with data from a sample of individuals who are unrepresentative of the population. For example, assume for tasks and WRC ratings that the standard deviation equals roughly 1.0 ($SD = 1.0$). If 25 SMEs, using a 5-point rating scale gave a mean importance rating to a particular ability of 2.5, then the standard error of the mean rating is $1/(\sqrt{25}) = 0.20$. For 2 standard errors ($SD = 1.96$), the variation is approximately $2 \times 0.20 = 0.40$ around the estimated mean importance rating. Therefore, when possible, larger SME pools are preferable to reduce standard errors associated with SME judgments. In addition, standard errors should be considered when specifying minimum acceptable ratings for identifying critical job tasks and employee specifications or making job tasks and employee specifications' comparisons.⁴⁸ How large of a sample of SMEs is large enough? This answer depends on the number of employees in the position for which selection procedures are being developed and the confidence level the user wants to have. Table 3.3 provides some general guidance. For instance, if there are, say, 300 individuals in the position of bank teller, for one to have roughly 90 percent confidence in the results, then a sample size of approximately 75 participants is needed. Table 3.3 is a general guide. The actual numbers will depend on such variables as the number

TABLE 3.3 Approximate Numbers of Participants Needed in a Job Analysis for Various Numbers of Employees in a Position Analyzed

Number of Employees in Position Being Analyzed	Approximate Numbers of Participants Needed in a Job Analysis Study	
	80% Confidence	90% Confidence
20	15	17
50	22	32
100	30	50
200	35	65
300	38	75
500	40	80

Note: Because population standard deviations are unknown in each study being undertaken, the population proportion formula was used in estimating the numbers of participants needed (Dan Biddle, *Adverse Impact and Test Validation*, 52).

Source: Adapted from Dan Biddle, *Adverse Impact and Test Validation* (Burlington, VT: Gower Publishing Company, 2005), 32.

of employees present on a given day, whether key employees are available on a given day, and other factors. Most important, ensure that SME panels are representative of the workforce in terms of characteristics such as protected group characteristics (demographics), work performance, shifts, and job experience.⁴⁹ If not representative, some groups will require oversampling.]

2. *Identifying and Rating Job Tasks.* Following training, the workshop leader serves as a group facilitator. The facilitator solicits from the group descriptions of the major job tasks performed. The group describes these major activities, and the facilitator records their comments on a projection screen or large sheets of paper so that the entire group can read the written tasks. The goal is to prepare task statements to accurately capture a consensus of the group's descriptions. Once prepared, the task statements are assembled into a survey whose format is like that of a task analysis inventory. Then, panelists and other SMEs use rating scales to make judgments about the task statements listed in the booklet.
3. *Identifying and Rating WRCs.* Following a group process similar to that used for generating task statements, SMEs next identify the employee specifications, which we refer to as WRCs, necessary for successful work performance. Panelists judge these characteristics using rating scales. The purpose of these ratings is to identify the most essential WRCs required of those applying for the job.
4. *Judging Selection Measure—Job Content Relevance.* Whether or not to undertake this last step is determined by the purpose of the job analysis and the validation strategy being used. This step is essential in content validation. As we describe in Chapter 8, SMEs judge the relevance of selection procedure content to the content domain of the job studied. These ratings help to establish content validity of selection procedures.

INCORPORATING JOB ANALYSIS RESULTS IN SELECTION PROCEDURES: A COOKBOOK

To this point, we have explored the actual application of job analysis in terms of collecting job information through several job analysis methods. By this time you may be wondering: "How do we actually use our collected information to develop or choose selection procedures?" Take another look at Figure 3.1. In that figure, we showed that job analysis results determine the relevant WRCs needed for effective performance. These WRCs, in turn, serve as the basis for constructing (for example, developing questions for an employment interview) or choosing (for example, purchasing a commercially available clerical ability test) needed selection procedures. Here, we study the last two elements of Figure 3.1: (a) identifying important WRCs from job analysis data and (b) incorporating these important WRCs in our selection procedures. These two elements are key steps in implementing job analysis results for HR selection purposes.

IDENTIFYING EMPLOYEE WRCs

Filip Lievens and Juan Sanchez have suggested that in estimating employee specifications or WRCs, researchers use both *direct* and *indirect* methods.⁵⁰ *Indirect* methods involve using specific steps to break down large inferential leaps involved in deriving critical WRCs from job tasks. We described those inferential leaps in our earlier discussion of Figure 3.1. *Direct* methods of WRC identification require larger inferential leaps than indirect methods because SMEs simply rate the importance of WRCs listed on a survey for an entire job, not individual tasks. SMEs do not engage in the more manageable, step-by-step processes of indirect methods.

In Figure 3.1, we showed that inferences play an important role in identifying WRCs. The identified WRCs, however, are useful only if they are accurate and complete. If the inferences are wrong, our selection procedures will be useless for predicting work performance. We might as well flip a coin and say, "heads you're hired; tails you're not." Given current federal laws and executive orders, inappropriate selection procedures produce a situation ripe for charges of disparate impact against certain applicant groups, or one in which new employees are unqualified for the job. Both situations are unfair to employers and employees alike. Taking appropriate steps to ensure our inferences are accurate minimizes the probability of situations such as these arising. In this section, we address the inference problem by describing one approach to inferring WRCs to incorporate in our selection procedures.

The method we describe is an indirect procedure for WRC determination. The WRCs are (a) derived from task information and (b) make use of SMEs' judgments regarding important tasks and essential WRCs required for a job. Like most job analysis methods, specific steps are taken in collecting SMEs' opinions using surveys. The surveys, some composed of job tasks and others consisting of WRCs, are given to SMEs who judge these aspects of a job using rating scales. Figure 3.9 provides some example rating scales for judging tasks and WRCs that SMEs can use. Also shown in Figure 3.9

FIGURE 3.9 Examples of SME Rating Scales and Screens for Identifying Important Job Tasks and Essential WRCs

Job Tasks

Rating Scale: Do you perform this task?

- 1 = No
- 2 = Yes

Screen for Performance: At least 67 percent of SMEs must say "Yes," task is performed.

Rating Scale: How important is it that you perform this task successfully?

- 0 = Not Important
- 1 = Somewhat Important
- 2 = Important
- 3 = Essential
- 4 = Critical

Screen for Importance: Task must have an average importance rating of at least 2.0 or higher.

Rating Scale: Should a new employee, upon starting your job, be able to perform this task successfully?

- 1 = No
- 2 = Yes

Screen for New Employee Importance: At least 67 percent of SMEs must say "Yes," new employee must be able to perform upon starting job.

Work-Related Characteristics (WRCs)

Rating Scale: How important is this WRC in performing your job effectively?

- 0 = Not Important
- 1 = Somewhat Important
- 2 = Important
- 3 = Essential
- 4 = Critical

Screen for How Essential: WRC must have an average importance rating of at least 2.0 or higher.

Rating Scale: Should a newly hired employee possess this WRC on their first day of work in this job?

- 1 = No
- 2 = Yes

Screen for How Essential: At least 67 percent of SMEs must say "Yes," new employee must possess this WRC on their first day of work.

Linking Work-Related Characteristics (WRCs) to Job Tasks

Rating Scale: How important is this WRC in successfully performing this task on your job?

- 0 = Not Important
- 1 = Somewhat Important
- 2 = Important
- 3 = Essential
- 4 = Critical

Screen for Linkage: WRC must have an average linking rating of at least 2.0 or higher with one or more job tasks.

Notes: The **rating scale** information is used to determine if a job task or a work-related characteristic (WRC) is judged as important (task) to the job or essential (WRC) for a job incumbent to possess on the job.

The **screen** rating criterion is a *minimum score* on the rating scale that a task or WRC must receive to be considered as an important job task or essential WRC.

are “Screens for Importance.” As explained later, these screens aid in identifying the most important job tasks and essential WRCs.

Group interviews of job incumbents in SME workshops are employed along with surveys to obtain task and WRC data. This method of WRC determination is specific to one job or family of jobs. Because it is job specific; the method is particularly appropriate for developing selection procedures, such as situational judgment tests or structured employment interviews. Implementation of the method’s sequential steps facilitates identification of appropriate selection procedure content that representatively samples the content of the job. Before describing the development of WRCs, understand several caveats. First, numerous job analysis–WRC approaches exist other than ones we have mentioned. For example, Frank Landy⁵¹ has illustrated how the tasks of a patrol police officer’s job can be analyzed using Edwin Fleishman’s taxonomy of human abilities.⁵² The abilities required to perform the job tasks serve as the basis for choosing the type of selection predictor to use (for example, a written test or an interview) as well as the content of the measure (for example, test items requiring deductive reasoning).

Second, like all selection procedure development methods, the identification of WRCs we describe involves user judgment. Although judgment is involved, our structured approach involves a series of steps designed to lead *systematically* from (a) analyzing the job to (b) identifying WRCs to (c) determining selection procedure content. It is this methodical, step-by-step sequence that narrows the inferential leaps that SMEs have to make and enhances the validity of SMEs’ WRC judgments.⁵³ Third, the sequence of steps taken helps a user comply with certain aspects of the *Uniform Guidelines on Employee Selection Procedures*.

Determining Employee WRCs

Initially, task or work activity data are collected, and these data, in conjunction with SMEs’ judgments, help us ascertain the WRCs to compose selection procedure content. The following sequential steps are taken in specifying WRCs:

1. Identifying job tasks and work behaviors
2. Rating importance of job tasks and work behaviors
3. Specifying WRCs necessary for successful job performance
4. Rating importance of identified WRCs
5. Linking important WRCs to important job tasks and work behaviors
6. Developing content areas of selection procedures (that is, a *selection plan*)

The goals of this process are to (a) uncover job-related information that should compose the selection procedures content and (b) identify selection procedures that reflect these procedures’ content. Before we see how we implement these steps, we need to clarify one point. As you read, you will see the terms “tasks” and “work behaviors” used. Understand that a *work behavior* is a broad description of the major activities of a job.

while a *task* is a more specific action associated with these work behaviors. Some strategies used in implementing a task analysis approach deal exclusively with job tasks while others focus on broader work behaviors. Nevertheless, many of the general procedures we discuss are similar, whether applied to tasks or work behaviors. Although we use the word tasks in our discussion, understand that our discussion applies to *work behaviors* as well.

1. Identifying and Rating Job Tasks and Work Behaviors. The first step is specifying job tasks. This initial step is crucial. It serves as the foundation from which employee specifications evolve and selection procedures are produced. A number of different approaches are useful in uncovering task content. For example, observing and interviewing job incumbents and supervisors and conducting brainstorming sessions with SMEs in workshops are methods for deriving task content. Whatever the methods used, the goal is to produce a survey that SMEs can use to rate job tasks.

Because of the importance of task data, proper development of task statements is critical. Rules such as those we discussed earlier for developing task statements are important for generating the type of task information we need. In sum, task statements (a) begin with an action verb and (b) describe *what* the worker does, for *whom* or *what* the worker does it, *why* the worker does it, and *how* the worker does it. The following example portrays an incorrect and a corrected task statement:

Incorrect: "Assists with inspection of construction projects."

Comment: First, the **what** is ambiguous and gives no real information as to the action. Second, neither the **why** nor the **how** questions have been answered.

Corrected:

What?

"*Inspects construction operations (erosion control, Portland cement concrete paving, asphaltic concrete paving, painting, fencing, sign placement) ...*

Why?

to ensure compliance with construction specifications ...

How?

by comparing visual observations with construction specifications and plans, and by following verbal instructions; while under daily review by the supervisor."⁵⁴

Another example of task development is a procedure used by Katherine Jackson and her colleagues.⁵⁵ Job analysts work with SMEs to write work behavior statements (that is, broad descriptions of the major aspects of a job) and task statements (that is, narrow descriptions of the actions associated with these work behaviors) for a specific job. These actions lead to a precise description of the work activities involved on the job. For example, Figure 3.10 shows one work behavior and associated task statements identified for the job of police sergeant. As you can see, the level of detail is quite precise. For the sergeant's job, 24 work behaviors and an accompanying 497 task statements were developed. Although this information seems massive, it is this level of

FIGURE 3.10 Example of a Work Behavior and of Associated Task Statements for the Job of Police Sergeant**Work Behavior 3**

Responds to life-threatening emergencies or critical incidents such as a plane crash, explosion, train wreck, tornado, flood, hazardous chemical spill, shooting, accident with injuries, hostage situation, bomb threat, and fire—using mobile data terminal (MDT), Fire and Rescue, robots, police vehicle, K-9, barricades, helicopter, radio, traffic vest, outside agencies, fire trucks, personal protective equipment, body armor, first aid kit, fire extinguisher, and firearms—following the Airport Aircraft Emergency Plan, County Police Department Critical Incident Response Plan, County Employee Manual, special orders, general orders, and HAZMAT guide in order to ensure the safety of property, self, and others during dangerous or hazardous situations. Stabilizes injured individuals until medical assistance arrives, and prevents the escape of an offender.

Associated Task Statements

1. Provides assistance to other agencies (e.g., State Police, local police department)
2. Extinguishes small fires (such as grass or vehicle fires) to prevent or minimize damage and prevent injury
3. Rescues people from dangerous situations such as burning buildings, damaged vehicles, and drowning
4. Administers first-aid to the injured at emergency scenes until medical help arrives
5. Evaluates an emergency or disaster scene to determine what assistance is required, whether evacuation is necessary, whether the ordinance disposal unit is necessary, whether the dispatching of emergency personnel is necessary, or if additional medical assistance is needed
6. Evacuates occupants of buildings and surrounding areas during emergencies or disasters
7. Maintains security in an emergency area and controls gathering crowds
8. Searches buildings and/or areas for bombs or other indications of criminal activity
9. Provides on-scene counseling to assist persons in dangerous situations or during emergencies, and reassures injured individuals that medical assistance is on the way
10. Determines if backup is necessary, and if so, requests backup assistance
11. Establishes a perimeter and if necessary diverts traffic and bystanders
12. Notifies the chain-of-command of the status of situations
13. Notifies Public Information Officer of the status of situations
14. Establishes a command post
15. Requests additional assistance from other personnel or agencies (HAZMAT, Fire Department, DOT, EPA, SWAT team)
16. Notifies hospitals

Source: Based on the Auburn University-Montgomery Center for Business and Economic Development, *Job Analysis and Content Validation Report: County Bureau of Police Services for the Rank of Sergeant* (Montgomery, AL: Auburn University-Montgomery Center for Business and Economic Development, 2004). Used by permission of Dr. Katherine Jackson.

precision in the identified work behaviors and task statements that facilitate development of job-related selection procedure content. Therefore, job relevance of resulting selection procedures content is enhanced.

2. Rating Job Tasks and Work Behaviors. Once we have task data for a specific job, the next step is to isolate the *important* tasks composing the job. Typically, we use job incumbents serving as SMEs to rate the tasks to make this determination using rating scales, such as frequency of task performance or task importance. We employ rating data to identify a job's most important activities. For instance, one possible strategy is to use statistical indices (for example, averages, percentages, or even more complex calculations) created from the rating scales. Then, we apply decision rules to these indices to define important tasks. We might require, for example, that important tasks

receive a minimum average rating on one or more of our rating scales. We retain tasks whose ratings exceed our minimum rating requirements for further screening. For instance, we might specify that an important task composing a job is one for which (a) at least 67 percent of the SMEs perform the task and (b) the task receives an average rating of at least 2.0 (= Somewhat Important) on a 5-point rating scale, where 1 = Not Important and 5 = Critical. Any one or more of several criteria are available. The important point is that a common, objective standard is employed so that it is possible to objectively justify the identification of important job tasks.

On the basis of our earlier example of the police sergeant position (see Figure 3.9), Figure 3.11 illustrates the rating scales used to judge one work behavior and several associated task statements. Whatever the analyses used, the “most important” tasks are the basis on which inferences regarding selection instrument content rest (see Inference Point (2), Figure 3.1). The major idea behind using task analysis inventories is to define important job content. That determination serves as a guide for defining essential WRCs included in selection procedures.

It is important in constructing a job analysis survey to write the tasks and work activities and their rating scales as specifically and concretely as possible. The more ambiguous, less observable the tasks and rating scales, the more likely raters will give inaccurate ratings. Inaccurate ratings distort the reliability and accuracy of a job analysis. Inaccuracy, in turn, affects determination of selection procedure content, which ultimately affects the quality of the human resource selection system.⁵⁶

In addition to using specific, less ambiguous tasks and rating scales to counter respondent errors, another option is to remove respondents who provide inaccurate information. One means to identify inaccurate responders is by including several bogus tasks (that is, job tasks known not to be performed by the respondents) on the survey. If respondents indicate they perform the bogus tasks, then they are removed from the study.⁵⁷

3. Specifying WRCs Necessary for Successful Job Performance. Once critical job tasks have been identified, we are ready to specify the WRCs required for successful job performance. We cannot overemphasize the importance of producing accurate, complete WRC statements. As we will see, correct phrasing of the statements is essential to developing useful selection procedure content. Several steps are necessary for appropriately specifying these WRCs.

Selecting a WRC Rating Panel. The first step is to select a panel of job experts (SMEs) who can identify important WRCs. Such a panel can consist of those who participated in a job's prior task analysis (see Steps 1 and 2) or be formed from a new group of individuals. Listed here are several considerations in forming the WRC rating panel.⁵⁸

- *A panel of SMEs (at least 10 to 20) is preferable over only one or two individuals.* However, as we saw in Table 3.3, this guideline depends on the number of participants in the position being analyzed and the accuracy users want in their analyses. Do not give emphasis exclusively to numbers of experts; however, we are also interested in the *quality* of their job knowledge and participation. If their

FIGURE 3.11 Example of Rating Scales Used to Rate a Work Behavior (detailed in Figure 3.10) and Associated Job Tasks for the Job of Police Sergeant

Associated Task	PERFORM					IMPORTANCE					Necessary at Entry		
	Yes	No	Rarely	Seldom	Occasionally	Frequently	Continuously	Not	Somewhat	Important		Critical	Yes
1. Provides assistance to other agencies (e.g., state police, local police department)	<input type="checkbox"/>	<input type="checkbox"/>	①	②	③	④	⑤	⑥	①	②	③	④	<input type="checkbox"/>
2. Extinguishes small fires (such as grass or vehicles to prevent or minimize damage and prevent injury)	<input type="checkbox"/>	<input type="checkbox"/>	①	②	③	④	⑤	⑥	①	②	③	④	<input type="checkbox"/>
•	•	•	•	•	•	•	•	•	•	•	•	•	<input type="checkbox"/>
15. Requests additional assistance from other personnel or agencies (HAZMAT, fire department, DOT, EPA, SWAT team)	<input type="checkbox"/>	<input type="checkbox"/>	①	②	③	④	⑤	⑥	①	②	③	④	<input type="checkbox"/>
16. Notifies hospitals	<input type="checkbox"/>	<input type="checkbox"/>	①	②	③	④	⑤	⑥	①	②	③	④	<input type="checkbox"/>

If NO, go to the next work behavior. If YES, rate the following associated tasks:

Work Behavior: Responds to life-threatening emergencies or critical incidents

Do you perform this work behavior? YES NO

Note: Perform = Do you perform this job task?
Frequency = How often do you perform this task in your current position?

Importance = How important is it for you to perform this task successfully?
Necessary at Entry = Should a new employee, upon starting the job of sergeant, be able to perform this task successfully?

Source: Based on the Auburn University-Montgomery Center for Business and Economic Development, Job Analysis and Content Validation Report: County Bureau of Police Services for the Rank of Sergeant (Montgomery, AL: Auburn University-Montgomery Center for Business and Economic Development, 2004). Used by permission of Dr. Katherine Jackson.

assessments and inferences regarding WRCs are incorrect, resulting selection procedures will necessarily suffer.

- *Focus on key characteristics in choosing the WRCs rating panel.* These characteristics include the following: (a) participation should be voluntary, (b) incumbents should have performed adequately on the job in question, (c) participants should have served on the job for a minimum period, and (d) importantly, members of protected groups should be represented on the panel.

Preparing WRC Panelists. Whatever the data collection methodology, training WRC panelists is essential.⁵⁹ Panel members will likely require explanations as to what WRCs mean, why WRCs are important, and what are the SMEs' roles in identifying and rating WRCs.

Collection of WRC data can take several forms. Survey questionnaires completed by panelists is one form. Alternatively, group meetings of panel members can be convened, discussions held, and listings made of WRCs by panelists working within groups.

The development and specification of WRCs is not always as straightforward a task as we present it here. Just plan on problems arising. For example, if the panelists serving as SMEs are not trained properly, they tend to produce broad, undefined descriptions of WRCs that are relatively useless in developing a measure. Statements such as "ability to work under stress" are not helpful in understanding exactly the requirements needed for job success. Such WRCs likely will be developed when SMEs simply take a job task and add words to it such as "knowledge of," "ability to," or "skill at" in defining some WRCs. For instance, the task of handling customer complaints becomes "ability to handle customer complaints." Not only is the WRC undefined and of little use in developing a predictor, but this process assumes a unique WRC for each job task. Realistically, a WRC may underlie a number of job tasks. In sum, spend the time that it takes to prepare the SMEs for WRC development. It is an investment that ultimately will save time and yield operational WRCs that lend themselves to translating needed selection procedure content.

Soliciting WRCs from Panelists. In actually specifying WRCs, SME panelists review tasks identified from the job analysis and ask themselves: "What WRCs should job incumbents have to perform each of these job tasks successfully?" In writing the WRCs, we recommend several guidelines. Again, appropriate phrasing of WRC statements facilitates making accurate inferences concerning employee job requirements.

Knowledge, skills, and abilities characteristics. Among other characteristics, almost all WRCs require some level of knowledge, skills, or abilities (KSAs). In writing KSA statements as well as other WRCs, consider the following:

- *Panelists should have a clear understanding of what is meant by knowledge, skills, and abilities.* Definitions of these terms can vary, but for our use, the following are helpful:

Knowledge: A body of information, usually of a factual or procedural nature, about a particular domain (for example, information systems) that makes for successful performance of a task.⁶⁰

knowledge
Body of information, usually of a factual or procedural nature, necessary for successful task performance

skill

Individual's proficiency (usually expressed in numerical terms) in performing a specific task.

ability

General trait an individual possesses when first beginning to perform a task.

Skill: An individual's level of proficiency or competency in performing a specific task (for example, typing speed).⁶¹ Level of competency is often expressed in numerical terms.

Ability: A more general, enduring trait or capability an individual possesses when the person first begins to perform a task (for example, inductive reasoning).⁶² Some analysts have difficulty distinguishing between skills and abilities.⁶³ For purposes of preparing WRC statements, it is not absolutely essential that a statement be correctly classified as a skill or an ability. More important is the content and wording of the statement itself; the statement, not its classification, serves as the basis for inferring selection procedure content.

- *Statements should show the kind of knowledge, skill, or ability and the degree or level required for successful task performance.* For example, in describing "typing skill," it should be clear whether the typing skill requires typing tables of data and complex numbers within a specified time period, typing letters at a self-paced rate, or typing from handwritten manuscripts at the rate of 40 words per minute without error, and so forth.
- *Specific KSA statements are preferable to broad, general ones that lack clarity.* In preparing a statement, it is usually necessary that a facilitator probe the exact nature, degree, breadth, and precision of a stated KSA. If, for instance, there is a statement such as "knowledge of mathematics," it may be necessary to ask, "What kind?" "To what extent?" "To solve what types of problems?" and "Is use of special mathematical software required?" Use of probing questions should permit development of more useful statements of the job specifications.
- *Although it is possible to prepare a long list of KSAs for many jobs, emphasize those judged as essential to successful job performance.* That is, emphasize KSAs rated as most essential to job success by KSA-rating panelists. Sometimes, certain KSAs infrequently performed are critical when needed. Take, for example, the job of a fire investigator. The investigator is required to know how to investigate fires, their causes, probability of arson, the location of where the fire started initially, and so forth. However, the investigator might also need the physical ability to fight a fire in case one were to erupt on site putting other people at risk. In such a case, the task itself might rarely occur, but if it did, it is an essential physical ability for applicants applying for the fire investigator's job to have.
- *In preparing knowledge statements, avoid adjective modifiers relative to the degree or extent of knowledge required (for example, "thorough," "some").* Here are examples of appropriate knowledge statements: "Knowledge of the application of word processing procedures using Microsoft® Word, including setting margins, centering text, creating style sheets, and naming and storing files." "Knowledge of the use and interpretation of simple and multiple correlation statistical procedures, including knowing when to use a procedure, knowing the importance of statistical assumptions, and understanding the interpretation of results in the context of human resource selection."

Also, avoid vague adverbs implying some level of performance (for example, *rapidly* or *effectively*) to modify the action of the statement. Ability statements should not confuse the action of the ability with the result of that action. For instance, look at this statement: "Ability to maintain accurate clerical accounting records." The result of the action, "Maintain accurate accounting records" is treated as the action itself. The statement would be better written as follows: "Ability to log accounting transactions using Microsoft Excel to maintain accurate and up-to-date accounting records."

After generating the WRCs, plan on editing the statements. When editing, the objective is to specify important content in as much detail as possible and give examples where appropriate. Again, the emphasis is on only the most critical WRCs, not every WRC mentioned. Figure 3.12 illustrates several knowledge, skills, and abilities developed in previous job analyses.

Personality characteristics. In addition, many jobs require certain personality traits as essential WRCs, for example, extraversion for sales personnel. Personality traits such as "dependability," "extraversion," and "conscientiousness" are often-cited WRCs of successful employees. In Chapter 12, you will read about the empirical evidence regarding the relationships between such traits with work outcomes, such as job performance, absenteeism, and turnover, as well as other outcomes. Because the *Uniform Guidelines* does not permit content validation to be used with abstract personality characteristics such as those mentioned earlier, one strategy is to redefine the abstract characteristics into more observable, concrete outcomes of the traits.⁶⁴ For example, "dependability" might be characterized in terms of "is never late; always shows up for work on time" or "does not miss work without an excused absence." Conscientiousness

FIGURE 3.12 Examples of Knowledge, Skills, and Abilities (KSAs) Statements Developed in Previous Job Analyses

Knowledge

- Knowledge of building materials including the uses, storage, and preparation of materials such as aluminum siding, Masonite®, concrete block, and gypsum board (building materials company supervisor)
- Knowledge of the development, scoring, and application of employee performance appraisal techniques such as behaviorally anchored rating scales, 360-feedback, and graphic rating scales (human resources consultant)
- Knowledge of basic and advanced first-aid procedures to include CPR techniques (state police corporal)
- Knowledge of aircraft nomenclature (type, number of engines, manufacturer, jet/non-jet engine) and performance characteristics such as speed, climb/descent rates, turning radius, and weather and radio capabilities (air traffic controller)

Skills

- Skill in using a bank proof machine to process 50 checks per minute without error (bank proof machine operator)
- Skill in typing business correspondence at 50 words per minute without error (secretary)

Abilities

- Ability to give oral testimony in court as an expert witness in an employment discrimination suit regarding test validation issues (human resources consultant)
- Ability to use basic arithmetic to calculate flow of current through an electrical circuit (lighting company technician)
- Ability to obtain facts and information by using interviewing skills and techniques (state police corporal)

might be described in terms, such as "works on an assignment until the completed project meets both predetermined quality standards and scheduled time lines." These traits and operational definitions obviously are not an exhaustive list; ones generated by SMEs will necessarily depend on the job itself.

Physical requirements characteristics. In addition to KSAs and personality traits, other worker characteristics are likely important. In the job analysis, a user should inquire about additional WRCs needed, such as physical requirements. Physical requirements are qualifications workers must possess to physically perform their jobs. These requirements can involve a number of physical abilities requiring specific levels of hearing, seeing, speaking, or lifting, to name a few. For example, the ability to lift, pull, or carry a specific amount of weight must be set for firefighters. Illustrations of such WRCs include the following: a firefighter must be "physically able to transport a 150-pound deadweight down a 75-foot ladder" or "physically hookup a truck-stored fire hose to a hydrant within 1 minute; pull 100 feet of dry fire hose to full extension within 3 minutes."

With regard to vision, minimum levels of corrected visual acuity are required in choosing certain nuclear plant workers, who must visually monitor dials and meters at a distance. In another case, "possessing the ability to see and distinguish among colors on a radar screen" is one physical requirement for a flight controller.

Operative or physically demanding jobs will require more physical abilities for adequate performance than will managerial positions. Thus, when setting employee specifications for operative positions, routinely consider physical ability qualifications. Be sure any specified physical abilities are *essential* to the job. Careful review of these abilities will help to ensure compliance with the Americans with Disabilities Act (ADA).

Where a listing and rating of physical abilities is concerned, the same methods described for generating and rating other WRCs are useful. That is, the goal centers on producing specific, observable, and measurable statements descriptive of physical job requirements. Additional examples of such statements include the following:

"Ability to read a voltmeter dial from a distance of 5 feet."

"Ability to drive a forklift, grab pallets holding four 55-gallon drums, and then transport the load, lift, and place on storage benches"

"Ability to hear and record equity purchase and sell orders in a loud (75–100 decibel level) commercial area"

Once listed, these characteristics are rated using scales like those used in judging other WRCs. Similarly, analyses are made of the ratings to determine those physical abilities most essential for a job. Development of selection procedures composed of essential physical abilities, such as work sample tests (see Chapter 13), then can proceed.

Ownership of tools and equipment characteristics. Ownership of tools, equipment, or a car are sometimes specified as essential WRCs. With regard to tools, automotive shops and construction companies sometimes require that workers supply certain basic tools or safety equipment. Delivery personnel often are required to "have a

current driver's license, own and drive a fully insured car, and have no moving vehicle violations within a prescribed time."

Possession of licensure and certification characteristics. Teachers, healthcare workers, nurses, child care workers, and similar professionals are usually required to pass special certification examinations, pass licensing exams and hold a certificate of successful exam passage, and pass criminal background checks. WRCs such as these are certainly appropriate and often legally required not only of the applicant but also of the employer selecting employees.

Other WRCs. More than likely, these "other" requirements are unique to a particular job; however, if "other" characteristics are critical to job success, they should be considered. Examples of these "other" characteristics might consist of such factors as a willingness on the part of an applicant or incumbent to work under unusual conditions of employment, such as frequent relocation, frequent overtime, specific shifts, frequent travel, or under unusual working conditions (hot, cold, dusty, working alone, etc.).

4. Rating the Importance of WRCs. Useful selection procedures should reflect the essential WRCs required for a specific job. That is, those WRCs most important for a job should account for more selection procedure content than less important ones. SMEs' ratings of WRCs usually determine WRC weighting of importance. Methods used in rating WRC importance are similar to those used in assessing job task importance. That is, respondents complete a questionnaire listing the identified WRCs. They use rating scales to judge WRC importance to job success. Actual questionnaire formats, including rating scales, can vary from one application to the next. However, most WRC rating scales employed resemble those shown in Figure 3.13.

FIGURE 3.13 Examples of Typical Rating Scales Used in Rating Work-Related Characteristics (WRCs)

A. How important is this WRC in performing your job effectively?

0 = **Not Important**—You can definitely perform your job effectively even if you do not possess this WRC.

1 = **Somewhat Important**—You can probably perform your job effectively even if you do not possess this WRC. There is no problem

2 = **Important**—It is unlikely that you can perform your job effectively unless you possess this WRC. There is a minor problem if you do not possess this WRC.

3 = **Essential**—You cannot perform your job effectively unless you possess this WRC. There is a problem if you do not possess this WRC.

4 = **Critical**—You cannot perform your job effectively unless you possess this WRC. There is a major problem if you do not possess this WRC.

B. Should a newly hired employee possess this WRC on their first day of work in this job?

Y = **Yes**; individuals on this job should possess this WRC on their first day of work.

N = **No**; individuals on this job do not need this WRC on their first day of work.

5. Linking WRCs to Job Tasks and Work Behaviors. It is critical to demonstrate that the essential WRCs identified in Step 4 are required for performance of important job tasks.⁶⁵ For a WRC to be essential, *at least* one important task must require it. Demonstrating links between WRCs and important job tasks is important for several reasons. First, in the event of a discrimination charge, such linking information is necessary to defend a selection procedure. By showing a tie between important job tasks and essential WRCs, evidence demonstrates that these essential WRCs are required on a job. Second, limiting WRCs to only those that are most essential improves the efficiency and effectiveness of selection procedures. Basing selection procedure content on WRCs that are not job related is wasteful of resources. Most important, the selection procedures reflecting such WRCs will fail to identify qualified job applicants.

Methods of establishing WRC → job task and work behavior links. There are several ways of showing WRC → job task and work behavior links. All involve using SMEs to review critical job tasks and then rating the extent to which a WRC is important for successful job task performance. We will describe one possible option; later, we will demonstrate it in an example.

At this point in the process, we have identified important job tasks and essential WRCs as judged by our SMEs. Next, we create a rating matrix (just imagine an Excel spreadsheet). Each important job task is a separate row and each essential WRC is a separate column. SMEs read each task. Then, they read across each column showing a WRC. They ask themselves: How important is this WRC in performing this job task? (Keep in mind, these linkage ratings are made only for those WRCs and tasks and work behaviors judged as important in our previous steps.) Then, SMEs use a rating scale such as the following to make their linkage ratings:

How important is this WRC in successfully performing this job task?

0 = Not important—You can *definitely* perform this task successfully even if you do not possess this WRC.

1 = Somewhat important—You can *probably* perform this task successfully even if you do not possess this WRC.

2 = Important—It is *unlikely* that you can perform this task successfully unless you possess this WRC.

3 = Essential—It is *very unlikely* that you can perform this task successfully unless you possess this WRC.

4 = Critical—You *cannot* perform this task successfully unless you have this WRC.

WRCs are considered “linked” to an important job task when the average SME rating equals or exceeds a predefined mean rating value, for example, ≥ 2.0 = *Important*.

The linking of WRCs to job tasks is a critical step. Do not take this linking step lightly. Linking data provide job- and task-specific cues as to the design and content of selection procedures that will have greatest physical and psychological fidelity with the job.

6. Developing Content Areas of Selection Procedures. So far, in our exploration of the process of developing appropriate employee specifications, we have studied the tasks performed on a job, the WRCs needed for successful job performance, and the relationships between these characteristics and task performance. Our final step is to screen our task and WRC information to identify the content of our selection procedures. Once established, selection procedures are constructed or, where possible, chosen from existing procedures to match selection procedure specifications.

We are sure you are sitting there wondering, "If someone collects all this information, how do they possibly wade through it all to determine what a selection procedure ought to measure?" This is where our SME rating information comes into play. We use SMEs' ratings of tasks, WRCs, and the links between them to screen out those tasks and WRCs not essential to our selection procedures. To identify key tasks and procedures, we require important tasks and essential WRCs to pass multiple screens, such as those shown in Figure 3.9. These are examples of rating screens to consider for reducing important job tasks and essential WRCs to only those that are most essential. Whatever the ratings employed, use of standardized, objective screening procedures enhances our chances of producing selection procedures that reflect the important content of a job.

An Operational Example

To summarize and, hopefully, clarify our discussion, let's look at an example of the entire process. Suppose we are attempting to develop selection procedures for the job of HR selection analyst. HR selection analysts work in a state personnel department. They are generally responsible for helping to develop and implement selection procedures used by state agencies in employee selection.

Assume that a current job analysis of the HR selection analyst position identified 15 major job tasks. Figure 3.14 summarizes the ratings given by a large group of SMEs to a number of these tasks. (Note: To conserve space, we have shortened the actual task and WRC statements. Ideally, they would be complete statements and resemble the examples of job task and WRC wording, which we presented earlier.) For a task judged to be important to the job, SME ratings must meet the following rating specifications: (a) at least 67 percent of the SMEs must indicate they perform the task; (b) at least 67 percent of the SMEs must indicate successful performance of the task by a new employee is necessary at job entry; and (c) SMEs must give a task a mean importance rating of 2.0 or higher. An examination of the summarized ratings indicates that five tasks (Tasks 1, 2, 3, 4, and 15) meet the previous rating specifications. These tasks are eliminated from the study.

Next, important job-related WRCs are identified. Figure 3.15 shows the mean importance ratings given to 6 of the 12 WRCs the SMEs previously identified. Like job tasks, WRCs must meet several rating criteria to represent the job content domain. These rating specifications are (a) SMEs must give a WRC a mean importance rating ≥ 2.0 , (b)

FIGURE 3.14 SMEs' Average Ratings of Abbreviated Job Tasks for the Job of HR Selection Analyst

Abbreviated Job Tasks	Task Performed? ^a	Task Frequency? ^b	Task Importance? ^c	Task Necessary at Job Entry? (Yes) ^d
1. Computes adverse impact statistics for selection procedures	70%	3.9	2.0	67%
2. Constructs written tests for use in HR selection	67%	4.1	3.0	88%
3. Conducts job analyses on entry-level jobs	75%	4.0	2.8	84%
4. Develops affirmative action plans and programs and monitors impact	69%	3.5	2.2	70%
5. Gives oral testimony in court regarding state selection procedures	10%	1.2	2.0	20%
6. Trains department managers in use of acceptable selection practices	27%	2.2	1.9	25%
•				
•				
15. Maintains job applicant applications and selection test records	71%	3.7	2.0	67%

Note: The task statements have been abbreviated to conserve space. Task statements shown in **bold** print are those passing the SME task rating screens.

^a Task Performed ratings were made based on the following: Do You Perform This Task? 1 = No, 2 = Yes.

^b Task Frequency ratings were made based on the following: How Frequently Do You Perform This Task? 1 = Rarely, 2 = Seldom, 3 = Occasionally, 4 = Frequently, 5 = Continuously.

^c Task Importance ratings were made using the following: How Important is it that You Perform This Task Successfully? 0 = Not Important, 1 = Somewhat Important, 2 = Important, 3 = Essential, 4 = Critical.

^d Necessary at Job Entry ratings were made using the following: Should a New Employee, Upon Starting Your Job, be able to Perform This Task Successfully? 1 = No, 2 = Yes.

FIGURE 3.15 SMEs' Average Ratings of Abbreviated WRCs for the Job of HR Selection Analyst

Abbreviated Job Tasks	WRC Importance? ^a	WRC Necessary at Job Entry? (Yes) ^b	WRC Relatedness to Job Performance ^c
1. Knowledge of recordkeeping procedures	2.0	50%	1.0
2. Knowledge of applied statistics	3.0	90%	3.0
3. Knowledge of test validation requirements	3.0	100%	3.0
4. Knowledge of development of task inventories	2.4	77%	2.0
5. Ability to read and understand technical written material	2.1	67%	2.1
•			
•			
12. Skill in using computerized data analysis packages (SPSS)	2.0	67%	1.8

Note: The WRC statements have been abbreviated to conserve space. WRC statements shown in **bold** print are those passing the SME WRC rating screens.

^a WRC Importance ratings were made using the following: How Important is this WRC in Performing Your Job?

0 = Not Important, 1 = Somewhat Important, 2 = Important, 3 = Essential, 4 = Critical.

^b WRC Necessary at Job Entry ratings were made using the following: should a newly hired employee possess this WRC on their first day of work on this job? 1 = No, 2 = Yes.

^c Relatedness to Job Performance ratings were made using the following: 0 = Not at all, 1 = Slightly, 2 = Moderately, 3 = Considerably.

for a new employee at job entry, and (c) SMEs must give a WRC mean relatedness to job performance rating ≥ 2.0 . As seen in Figure 3.15, SMEs judged five of the six WRCs shown as essential in performing the job; "Knowledge of Recordkeeping Procedures" was eliminated for failure to meet two of the rating criteria (other WRCs were judged as important but are not shown in Figure 3.15).

as important but are not shown in Figure 3.15).
SMEs link the WRCs to the important job tasks by rating how important the

screened WRCs are for each of the important tasks. Figure 3.16 illustrates the SMEs' mean ratings of WRC importance for performing the five job tasks. On the basis of the requirement that each WRC must receive a mean rating of ≥ 2.0 for at least one job task, Figure 3.16 shows that each of the five WRCs were tied to at least one important job task.

At this point, those WRCs that our selection procedures should contain are known. These WRCs serve as the basis for deriving selection procedure content. Comparing the WRC ratings summarized on our rating form with the pre-established rating criteria that we mentioned earlier helps us determine needed selection procedure content. Content areas of our selection procedures are defined by those WRCs that meet all of the prescribed rating criteria. That is, (a) if SMEs rate a WRC as important, (b) if at least two-thirds of SMEs believe that new employees should possess the WRC upon job entry, and (c) if SMEs link the WRC to performance of an important job task, then

FIGURE 3.16 Mean Ratings of WRC Importance Linked to Task Performance for the Job of HR Selection Analyst

Abbreviated Job Tasks	WORK-RELATED CHARACTERISTICS (WRCs)					Skill in Using Computerized Data Analysis Packages (SPSS)
	Knowledge of Applied Statistics	Knowledge of Test Validation Requirements	Knowledge of Development of Task Inventories	Ability to Read and Understand	• • •	
1. Computes adverse impact statistics for selection procedures	3.7	2.0	0.9	0.0	•	3.8
2. Constructs written tests for use in HR selection	3.5	3.0	2.7	2.0		1.7
3. Conducts job analyses on entry-level jobs	2.9	3.7	3.9	0.0		2.1
4. Develops affirmative action plans and programs and monitors impact	0.7	1.2	0.8	1.0		1.3
•						
•						
•						
15. Maintains job applicant applications and selection test records	0.5	0.3	0.0	0.0	• • •	0.0

Note: The task and WRC statements have been abbreviated to conserve space. WRC \leftrightarrow Task Linkage ratings were made using the following:
How Important is This WRC in Successfully Performing This Task on your Job? 0 = Not Important, 1 = Somewhat Important, 2 = Important,
3 = Essential, 4 = Critical.

the WRC should compose selection measure content. Figure 3.17 summarizes the final tabulations of the WRCs evaluated.

In our HR selection analyst example and as shown in Figure 3.18, five WRCs meet all of the screening criteria (that is, Knowledge of Applied Statistics, Knowledge of Test Validation Requirements, Knowledge of Development of Task Inventories, Ability to Read and Understand Technical Written Material, and Skill in Using Computerized Data Analysis Packages [SPSS]). Therefore, these five WRCs should define the selection procedure content for the job of HR selection analyst. Next, we see how we might take these results and operationally translate them into a selection plan for the job.

Determination of Selection Procedure Content

Now that we know what is required to perform a job, how do we translate these WRCs into selection procedures? The answer to this question is usually technical. The development of assessment methods requires the use of specially trained individuals, such as industrial psychologists. Yet job analysts and others working in HR can play an integral role in developing selection measures. The experience and information obtained

FIGURE 3.17 Summary of WRC Tabulations for Determining Content Areas of Selection Procedures for the Job of HR Selection Analyst

Work-Related Characteristics (WRCs)	WRC IMPORTANCE CRITERIA		
	Mean Importance of WRC ^a	Percentage Indicating a New Employee Should Possess this WRC ^b	Task Statements (numbers) and Mean Ratings of Task Importance for Which a WRC is Necessary ^c
1. Knowledge of record-keeping procedures	2.0	50%	2(3.1), 3(3.3), 4(2.4), 15(3.8)
2. Knowledge of applied statistics	3.0	90%	1(3.7), 2(3.5), 3(2.9)
3. Knowledge of test validation requirements	3.0	100%	1(2.0), 2(3.0), 3(3.7)
4. Knowledge of development of task inventories	2.4	77%	2(2.7), 3(3.9)
5. Ability to read and understand technical written material	2.1	67%	2(2.0)
•			
•			
12. Skill in using computerized data analysis packages (SPSS)	2.0	67%	1(3.8), 3(2.1)

Note: The WRC statements have been abbreviated to conserve space. WRC statements shown in **bold** print are those selected for defining the content of selection procedures.

^a Important WRCs are those receiving a rating of **2.0** or higher on the following scale:

- 0 = Not Important
- 1 = Somewhat Important
- 2 = Important
- 3 = Essential
- 4 = Critical

^b WRCs that should be possessed by newly hired employees are those chosen by **67%** or more of the SMEs.

^c Numbers **outside** of the parentheses are task statement numbers. Numbers **inside** the parentheses are average importance ratings of a WRC for that task's performance. The mean ratings are taken from Figure 3.16.

FIGURE 3.18 WRC Content Areas Identified for Measurement by Selection Procedures for the Job of HR Selection Analyst

Work-Related Characteristics (WRCs)	SELECTION PROCEDURE CONTENT AREA CRITERIA			
	Is This WRC an Important One?	Is This WRC Necessary for Newly Hired Employees to Possess?	Is This WRC Necessary for an Important Job Task?	Should This WRC Serve as a Selection Procedure Content Area?
1. Knowledge of applied statistics	Yes	Yes	Yes	Yes
2. Knowledge of test validation requirements	Yes	Yes	Yes	Yes
3. Knowledge of development of task inventories	Yes	Yes	Yes	Yes
4. Ability to read and understand technical written material	Yes	Yes	Yes	Yes
•	•	•	•	•
•	•	•	•	•
•	•	•	•	•
12. Skill in using computerized data analysis packages (SPSS)	Yes	Yes	Yes	Yes

Note: The WRC statements have been abbreviated to conserve space. WRC statements shown in **bold** print are those selected for defining selection procedure content.

during a job analysis is valuable for suggesting selection methods that reflect important WRCs. Before building or choosing our selection procedures, we must decide on the relative importance of our WRCs as well as the type of procedure most appropriate for collecting this information. We refer to this process of specifying the relative WRC weights and choosing the appropriate procedures for measuring them as **developing a selection plan**. The preparation of a selection plan occurs in two phases:

1. Determining the relative importance of WRCs
2. Choosing the selection procedures to assess these WRCs

developing a selection plan
Specifies the weighted importance of specific work-related characteristics and how they will be measured.

Determining Relative Importance of WRCs. Previously in this chapter, we identified WRCs important to a job. For most jobs, it is unlikely that all WRCs will be equally critical to job success. Some WRCs are more important than others; these WRCs should play a more dominant role in determining selection procedure content and use. Before choosing selection procedures and their content, it is important to determine the relative importance of WRCs these measures should assess.

Several options are available for determining relative importance of employee specifications. For example, SMEs might complete a survey to make relative determinations of the WRCs' importance.⁶⁶ The questionnaire might consist of a listing of essential WRCs previously identified. Respondents assign a relative importance weight to each WRC from 0 to 100 percent, so that the sum of the weights totals 100 percent. The product of this process would be a relative weighting of the essential WRCs. Rather than administering a separate questionnaire that defines relative WRC importance,

there is another option. Because we used a task analysis survey, we already have collected WRC and task importance information. We might assume that the WRCs rated by SMEs as being more important for several job tasks should represent greater selection measure content than the WRCs judged as being less important for fewer tasks. We can simply multiply our WRCs' *importance* ratings by the *task importance* ratings for those tasks requiring the WRC. This calculation will yield points for each WRC. Relative weights are determined by obtaining the proportion of each WRC's points for all total WRC points computed. The relative weight will indicate the extent of WRC coverage in the selection procedures. Using methods such as these, WRCs needed for a variety of important tasks will compose more selection measure content than WRCs used for only a few or less important tasks. Shortly, we will see the role these importance weights play in developing and choosing among predictors of job success.

Choosing Selection Procedures to Assess Employee WRCs. A variety of procedures are available for assessing applicants. Many of the book chapters discuss the nature and application of these methods. Choosing ways to assess relevant WRCs requires consideration of a number of factors. Inferences and judgments play an important role in deciding which means are best for measuring which specifications. In considering possible alternatives, a personnel decision maker choosing a selection measure should ask the following types of questions:⁶⁷

1. *Have job applicants demonstrated past behaviors or had experiences before taking the job that are associated with successful performance of the tasks of the job?* If so, consider evaluation of such past behaviors, such as through a structured interview or biographical data questionnaire.
2. *Can job applicants be observed performing the job or part of it? Is there a means for simulating the job in a test situation that is likely to require important behaviors as defined by the job?* If so, is there a practical way of measuring simulated work performance? When demonstration of successful performance is possible and measurable for a job applicant, a work sample or performance test is a possibility.
3. *Would a written test be best for examining worker requirements in terms of eliciting desired reactions and providing practical scoring?* If so, a paper-and-pencil or computer-administered test is often appropriate for assessing job knowledge.
4. *Would giving job applicants an opportunity to express themselves orally through an interview cover job requirements that might go unassessed using other means?* In this case, a structured selection interview is a sound option, depending on the number of job candidates who will interview for the position.
5. *Can the assessment method produce reliable and valid data for evaluating job applicants' possession of a WRC?* If not, drop the method from consideration and replace it with one for which there is prior evidence of reliability and validity for the desired inferences and applications.

6. Is it practical and within our resources to use a particular method for measuring a WRC? If not, consider another alternative.

John Campbell has illustrated how such a questioning approach might suggest alternative means for assessing the same WRC. For instance, suppose an ability, such as "ability to relate verbally with persons of varied socioeconomic levels," was important for the job of social worker. Campbell noted that in studying this ability, several selection methods are possible:

1. The applicant may have performed the same, or very similar, kinds of tasks in previous jobs. We then could try to find out how effective he or she was on that task in the past.
2. If previous experience does not exist, one might try to "simulate" the task in some fashion. For example, one might contrive a role-playing situation and include as many of the real-life dynamics as possible.
3. Several steps further removed from a direct sample of job behavior is the response of the applicant to open-ended questions when interviewed by members of the target group. The interview could pose hypothetical situations and focus on the content of the answers; minority group interviewers could play the role of a hostile minority group member to see how the applicant handled the hostility.
4. A paper-and-pencil predictor could be used that poses a number of hypothetical situations for the applicant (situational judgment test).
5. One could use a test such as Rokeach's Dogmatism Scale in the belief that it has something to do with how people relate to, for example, minority group members.⁶⁸

Practical considerations will play a role in choosing the type of selection measure to use. For example, if an organization has hundreds of applicants applying for a position such as that of a bank teller in a large urban bank, the possibility of using a multiple-choice, paper-and-pencil, or computer-administered test will be given careful consideration because of its low cost and relative ease of administration to large groups of applicants.

An Example Selection Plan for the Job of HR Selection Analyst

Figure 3.19 shows an example selection plan for the HR selection analyst job. For illustration purposes, we are showing only five of several WRCs critical to the job. At the top of our plan, a variety of possible selection procedures is shown. You may be unfamiliar with some of these techniques (you will read about them in coming chapters); however, for our present purposes, complete understanding is not necessary. What is important is to understand is that we have chosen a variety of methods for illustration purposes. In practice, two or three methods would likely be used.

FIGURE 3.19 An Example Selection Plan for the Job of HR Selection Analyst

WRCs to be Used in Selection	WRC Weight	SELECTION PROCEDURES					
		Application Form	Reference Check	Selection Interview	Work Sample (Performance) Test	Written Objective Test	Training and Experience Evaluation
1. Knowledge of applied statistics	15%					15%	
2. Knowledge of test validation requirements	15%	5%	5%	15%		15%	
3. Knowledge of development of task inventories	10%				5%		5%
4. Ability to read and understand technical written material	10%					10%	
•				•		•	
•				•		•	
•				•		•	
12. Skill in using computerized data analysis packages (SPSS)	10%	5%			5%		
Total WRC Weight	100%	10%	5%	25%	5%	50%	5%

Note: The WRC percentage weights do not sum to 100% because other relevant WRCs and their weights are not shown.

Let's study the example in more detail. With respect to the first two WRCs, "Knowledge of Applied Statistics" and "Knowledge of Test Validation Requirements," we are dealing with specific bodies of information and knowledge in two related technical fields. Because we are interested in the extent to which applicants possess knowledge of these technical areas, a written multiple-choice test is recommended. Test content could be based on actual problems encountered on the job. Because the two content areas are judged to be equally important, roughly half of the exam should concentrate on test validation issues and the remainder should focus on applied statistics.

With respect to "Knowledge of Test Validation Requirements," we want to know about applicants' knowledge and actual experiences with test validation matters. Three additional assessment methods are possible. The application form could ask applicants for a list of previous experiences in test validation research. We may contact previous employers through reference checks to verify certain stated test validation capabilities. A structured oral interview would let applicants describe in detail their experiences or, possibly, respond to technical questions or situations concerning their knowledge of test validation research. Our selection method weights show that greater emphasis is placed on the interview than on the application form or reference check in appraising this WRC.

"Knowledge of Development of Task Inventories" is assessed through a selection interview or, perhaps, a training and experience evaluation. In addition to questions

about test validation, our selection interview also should incorporate questions involving applicants' knowledge about the development of task inventories. Training and experience evaluations could play a role in objectively judging applicants' experiences with task inventories.

Applicants' "Skill in Using Computerized Data Analysis Packages" also should be assessed. Relative to some WRCs, this skill plays a less critical role in accounting for selection analyst job success. An application form could ask for information on formal training, experience, or self-rated expertise with data analysis packages. Applicants also could be scored objectively on their skill by actually using a statistical or data analysis software package to solve a realistic problem. A work sample or performance test assesses this skill.

Besides suggesting alternative methods for appraising job-relevant WRCs, a selection plan has an additional value. That is, the weights assigned to a selection method for each WRC are useful in determining the relative emphasis placed on the content areas of the measures. For instance, think back to the job of HR selection analyst. Assume we plan to allocate 2 hours for assessing each HR selection analyst applicant. Some of our assessments will occur in groups (for example, a written test), whereas other assessments apply to individuals (for example, an interview). From examining our selection plan shown in Figure 3.19, we see that half of our time allocated for selection (50 percent of the WRC weights) should be assessed through a written, multiple-choice test. From previous experience, we know that roughly 50 multiple-choice items can be completed in an hour. Thus, we decide to use 50 items on our written test. How do we determine the proportion of these items that should be allocated to each WRC? Again, referring to our selection plan, we see that two WRCs are measured with our test; each has the same importance weight (15 percent). Therefore, 8 of the 50 multiple-choice items should be written to measure "Knowledge of Test Validation Requirements" and 8 should be written to measure "Knowledge of Applied Statistics." We would follow this same rationale in deciding how we want to allocate our remaining time to our other selection methods.

As you look at our proposed selection plan, you may notice an interesting result. Our job analysis appears to have produced a selection program whose contents seem to reflect the major contents of the job. Selection procedure and job content overlap is precisely what we want. The more we can ensure a match between the content of our selection methods and the demands of the job, the more confident we can be in the value of our selection program and its procedures. Of course, we would not stop with a job analysis as final evidence of selection method usefulness; job analysis is really the first step. Where feasible, we would plan validation research studies to examine how well our proposed measures predict successful job performance.

Some job analysis experts have questioned whether incumbents are capable of making the kind of inferences needed to identify the relevant worker attributes required to perform a job, particularly when attributes such as traits are abstract in nature.⁶⁹ Evidence suggests that job incumbents have greater difficulty in making reliable job analysis ratings than professional job analysts.⁷⁰ Recent research, however,

has shed some light on the ability of incumbent SMEs to make accurate ratings of stimuli, such as WRCs. For example, Erich Dierdorff and Frederick Morgeson used a sample of more than 47,000 incumbents in more than 300 occupations to examine incumbents' ratings of tasks, responsibilities, knowledge, skills, and traits.⁷¹ One of several conclusions they reached was that incumbents were capable of providing reliable and discriminating ratings of knowledge and skills. However, on less specific, less observable descriptors—namely, abstract traits—the raters could not make reliable ratings. Other research points to the important finding that certain forms of training, that is, frame-of-reference training, can enhance the quality of ratings given by job incumbents, even on abstract traits, such as personality traits.⁷² Taken in total, when developing employee specifications, recent research seems to suggest that

1. A structured, systematic approach, such as the one we have described, should be used to reduce the size of inferential leaps made by job incumbents when rating their jobs.
2. Incumbents can reliably and validly rate the specifications for their position when the specifications deal with specific, more observable job descriptors, such as knowledge and skills.
3. Ratings of more abstract traits are improved when raters are properly trained using methods such as frame-of-reference training.

EMPLOYEE SPECIFICATIONS FOR JOBS THAT ARE ABOUT TO CHANGE OR HAVE YET TO BE CREATED

We have mentioned throughout our discussion that selection procedures must be based on a job analysis. We have discussed at length the use of methods to analyze jobs as they *currently* are being performed. But suppose a job does not yet exist or is about to undergo a drastic change—for example, through organizational restructuring. How do you develop employee specifications for a job about to change? How do you identify these specifications when a job that does not yet exist is being created? In these cases, selection procedures must be able to distinguish between individuals who can and who cannot perform the job as it *will* be performed in the future.

Conducting a job analysis of “future jobs” in our hypothetical situation is a problem. One option for handling current jobs that will change in the future is what Benjamin Schneider and Andrea Konz have referred to as “strategic job analysis.”⁷³ The purpose of their approach is to define the tasks and WRCs thought to be needed for a job as it is predicted to exist in the future. In essence, the method consists of the following steps:

1. An analysis of the job is made to identify current tasks and WRCs.
2. Subject matter experts (for example, job incumbents, supervisors, managers) knowledgeable about the job are assembled in a workshop to discuss how future issues (for example, technological change) are likely to affect the job.

3. Information on expected future tasks and WRCs is collected from individuals knowledgeable about these expected job changes.
4. Differences between present and future judgments about the job are identified to isolate those tasks and WRCs for which the greatest change is anticipated. This task and WRC information serves as the basis for selecting incumbents in a job that does not currently exist.

Obviously, a key component of the entire process is the SME asked to predict future job change. If a current job is changed, incumbents, supervisors, managers, and other experts can forecast changes in job activities and WRCs.

If a new job is created, it will be necessary to use a more creative approach to selecting experts to make future job task and WRC predictions. Select individuals within the organization who can envision what the job will be like. Consider others outside the organization who have specific technical knowledge about the needed changes. For example, people in the organization who are familiar with corporate strategy and technological change might be helpful. Supervisors and incumbents of jobs who have tasks similar to those predicted for the new one also can participate. If the new job entails running a new piece of equipment, a technical representative of the manufacturer may provide useful information regarding the tasks and worker requirements necessary.

The process of strategic job analysis has many, yet-to-be-resolved issues. For example, what are the reliability and validity of experts' future job predictions? What experts are most helpful and accurate in forecasting change? What is the best way to conduct workshops and job analyses to collect the data needed? Will this approach be accepted if challenged in the courts? These are but a few of the unanswered questions that remain. Richard Arvey, Eduardo Salas, and Kathleen Gialluca have taken a different, empirical tack with regard to analyzing future jobs.⁷⁴ Rather than tasks, their concern is with statistically forecasting the future skills and abilities needed to perform job tasks. The need-to-know skills and abilities could occur, for instance, when new plants with new jobs are being started, or when job redesign efforts involving reconfigurations of tasks into new jobs are occurring.

Using comprehensive task and ability inventories obtained from 619 skilled-trade incumbents, Arvey and his colleagues sought to determine whether it would be possible to predict required abilities from job tasks. Results from their analyses suggested that it was possible to forecast some needed abilities from task data. Other WRCs, however, were not particularly predictable. Nevertheless, results from their research were encouraging enough to suggest that when it is possible to build a comprehensive database of links between job tasks and abilities, forecasting future abilities from existing task information should be considered. All that is needed for future jobs is to estimate the key tasks that might be performed; required abilities could then be predicted. A major problem with such an approach is that collecting task and ability data on a large-scale basis is likely to be feasible only in large organizations.

Another approach to estimating the requirements of future jobs involves use of the Occupational Information Network or O*NET (www.onetonline.org) developed by the Department of Labor. O*NET is a comprehensive database of information that describes characteristics of workers and the work they do in jobs representative of the national labor force. Richard Jeanneret and Mark Strong conducted a study to determine whether it would be possible to identify selection instruments by using information on the occupations' generalized work activities stored in the O*NET database.⁷⁵ Generalized work activities are essentially groups of job behaviors used in performing major work functions (for example, identifying objects, actions, and events; teaching others; and thinking creatively). Results of their research showed that the generalized work activities were particularly helpful in choosing selection measures for occupations requiring intelligence and verbal and numerical aptitudes; they were less useful for occupations requiring manual dexterity. If it is possible to estimate generalized work activities required in an occupation, then knowledge of these activities might help in selecting appropriate selection instruments.

With regard to O*NET, we suspect that future research will draw on this database to examine the efficacy of using current O*NET data to infer required WRCs to use in selection. Current research using O*NET data has suggested the efficacy of these data in future research on employee specifications.⁷⁶ Use of O*NET to specify future work requirements is still being developed, and additional research is needed, but O*NET may hold particular promise for specifying selection procedures. Given the rapid technological change that many organizations are experiencing, the need to conduct some form of future-oriented job analysis is likely to become a necessity. At this point, the details of application have yet to be refined. Clearly, more research is needed on methods to identify employee specifications of future jobs and job tasks.

CONCLUSION

At this point in the chapter, we're guessing you must be thinking "C'mon, man. You've taken me through a lot. Do you think this level of detail is really necessary?" The short answer is (you guessed it!), "Yes, we do." Now that you are at the end of the chapter, keep the following quote in mind. Robert Guion, in commenting on the amount of detail and comprehensiveness of job analysis information required in HR selection research, said

The level of detail desired may also be determined by the likelihood of litigation. Prudent personnel researchers attend not only to the best wisdom of their profession but to the realities of the courtroom. In a specific situation, a detailed job analysis may not be necessary technically, but failure to have evidence of an "adequate" job analysis, in the view of the trial judge, may result in an adverse decision in court.⁷⁷