

# PERSONALITY-BASED JOB ANALYSIS

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## PERSONALITY-BASED JOB ANALYSIS

When the prevailing professional belief is that personality has little relevance for the study of work performance, there is no need for applications of personality-based job evaluations. This conventional wisdom persisted for at least two decades from the 1960's through the 1980's. The tide of research evidence began to rise in the early 1990's suggesting that personality variables are systematically related to job performance. Hough and Oswald (2008) summarize personality-prediction research findings over the past 15 years. They conclude that personality variables predict job performance (cf. J. Hogan & Holland, 2003), counterproductive work behavior (cf. Berry, Ones, & Sackett, 2007), team performance (cf. Peeters, Van Tuijl, Rutte, & Reymem, 2006), job satisfaction (cf. Judge, Heller, & Mount, 2002), and major life outcomes (cf. Roberts, Kuncel, Shiner, Caspi, & Goldberg, 2007).

In the domain of job performance, personality measures predict overall job performance, task performance, training performance, objective indices of productivity, managerial effectiveness, and organizational promotion. Also predicted are criteria associated with integrity, innovation, goal setting, and cultural adaptation (Hough & Oswald, 2008). In short, the empirical links between personality variables and meaningful multidimensional job criteria require a reconsideration of ways to evaluate jobs for personality-based requirements that facilitate and enhance job performance of employees.

Despite the increased use of personality measures in the workplace, direct methods to analyze jobs for their personality requirements are relatively unavailable. Although themes involving personality constructs inevitably emerge during job analysis, most structured job analysis procedures will not capture them (Guion, 1992). Incumbents and supervisors typically describe effective and ineffective job performance in terms of personality characteristics. In the past, job analysts deliberately ignored such information because the descriptions do not refer directly to observed behavior. In fact, an entire job analysis strategy focuses on "job-oriented" as opposed to "worker-oriented" job requirements. Nevertheless, when we record job information provided by incumbents and supervisors, invariably it will contain information about personal characteristics that are associated with varying degrees of effective job performance. In this chapter, we review the current status of personality-based job analysis, a term that we use interchangeably with work analysis, and provide directions for future research. We also introduce and illustrate the use of a job analysis instrument developed over the last ten years specifically to assess personality-based worker-oriented requirements: the Performance Improvement Characteristics (PIC; J. Hogan & Rybicki, 1998) job analysis. Table 1 outlines steps for administering, scoring, and interpreting the PIC.

## JOB ANALYSIS TECHNIQUES

The classic job analysis methods, such as time and motion studies, sought to identify tasks and instruct others who perform them (e.g., Gilbreth, 1911; Taylor, 1923). However, proponents of these approaches soon realized that individual differences in worker behaviors affected task performance (Primoff & Fine, 1988). Subsequent efforts lead to job analysis methods for identifying the behaviors required to complete tasks and worker-oriented approaches designed to specify Knowledge, Skills, Abilities, and Other characteristics (KSAOs).

Sparks (1988) is careful to point out that statutory law does not prescribe job analysis as a condition necessary for compliance. However, one of the most influential documents guiding personnel decisions, the *Uniform Guidelines on Employee Selection Procedures* (EEOC, 1978), expresses a clear preference for basing assessments on job analyses that identify "work behavior" associated with tasks. These guidelines specify that KSAOs should be defined in terms of "observable behaviors and outcomes," or behaviors and outcomes that are "able to be seen, heard, or otherwise perceived by a person other than the person performing the action." Specifying job analytic information in terms of concrete and observable behaviors aims to reduce inaccuracies resulting from self-presentation and impression management by individuals providing the information (Morgeson & Campion, 1997). These efforts underscore the importance of describing jobs using clear, observable, and verifiable terminology.

## JOB-ORIENTED APPROACHES

Job-oriented approaches describe work in technical and behaviorally explicit terms. Using these methods, analysts identify work *elements*, or “the smallest unit into which work can be divided without analyzing separate motions, movements, and mental processes” (Cascio, 1987). These elements represent behavioral building blocks of *tasks*, which (a) involve an action or series of actions performed closely in time, (b) have a clear starting and stopping point, (c) result in performance of a meaningful objective, and (d) belong to a specific job. Moreover, tasks should be observable and as behaviorally explicit as possible (Harvey, 1994).

Professionals may use several techniques to execute a job-oriented job analysis. For example, Gael (1990) and Gatewood and Feild (1998) suggest that interviews with Subject Matter Experts (SMEs) represent an effective method for compiling task information. Specifically, analysts collect task information during initial interviews, then check and modify this information in verification and follow-up interviews. Analysts sort tasks into broader *task clusters*, and SMEs rate them to determine importance and criticality using scales such as time spent on the task, criticality, and difficulty. Although these techniques can be resource intensive, they provide an effective method for quantifying data from large numbers of respondents. However, it is difficult for interviewees to focus exclusively on observable work behavior without discussing ability (competence) and personal characteristics that influence performance.

Task statements represent the fundamental unit of analysis across job-oriented analysis methods. Using the Functional Job Analysis (FJA), analysts review job-related reference materials, interview SMEs to obtain task information, and conduct on-site observations to gather supplemental information (Veres, Locklear, Sims, & Prewett, 1996). In the mid-1960s, the Air Force Human Resources Laboratory used tasks to develop the Comprehensive Occupational Data Analysis Programs (CODAP). They designed the CODAP to automatically process, organize, and report occupational data for selection, classification, training, evaluation, and job design (Jansen, 1985; Phalen, 1975). Finally, analysts may use the critical incident technique to identify behaviors associated with particularly effective or ineffective task performance (Flanagan, 1954). However, unlike other work-oriented methods, this approach focuses on critical *behaviors* as much as tasks, and allows professionals to use behavioral critical incidents as scale anchors to illustrate effective and ineffective task performance (Gael, 1988).

## WORKER-ORIENTED APPROACHES

In contrast to job-oriented methods, worker-oriented job analysis describes jobs with a common set of descriptors, which allows for comparisons using the same metric (McCormick, 1976). More specifically, worker-oriented job analysis describes the general human characteristics involved in performing task-related behaviors rather than describing the tasks (Veres et al., 1996). In focusing on individual characteristics, worker-oriented methods identify broad similarities between dissimilar jobs and may, therefore, be used “off the shelf” for many different jobs (Gatewood & Feild, 1998; Harvey, 1994). Common examples of worker-oriented job analysis instruments include the Position Analysis Questionnaire (PAQ; McCormick & Jeanneret, 1988), the Occupational Analysis Inventory (OAI; Cunningham, Boese, Neeb, & Pass, 1983), the Threshold Traits Analysis System (TTAS; Lopez, 1988), and the Ability Requirement Scales (ARS; Fleishman & Mumford, 1988).

Perhaps the best-known of these instruments is the PAQ, which describes general work behaviors in terms of (a) information input, (b) mental processes, (c) work output, (d) relationships with other people, (e) job context, and (f) other job characteristics. To determine the job relevance of these items, the PAQ uses rating scales and a standardized deductive method for collecting reliable and valid worker-oriented data across a variety of jobs

(Gatewood & Feild, 1998; Peterson & Jeanneret, 1997). Considering potential problems due to the reading difficulty of the PAQ, Harvey, Friedman, Hakel, and Cornelius (1988) created the Job Element Inventory (JEI). The JEI uses the same item format and underlying content as the PAQ, but considers only relative time spent on each item to describe a job of interest.

A similar structural relationship exists between the OAI and the General Work Inventory (GWI; Ballentine & Cunningham, 1981). Research using the OAI (Boese & Cunningham, 1975) concludes that five major categories underlie its worker-oriented items: (a) information received, (b) mental activities, (c) work behavior, (d) work goals, and (e) work context. In contrast, the GWI is a shorter and less technical alternative to the OAI developed for large-scale data collection using “any literate respondent who is familiar with the job to be analyzed” (Cunningham, Wimpee, & Ballentine, 1990, p. 34).

The TTAS is a trait-oriented job analysis technique, designed in the 1970s, that identifies the personal characteristics required to perform the functions of a job. With the TTAS, traits are the fundamental unit of analysis as they represent the vital link between job demands and the worker’s resulting job performance. Development of the TTAS began with specifying the human traits required for successful job performance. Following a review of the available literature, the authors chose 33 traits subdivided into five major categories: (a) physical, (b) mental, (c) learned, (d) motivational, and (e) social. Physical, mental, and learned traits represent *ability* or “can do” factors, while motivational and social traits reflect attitudinal or “will do” factors (Lopez, Kesselman, & Lopez, 1981). As a worker-oriented job analysis method, the TTAS foreshadowed later personality-based job analysis tools by including personality-related constructs (e.g., adaptability, dependability, perseverance) among its 33 dimensions. Although largely replaced by O\*NET and other taxonomic systems, these systems borrowed from both the content and structure of the TTAS.

The ARS provides a taxonomic system for describing and measuring job activities. This method evaluates human abilities needed to perform job tasks and identifies potentially useful individual difference measures for predicting these abilities. As a follow-up to the ARS, Fleishman and Mumford developed the Fleishman Job Analysis Survey (F-JAS; 1991) to examine personal attributes required across different jobs. The taxonomy of abilities included with this technique contains 52 cognitive, physical, psychomotor, and sensory abilities. After identifying the abilities required in a given job, analysts use rating scales to indicate the level of functioning required for each job.

## HYBRID APPROACHES

Some more recently developed methods combine job- and worker-oriented approaches for conducting a job analysis (Sanchez & Levine, 1999). Designed as a replacement for the U.S. Department of Labor’s Dictionary of Occupational Titles, O\*NET uses multiple descriptors to provide (a) both job- and worker-oriented “windows” into specific jobs, (b) a common language for describing different jobs, and (c) a hierarchical taxonomy for classifying occupational descriptors. The broad descriptor domains of the O\*NET content model subsume both job- and worker-oriented approaches for obtaining job analytic information. Job-oriented information may be referenced in occupational requirements (e.g., generalized work activities, work context, organizational context), occupation-specific requirements (e.g., occupational skills, knowledge, tasks, duties, machines and equipment), and occupation characteristics (e.g., labor market information, occupational outlook, wages) domains. Worker-oriented information appears in the experience requirements (e.g., training, experience, licensures), worker requirements (e.g., basic and cross-functional skills, knowledge, education), and worker characteristics (e.g., abilities, occupational values and interests, work styles) domains (Peterson et al., 2001).

The Work Profiling System (WPS; Saville & Holdsworth, 1995) is another hybrid job analysis. The WPS consists of three job analysis questionnaires for managerial and professional jobs, service and administrative jobs, and manual and technical jobs. Questionnaires include a job content section to identify the main job tasks and a job context section to establish physical environment, responsibility for resources, compensation, and other contextual aspects of the job. Analysts can use this information to determine appropriate methods for assessing job candidates and matching candidates against the job's key requirements.

## PERSONALITY-BASED JOB ANALYSIS

Despite efforts to incorporate worker characteristics into job analysis methods, industrial-organizational psychologists have largely ignored the specific personality characteristics required for successful job performance. Raymark, Schmit, and Guion (1997) observed that “if the job analysis method emphasizes only cognitive or psychomotor aspects of jobs, it is likely that only cognitive or psychomotor predictors will be hypothesized” (p. 724). Job analysts often lack a consistent vocabulary or methods for describing personal characteristics. As a result, they rarely look for personality-related characteristics when analyzing jobs despite research demonstrating that personality-based job analysis ratings predict the criterion-related validity of personality scores (Cucina, Vasilopoulos, & Sehgal, 2005).

Employers actively seek personality information when hiring to fill open positions. For example, Brinkmeyer (1995) analyzed over 6,000 job postings from nine U.S. national newspapers to determine what employers require from applicants. She reported that employers emphasized five general qualities in job postings: (a) previous job experience (53%), (b) specific educational requirements (50%), (c) interpersonal skills (49%), (d) technical skills (48%), and (e) salary level (12%). Brinkmeyer categorized interpersonal skills into six dimensions: (a) communication skills, (b) sensitivity to others, (c) sociability, (d) collaborative problem solving, (e) organization, and (f) responsibility. Employers recruit for interpersonal skills about as often as job experience, educational requirements, and technical skills. They often value individual skills and characteristics that are difficult to capture with traditional job analysis methods.

To fill this gap, industrial-organizational psychologists developed local, customized job analysis instruments for capturing job requirements associated with worker personality. For example, a joint-service military classification effort identified personality-based descriptions as one of the job analysis methodologies required for successful job performance (Knapp, Russell, & Campbell, 1995). Sumer, Sumer, Demirutku, and Cifci (2001) created a personality-based job analysis for identifying critical characteristics in prospective military officers. R. Hogan and J. Hogan (1995, p. 75) developed a taxonomy of personality-related job analysis ability statements that were included in their job analysis questionnaires. They analyzed critical job tasks and abilities through a linkage process specified by Goldstein, Zedeck, and Schneider (1993). Regardless of job, results indicated that personality-based ability statements are the most frequently endorsed as critical for job performance and provide useful information for test and criterion specification.

The Personality-Related Position Requirements Form (PPRF) evaluates 12 personality-related dimensions. Research shows that the PPRF reliably differentiates jobs in terms of the characteristics required for job success (Raymark, Schmit, & Guion, 1997). The 107 items comprising the PPRF require SMEs to respond to the item stem, “Effective performance in this position requires the person to...,” indicating the extent to which each behavior is associated with job performance on a three-point rating scale ranging from 0 (*Not required*) to 2 (*Essential*).

The emergence of these instruments signals a shift away from job-specific tasks toward direct assessment of personal characteristics related to successful performance across jobs. In the remaining sections of this chapter, we focus on the PIC (J. Hogan & Rybicki, 1998) job analysis. Hogan Assessment Systems (Hogan) developed the PIC for use in selection and development applications. It represents one of the most robust personality-based job analysis instruments based on the Five-Factor Model (FFM) of personality.

## THE PERFORMANCE IMPROVEMENT CHARACTERISTICS JOB ANALYSIS

The PIC identifies the personal characteristics needed for a job and the degree to which they enhance performance. It contains 48 items that align with the Five-Factor Model (FFM; cf. Digman, 1990) of personality and the seven primary scales on the Hogan Personality Inventory (HPI; R. Hogan & J. Hogan, 2007). Hogan developed the PIC by following a three-step process: (a) generating observable and verifiable behavioral statements reflecting each personality dimension, (b) ensuring relevance of FFM items across the spectrum of occupational work, and (c) building a survey mechanism for SMEs to indicate the extent to which each characteristic would improve performance in a given job. Table 2 shows the seven scales of the PIC along with their definitions. Figure 1 presents a copy of the PIC with its complete item content.

## DEVELOPMENT

The FFM is a useful starting point for any application of personality assessment because it provides a systematic method for classifying individual differences in social and work behavior. Virtually any personality assessment for any purpose can be described in terms of these five dimensions (Wiggins & Pincus, 1992). As a result, the FFM is the paradigm for modern research in any personality taxonomic application. The FFM is particularly relevant for job analysis and evaluation of characteristics important for job performance because it provides a taxonomy for the structure of observer ratings. The FFM is based on observers' descriptions of others. Applications of the FFM for job analysis tells us about the reputation of observable tendencies in behavior of employees who are competent performers. The five broad FFM dimensions are (a) Surgency, (b) Agreeableness, (c) Conscientiousness, (d) Emotional Stability, and (e) Intellect/Openness to Experience.

The personality predictor measure we use in test validation research and personnel selection applications is the HPI. The HPI is the first measure of personality developed specifically to assess the FFM in occupational settings within a normal population. It contains seven primary scales aligned with the FFM. As seen in Figure 2, the HPI is a representative FFM measure and findings based on the HPI should generalize to other well-validated personality measures. Specifically, any job analysis method that captures the structure of the FFM and the HPI should be relevant for identifying personality predictors from a FFM inventory. Although we developed the PIC for use with the HPI, the PIC results can be used to hypothesize predictor constructs across any number of FFM measures in personnel research.

Initial efforts that led to the development of the PIC used the FFM structure with adjective checklist item content to indicate worker requirements (J. Hogan & Arneson, 1987). SMEs used this checklist to describe the characteristics of an ideal employee in a specific job. This method yielded positive results and suggested that this would be a fruitful approach to identify important worker characteristics required in a range of jobs. For example, researchers found that (a) the checklist reliably differentiated between jobs, (b) both supervisors and high-performing incumbents agreed on the profile of the ideal workers, and (c) the profile of the ideal *worker* differed from that of the ideal *person* (J. Hogan & Rybicki, 1998). These findings indicated that a FFM-based job analysis instrument could provide reliable and valid results. Professionals can use the PIC, in conjunction with test validation research for personnel selection and development, for any job where people interact with others.

## PIC CHARACTERISTICS AND PROCEDURES

When completing the PIC (see Figure 1), SMEs rate jobs using 48 items on a four-point rating scale with responses corresponding to 0 (*Does Not Improve Performance*), 1 (*Minimally Improves Performance*), 2 (*Moderately Improves Performance*), and 3 (*Substantially Improves Performance*). Hogan scores PIC results by aggregating SME ratings to form a seven-dimension profile that reflects the personality characteristics most relevant to successful job performance. Following data collection, Hogan computes normative scores derived from a PIC archive containing data from over 300 jobs. Analysts plot these results on a graph that represents the optimal personality profile for predicting successful job performance. Five to nine items comprise each scale, with no item overlap between the seven scales. Across items, the PIC has an average phrase length of 4.5 words, an average word length of 5.5 letters, and an average of 1.6 syllables per word. Based upon these results, Flesch-Kincaid analyses indicate that the PIC is consistent with a seventh grade reading level.

Internal consistency reliability estimates for PIC scales range between 0.76 (Adjustment) and 0.87 (Interpersonal Sensitivity), with an average of 0.83. Moreover, one-month interval test-retest reliability estimates range between 0.60 (Learning Approach) and 0.84 (Inquisitive), with an average of 0.71. Also, the PIC has adequate convergent and discriminant validity with the PPRF (J. Hogan & Rybicki, 1998).

Research indicates that the PIC effectively differentiates between jobs, and scores on PIC scales correspond to HPI scales that predict successful job performance. J. Hogan and Rybicki (1998) evaluated the discriminating power of the PIC by comparing results from 11 jobs spanning (a) the six major occupational types in Holland's (1985, 1997) RIASEC vocational theory and (b) a range of occupational classifications from the Dictionary of Occupational Titles (DOT; U.S. DoL, 1991). Their results demonstrate that various personality characteristics are differentially important across different jobs. For example, SMEs indicated that Sociability is more important for sales jobs than management jobs. Secondly, SMEs indicated that Ambition is more important for management, sales, and research jobs than secretarial or material handling jobs. Finally, although SME ratings for Adjustment did vary between jobs, these ratings all fell within one standard deviation of the mean of the normative sample, indicating that being calm and resilient to stress represents an important personal characteristic across jobs.

Meyer & Foster (2007) not only demonstrated that the PIC differentiates between jobs, but evaluated the predictive validity of the PIC in predicting supervisory ratings of overall job performance. Specifically, they examined the utility of three different approaches (partial-weighting, full-weighting, and profile similarity) to validate the PIC. They weighted HPI data from seven archival studies using each method according to the PIC profiles for the same and different jobs, and correlated these data with performance. By weighting the HPI results for a given job by the PIC profile for that job, the HPI predicted supervisory ratings of job performance. Moreover, results showed that the HPI was more predictive of job performance when weighted according to its own PIC profile than a profile representing a different job. Meta-analytic evidence demonstrated that the profile similarity approach performed best in differentiating between jobs and predicting overall performance.

To date, Hogan has administered the PIC to over 12,000 SME's representing over 400 jobs. When PIC data are gathered for a job, Hogan classifies the job into one of seven job families: Managers & Executives, Professionals, Technicians & Specialists, Operations & Trades, Sales & Customer Support, Administrative & Clerical, and Service & Support. Hogan derived these job families from the nine job classifications used by the Equal Employment Opportunity Commission (EEOC). Using archival data, one-way ANOVAs reveal that results for all seven PIC scales vary significantly by job family ( $p < .01$ ). Table 3 presents the average PIC scores by job family. Figure 3 presents average normative PIC profiles for each of the seven job families.

Results presented in Figure 3 again demonstrate that the PIC differentiates between jobs, even when jobs are aggregated at a job family level. Results are generally consistent with J. Hogan and Rybicki (1998). For example, SME ratings indicate that Adjustment and Sociability are most important for jobs in the Managerial and Sales job families. Inquisitive is most important for Managers, and Service and Support jobs require the highest levels of Interpersonal Sensitivity. Ratings on Adjustment vary by job family, but all fall approximately within one standard deviation of one another. The same is true for Prudence and Learning Approach.

In summary, although personality contributes to job performance across contexts, many traditional job analysis techniques fail to investigate the personal characteristics required for success in a given job. As a result, these techniques conclude that cognitive and psychomotor predictors represent critical worker characteristics, with personality playing a minor or even trivial role. However, in the last decade, personality-based job analysis instruments such as the PPRF and the PIC suggest that professionals can use personality characteristics to differentiate between jobs, and more importantly, demonstrate predictive validity with job performance. Results from personality-related job analyses can serve a number of intended purposes, such as: (a) developing hypotheses about personality scales most predictive of job performance, (b) specifying training needs, and (c) identifying behaviors associated with successful performance to construct job performance rating forms for criterion validation.

## ILLUSTRATIVE APPLICATIONS

To illustrate the use of the PIC, we present results for three jobs: (a) a CEO in a regional real-estate company, (b) Sales Representatives in a national telecommunications company, and (c) Drivers in a southeast transportation company. Hogan collected PIC data for all three jobs as part of test validation efforts designed to establish a selection profile for high potential job applicants. The process used for these job analyses followed the procedures outlined in Table 1.

### *Step 1 – Review of Existing Job Analysis Information*

The first step requires a review of existing job analysis information. During this step, analysts collect and review additional job information using existing job descriptions, job postings, structured job interviews, focus groups, observations, and existing performance metrics. This information provides the foundation for comparing and interpreting PIC results.

In addition to collecting PIC data, Hogan reviewed job descriptions and conducted job analysis interviews for all three sample jobs. Also, Hogan conducted focus groups to collect additional job content for the CEO job. For all three jobs, analysts used this information to provide job specific context in which to interpret PIC results.

### *Step 2 – Identify and Train SMEs*

Step 2 involves identifying 8-10 SMEs to complete the PIC. SMEs should be familiar with the job requirements and behaviors associated with successful performance. Although supervisors and high performing job incumbents typically serve as SMEs, others with knowledge of the job may also serve as raters, including co-workers and peers, clients/customers, human resource representatives, or former job incumbents.

SME training helps ensure that job analysis results are consistent across raters and serve as a valid indicator of job requirements. Although PIC instructions are meant to be self-explanatory so that the job analysis survey can be completed without additional training, one-on-one instruction (a) provides an opportunity to clarify the purpose of the job analysis and its instructions, (b) helps establish a common frame of reference for SMEs to

complete ratings, and (c) gives SMEs an opportunity to ask questions about the survey or the process used for collecting and using data. Analysts may provide PIC training by telephone, via a web-based seminar, or in person.

Both supervisors and high performing job incumbents served as SMEs for the three sample jobs. Co-workers and peers highly familiar with the target job also served as SMEs for the CEO job. For all three jobs, SMEs received instructions on the purpose of and procedures for completing the PIC prior to data collection.

### *Step 3 – Data Collection*

Next, Hogan collects SME responses to PIC items. The PIC is available online and via paper-and-pencil. For online administrations, SMEs complete the PIC on a website accessed using Hogan-generated user IDs and passwords. Data collected online are stored in and automatically retrieved from an SQL database. In contrast, for paper-and-pencil administrations, Hogan mails all necessary materials to SMEs, who complete the forms and fax back completed answer sheets. Analysts scan these data into the database for scoring and storage.

PICs for the sample jobs were completed via paper-and-pencil for the Driver job and through the Hogan website for the CEO and Sales Representative jobs. SMEs completed the PIC for the CEO (N = 8), Sales Representative (N = 23), and Driver (N = 18) jobs.

### *Step 4 – Data Analysis*

Data analyses begin by computing inter-rater reliability estimates on item responses using intra-class correlations (ICC; Shrout & Fleiss, 1979). Specifically, Hogan uses a two-way mixed model to test for absolute agreement among ratings. Two-way mixed models are appropriate with interchangeable raters and fixed items. Absolute agreement takes the magnitude of rating differences into account when computing reliability.

Hogan requires a reliability coefficient of .80 before proceeding with further analyses. When reliabilities fall below this level, analysts correlate individual item-level responses to identify potential outliers, which are removed from further analyses. If no outliers exist, data from additional raters may be required to achieve adequate reliability ratings.

Figure 4 presents normative PIC profiles for the three sample jobs. ICC estimates were .84, .94, and .89 for the CEO, Sales Representative, and Driver jobs, respectively. As seen, PIC results from the three client organizations that provided sample data indicate that successful CEO's deal well with stress (high Adjustment), are driven for success (high Ambition), enjoy interacting with others (high Sociability), and seek out new methods for approaching work and work processes (high Inquisitive). Successful Sales Representatives are also characterized by high Ambition and Sociability, but not Adjustment or Inquisitive. In contrast, other than requiring moderate levels of Adjustment, successful Drivers are primarily characterized by an ability to follow rules and adhere to regular practices and job structure (high Prudence). As these results demonstrate, although commonalities exist across jobs, job type can moderate the relationship between some FFM scales and job performance.

### *Step 5 – Incorporating Job Analysis Results with Validity Data*

During step 5, Hogan compares PIC results to additional job analysis information. Examining similarities and differences across data collected through multiple methods helps assure that results are valid and will generalize to future job applicants and incumbents. Differences can be important indicators of (a) recent

or impending changes in a job, (b) a failure to collect or interpret data accurately, or (c) a lack of clarity in or common frame of reference for job requirements across raters.

Also, Hogan compares PIC results to archival PIC information for similar jobs and interprets PIC results in relation to SME ratings on another job analysis survey, the Competency Evaluation Tool (CET; Hogan Assessment Systems, 2006). The CET asks SMEs to indicate the degree to which each of 56 listed competencies relates to successful performance in the target job. A brief definition accompanies each listed competency to align raters' frames of reference. Raters evaluate each competency using a five-point scale ranging from 0 (*Not Associated with Job Performance*) to 4 (*Critical to Job Performance*).

After SMEs complete the CET, Hogan computes mean criticality ratings for each competency across all raters, as well as a mean criticality rating across all competencies. Using these data, analysts identify the critical competencies for the target job as those competencies with mean scores one standard deviation above the overall average. Typically, eight to twelve competencies meet this requirement. The SME ratings provide a basis for structural models to examine comparability of job domains and their competencies across jobs within and across families (J. Hogan, Davies, & R. Hogan, 2007). Table 4 presents the critical competencies from the CET for CEO, Sales Representative, and Driver jobs.

After identifying critical competencies, Hogan examines relationships between scores on each of the seven HPI scales and supervisory ratings of competency related behaviors using data in the Hogan research archive, which contains criterion-related validity evidence from over 250 jobs. These relationships are derived from meta-analysis results examining the empirical validity of each HPI scale for predicting conceptually aligned job behaviors. As demonstrated by J. Hogan and Holland (2003), individual personality scales are more predictive of job performance measures when conceptually aligned with specific work outcome measures. Researchers often underestimate the predictive validity of personality assessments when they only use procedures that focus on the relationships of individual personality scales to overall job performance.

Furthermore, very few applied personality inventories produce only one scale intended to represent an accurate and valid representation of personality. Instead, the majority of personality instruments produce multiple scales intended for simultaneous examination and interpretation. Therefore, Hogan identifies which PIC scales are most related to job performance, determines the mechanisms by which specific PIC scales contribute to job performance through conceptually aligned job-critical competencies, and leverages these results to predict successful performance in the target job.

#### *Step 6 – Reporting and Communicating Results*

Once Hogan determines the most predictive personality scales from the PIC, as well as manifestations of those attributes in job-critical competencies for the target job, analysts document results from the job analysis process and communicate results to the client. The interpretation and communication of results may differ based upon the intended use of the job analysis data (e.g., selection, development, job comparison). Specifically, if the purpose of the job analysis is to incorporate personality assessment into personnel selection, Hogan uses PIC results to create a profile to distinguish between high-, moderate-, and low-potential job applicants. For a selection context, Hogan provides additional information, such as estimated pass rates based upon archival information for similar jobs and assessment contexts and estimated adverse impact based upon archival assessment data.

Alternatively, when the purpose of the job analysis is to help employees create comprehensive developmental plans, Hogan uses PIC and CET results to provide incumbents with information about the personality

characteristics and competencies most-closely associated with successful job performance. Specifically, PIC results provide insights into behavioral attributes required for success in the job, whereas CET results represent how those behaviors translate into successful performance in the job. For example, the HPI Adjustment scale is significantly related to multiple CET dimensions, including Stress Tolerance, Work Attitude, Teamwork, Customer Service, and Dependability. Developmental plans for individuals with low scores on Adjustment may focus on any of these areas if CET results indicate that they are essential for successful job performance.

Organizations also collect job analysis data for other purposes, such as comparing the personality-based requirements of two jobs. For example, when the employer uses PIC and CET results to compare jobs, analysts graph PIC results and compare CET ratings to determine the degree of between-job similarity. Specifically, they construct 95% confidence intervals for each PIC scale by adding or subtracting 1.96 (SE<sub>msmt</sub>) to and from each raw score scale mean. Overlap between CET ratings provides additional evidence of between-job similarity. To conduct these analyses, Hogan computes Tilton's (1937) overlap statistic, dividing the number of CET dimensions rated as important or unimportant in both jobs (N<sub>s</sub>) by the sum of N<sub>s</sub> and the number of CET dimensions rated differently across the jobs (N<sub>d</sub>). This calculation allows analysts to determine the percent of job-critical competencies that the two jobs share. Job similarity comparisons provide a useful means of determining how effective one profile may be for multiple jobs or if criterion-related evidence can be transported from one job to another (J. Hogan, Davies, & R. Hogan, 2007).

## SUMMARY

Both the purpose of the job analysis and job context play critical roles in determining how to approach these steps. For example, job type and level may impact the selection of SMEs. For higher level jobs, multiple supervisors or incumbents may not be available. As with our CEO example, peers and co-workers often serve as SMEs for senior executive jobs. In addition, very little existing information, such as job descriptions or performance metrics, may exist for new jobs. In such cases, job analysis results can serve as important indicators of how well key stakeholders, or those designing the job, agree on its objectives and the personal characteristics required for success.

Furthermore, analyses, interpretation, and implementation of job analysis results may differ based upon the purpose of the job analysis. For selection, comparing job analysis results with information establishing the validity of the personality constructs under examination is critical for establishing predictive profiles. In contrast, comparing results across multiple profiles is critical for establishing job similarity. Analysts must first define the purpose of the job analysis before they can examine, communicate, and implement results.

## DISCUSSION

Despite the increased use of personality measures in the workplace (Hough & Oswald, 2008), relatively few methods for analyzing jobs using personality-related terminology exist. Although some worker-oriented job analysis methods do take personality-related constructs into account, few job analysis instruments are designed to assess these characteristics. In this chapter, we describe the development and application of the PIC, a job analysis designed to specify personality-based requirements of various jobs.

Similar to other worker-oriented methods, there are several advantages of the PIC. First, it allows professionals to draw cross-job comparisons because all jobs are measured using the same dimensions and rating scales. This not only allows job comparison, but also provides information to determine when local criterion-related validity evidence is transportable to additional locations or other jobs. Such comparisons are required for

validity generalization under the *Principles for the Validation and Use of Personnel Selection Procedures* (Society for Industrial and Organizational Psychology, 2003). However, unlike other worker-oriented methods, the PIC aligns with one personality instrument, the HPI, which predicts a wide range of important individual behaviors across jobs and organizations. Nevertheless, because the PIC is sufficiently representative of the FFM, and it can be used to align with any FFM personality-based inventory. Finally, by measuring broad personality-related constructs instead of narrowly defined job tasks, the PIC offers a more robust approach to job analysis than job-oriented methods that cannot adapt to contexts in which tasks are ambiguous or change over time.

Like any personality-related job analysis instrument, the PIC does not capture all of the individual characteristics essential for successful job performance. Instead, analysts should use the PIC in conjunction with additional job analysis information to gain a comprehensive understanding of job requirements. Such information may include educational or certification requirements, job descriptions, existing performance metrics, data gathered during interviews or focus groups, or validity evidence gathered for other jobs with similar personality requirements.

Analysts should conduct personality-based work analysis when their organization considers including personality measures in human resource interventions. Once analysts identify the personality characteristics associated with successful job performance, they can use the results to create profiles to identify high-potential job applicants, pinpoint developmental opportunities with current job incumbents to facilitate development, and structure training programs around the behaviors associated with these characteristics. Applications are most effective when they rely upon accurate and reliable information gained through job analysis.

Although job-oriented approaches provide valuable information concerning the tasks that are critical for performance, jobs cannot be clearly or completely defined using only a list of specific tasks. Failure to consider personality in work analysis efforts results in failure to capture individual characteristics that are essential for success across jobs. Furthermore, when jobs change, it is critical that organizations identify the individual characteristics that facilitate incumbents' accommodation to a new role. Similarly, when new jobs evolve that require total workforce staffing (e.g., airport security screener), an a-priori job analysis of the "unborn" job is essential for developing selection tools used to populate a new workforce.

Personality-based work analysis provides an effective method for comparing jobs to one another, but also for assessing individual potential across several jobs. Just as individual personality characteristics predict multiple outcomes, individuals possessing certain characteristics may be successful across multiple jobs. For example, the HPI Ambition scale is the most predictive scale across managerial- and sales-related positions. However, this should come as no surprise, because the Ambition scale measures the degree to which a person is self-confident, goal oriented, and driven (R. Hogan & J. Hogan, 2007). The PIC is designed to create a profile of the "ideal" employee for a specific job. Just as PIC profiles can be compared to one another, individual HPI scores can be compared to multiple PIC profiles to assess candidate fit. Such comparisons require accurate job analysis profiles for the jobs available in the organization.

The paucity of research on personality-based work analysis instruments creates opportunities for future research in this area. First, researchers should explore different item and response formats. For example, items assessing deficiencies within organizations may prove more effective for identifying training needs than items written to identify ideal employee profiles. Second, researchers should explore alternative methods for assessing individual fit to an ideal profile. As personality constructs differentially predict performance in different jobs, researchers should examine methods for weighting personality variables when creating ideal

profiles and comparing individual scores to these profiles. Along those lines, alternatives for comparing ideal profiles to one another also warrant investigation. For example, researchers have yet to examine the potential benefits of excluding scales unrelated to job performance when comparing ideal profiles. Finally, job analysis methods need continual refinement to enhance their predictive accuracy for forecasting the job requirements employers need to acquire and develop workforce talent.

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Table 1

*Job Analysis Process for the PIC*

Step	Description
1. Review Job Information	Begin job analysis by reviewing all available information (e.g., job descriptions, performance metrics) for the target job
2. Identify and Train SMEs	Identify at least 8 to 10 Subject Matter Experts (incumbents, supervisors, other job experts) to complete the PIC
3. Data Collection	Administer PIC and collect additional job analysis data if applicable (e.g., interviews, observation, SME focus groups)
4. Data Analysis	Examine reliability of SME responses and identify which personality-based scales are most related to performance in the target job(s)
5. Incorporate with Other Data	Review PIC results along with other information (e.g., other job analysis data, validity information)
6. Reporting Results	Deliver PIC results, providing appropriate interpretive information based on the intended use of the HPI (e.g., selection or development)

Table 2

*PIC Scale Definitions*

Scale Name	Definition
	<i>Would performance be improved if the incumbent</i>
Adjustment	is calm and self-accepting
Ambition	takes initiative and displays self confidence
Sociability	needs or enjoys social interaction
Interpersonal Sensitivity	is perceptive, tactful, and sensitive
Prudence	is conscientious and conforming
Inquisitive	shows creativity and an interested solving in problems
Learning Approach	remains up-to-date with job related knowledge

Table 3

## PIC Results by Job Family

Job Family	N	Adjustment		Ambition		Sociability		Interpersonal Sensitivity		Prudence		Inquisitive		Learning Approach	
		M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
Managers & Executives	185	19.95	2.39	17.48	1.88	9.73	2.91	13.67	2.22	18.23	1.94	13.77	2.52	11.83	1.57
Professionals	98	19.05	2.40	15.76	2.32	7.85	2.45	12.47	2.66	18.48	2.12	12.64	2.55	11.97	1.54
Technicians & Specialists	38	18.17	3.00	14.72	2.06	6.39	2.43	11.61	2.14	18.27	2.20	12.26	2.55	11.60	1.50
Operations & Trades	42	19.49	1.94	14.88	2.09	6.28	2.91	12.03	2.55	19.62	1.42	11.38	2.82	10.98	1.81
Sales & Customer Support	40	18.91	1.75	17.31	1.32	10.05	2.22	13.55	1.87	18.10	1.43	12.69	1.30	11.50	.99
Administrative & Clerical	27	19.48	1.35	15.69	1.94	7.07	2.07	12.55	1.84	18.71	1.45	10.87	1.69	11.58	1.06
Service & Support	14	20.03	1.83	16.24	1.53	9.30	1.58	14.63	1.35	19.31	1.46	11.30	1.73	10.89	1.29

Note: N = Number of jobs

Table 4

*Highest Rated Competencies for CEO, Sales Representative, and Driver Jobs*

	<b>CEO</b>	<b>Sales Representative</b>	<b>Driver</b>
1	Judgment	Integrity	Dependability
2	Industry Knowledge	Achievement Orientation	Safety
3	Trustworthiness	Trustworthiness	Trustworthiness
4	Leadership	Dependability	Work Attitude
5	Achievement Orientation	Oral Communication	Job Knowledge
6	Decision Making	Planning/Organizing	Integrity
7	Building Partnerships	Sales Ability	Detail Orientation
8	Organizational Commitment	Consultative Sales	Verbal Direction
9	Conflict Resolution	Flexibility	Organizational Commitment
10	Stress Tolerance	Stress Tolerance	Stress Tolerance

Figure 1

The PIC

## PERFORMANCE IMPROVEMENT CHARACTERISTICS JOB ANALYSIS



NAME: \_\_\_\_\_ ID: \_\_\_\_\_

**Instructions**

Personal characteristics affect job performance as a \_\_\_\_\_. Below is a list of characteristics used to describe behavior. Please provide a rating of the extent to which each characteristic improves performance as a \_\_\_\_\_. Use the scale below to mark your responses in the blanks provided.

Does <b>Not</b> Improve Performance	<b>Minimally</b> Improves Performance	<b>Moderately</b> Improves Performance	<b>Substantially</b> Improves Performance
0	1	2	3

**Would job performance improve if the incumbent \_\_\_\_\_?**

1. Is steady under pressure _____	25. Is kind and considerate _____
2. Is not easily irritated by others _____	26. Understands others' moods _____
3. Is relaxed and easy-going _____	27. Likes being around other people _____
4. Doesn't worry about his/her past mistakes _____	28. Is good-natured, not hostile _____
5. Stays calm in a crisis _____	29. Is self-controlled and conscientious _____
6. Rarely loses temper _____	30. Supports the organization's values _____
7. Doesn't complain about health problems _____	31. Is hard-working _____
8. Trusts others -- is not suspicious _____	32. Does as good a job as possible _____
9. Gets along well with supervisors and authority figures _____	33. Pays attention to feedback _____
10. Takes initiative -- solves problems on his/her own _____	34. Likes predictability at work _____
11. Is competitive _____	35. Rarely deviates from standard procedures _____
12. Is self-confident _____	36. Respects authority _____
13. Is positive _____	37. Is imaginative and open-minded _____
14. Takes charge of situations _____	38. Is interested in science _____
15. Has clear career goals _____	39. Is curious about how things work _____
16. Enjoys speaking in front of groups _____	40. Likes excitement _____
17. Seems to enjoy social interaction _____	41. Enjoys solving problems and puzzles _____
18. Likes social gatherings _____	42. Generates good ideas and solutions to problems _____
19. Likes meeting strangers _____	43. Likes cultural activities _____
20. Needs variety at work _____	44. Keeps up on advances in the profession _____
21. Wants to be the center of attention _____	45. Likes to learn new things, enjoys education & training _____
22. Is witty and entertaining _____	46. Is good with numbers _____
23. Is warm and friendly _____	47. Remembers details _____
24. Is tolerant (not critical or judgmental) _____	48. Reads in order to stay informed _____

**RESEARCH INFORMATION ONLY -- OPTIONAL**

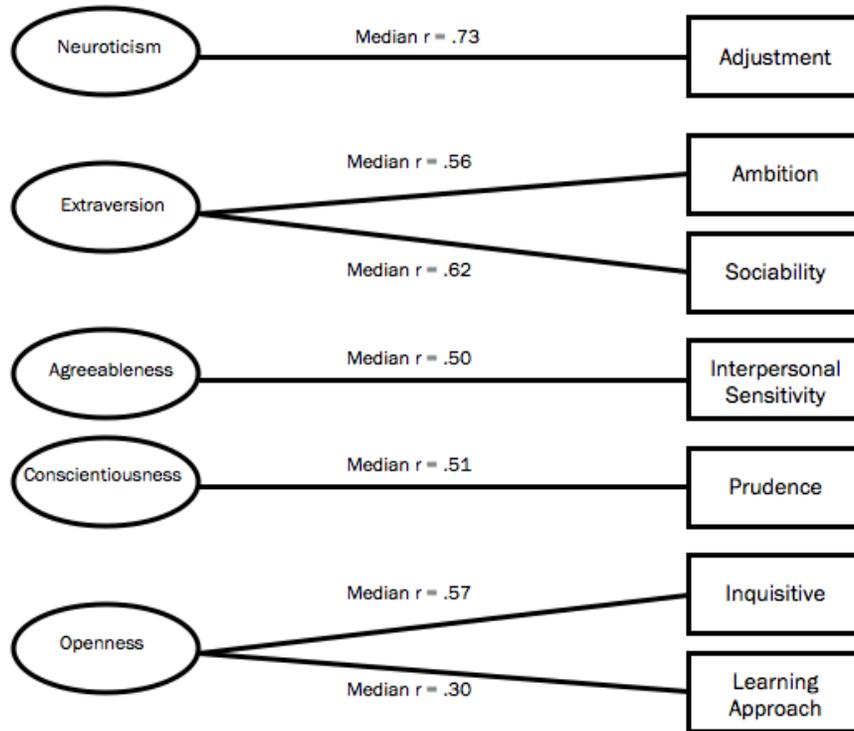
1. Indicate **all** your years of experience with the **job** you just described as a (name of job described): \_\_\_\_\_  
 \_\_\_\_\_ Supervisor    \_\_\_\_\_ Incumbent    \_\_\_\_\_ Trainer    \_\_\_\_\_ Other: \_\_\_\_\_

2. Gender:    \_\_\_ Male    \_\_\_ Female

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Figure 2

*Relationships between the HPI and Other Five-Factor Model (FFM) Inventories*



Note: Median correlation coefficients summarize HPI relations with the NEO PI-R (Goldberg, 2000), Goldberg's (1992) Big-Five Markers (R. Hogan & J. Hogan, 2007), Personal Characteristics Inventory (Mount & Barrick, 2001), and the Inventario de Personalidad de Cinco Factores (Salgado & Moscoso, 1999). The ranges of correlates are as follows: Adjustment/Emotional Stability/Neuroticism (.66 to .81); Ambition/Extraversion/Surgency (.39 to .60); Sociability/ Extraversion/Surgency (.44 to .64); Interpersonal Sensitivity/Agreeableness (.22 to .61); Prudence/Conscientiousness (.36 to .59); Inquisitive/Openness/Intellect (.33 to .69); Learning Approach/Openness/Intellect (.05 to .35).

Figure 3

Normative PIC Results by Job Family

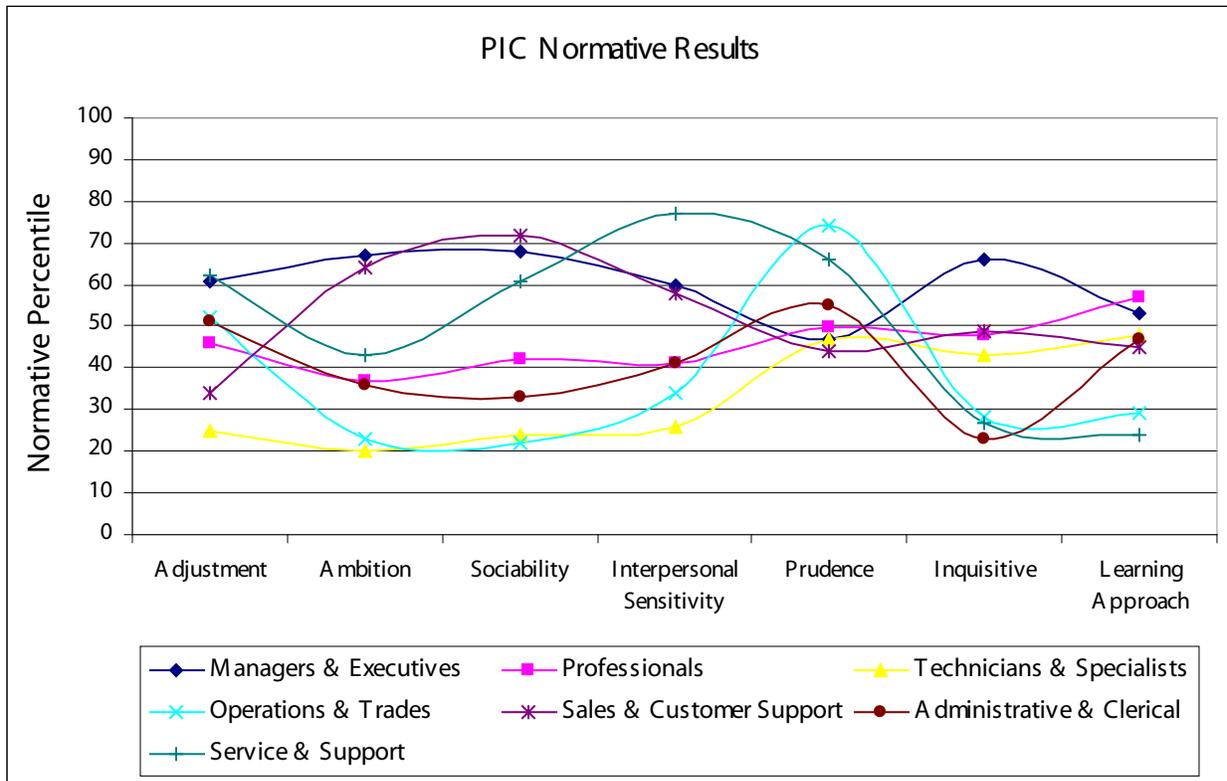


Figure 4

Normative PIC Results for CEO, Sales Representative, and Driver Jobs

