Evaluating Personality-Based Job Requirements

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Although "worker characteristics" is a major focus of job analysis methods, there are few systematic procedures for studying personality-based job requirements. This is not to say that job analysts have ignored personality influences; there are personality footprints visible in many worker-oriented job analysis methods. However, most available methods have not focused on trying to solve the problem of what personality characteristics are important for effective job performance. To answer this question requires a taxonomy of personality characteristics that influence work, a procedure for identifying these characteristics reliably, and methods to evaluate the validity of the job analysis results.

Our objective for developing a new job analysis method was to investigate the possibility that an integrated system of job analysis, predictor specification, and criterion measurement could be built on a common taxonomy of underlying Big-Five personality constructs. We wanted to be able to link personality constructs as job requirements to predictors and outcome measures that assess individual differences. This personality-based job analysis is intended to serve empirical test validation.

The first question for any assessment is what to measure. The defensible answer will specify which constructs and why they are important. We sought to identify and evaluate personality characteristics that influence work—characteristics whose manifestations are sufficiently important that they can be observed and evaluated by others. Sixty years of personality research suggests five factors can account for observers' descriptions of individual differences in social behavior. These "Big-Five" factors emerge from lexical analyses of trait descriptions evaluating others' performance. The five dimensions as they apply to worker performance are as follows:

Emotional Stability = nervous and moody—calm and assured

Extraversion/Surgency = quiet and unassertive—active and outgoing

Conscientiousness = impulsive and careless—responsible and conforming

Agreeableness = hard-nosed and tough—tactful and sensitive

Intellect/Openness = narrow and unimaginative—curious and imaginative

The observable part of personality is a person's reputation. At work, reputation builds from interactions with others, it is evaluative in nature, and observers can rate targets with high reliability. This suggests that a personality-based job analysis minimally ought to assess five dimensions because they are the core of an adequate description of a worker's reputation.

Construction of Performance Improvement Characteristics

The Performance Improvement Characteristics (PIC) job analysis method is designed to evaluate personality-based job requirements that can subsequently inform test validation research (Hogan & Rybicki, 1998). Ideally, PIC results reflect the personality dimensions that are most

important for job performance and these results are then used to develop hypotheses about personality measures that, potentially, are valid predictors of job performance. PIC results also have implications for criterion specification in that personality requirements can point to the importance of certain job performance criteria (e.g., if conscientiousness is important worker requirement, then performance criteria such as integrity, attention to detail, and dependability ratings could be relevant).

The structural model for the PIC derives from the structure of the Hogan Personality Inventory (HPI; Hogan & Hogan, 1995), which is a measure of normal personality based on the Big-Five model. The goal of the HPI is to predict occupational performance and its has a 20 year history of doing so. We wished to capitalize on the measurement structure that we knew would successfully integrate a job analysis with valid predictors of job performance. The PIC consists of 48 items that form seven scales. Each scale consists of five to nine items, with no item overlap, and the scales, along with their corresponding Big-Five dimensions and definitions, appear in Figure 1. The response format is a 4-point scale indicating the extent to which having the personal characteristic improves job performance. It is interesting to note that Primoff's Job Element Procedure(see Primoff & Eyde, 1988) uses a very similar evaluation format. The Flesch-Kincaid analysis indicates that the items are written at a 7th grade reading level. A sample of the PIC rating form apprears in Figure 2.

Figure 1

PIC Scales, Corresponding Big-Five Factors, and PIC Scale Definitions

PIC Scale	Big-Five Factor	PIC Scale Definition
Adjustment	Emotional Stability	Resilient, upbeat, & remaining calm under pressure
Ambition	Surgency	Competitive, self-confident, & taking initiative
Sociability	Surgency	Approachable, outgoing, & social
Likeability	Agreeableness	Considerate, perceptive, tactful, & good natured
Prudence	Conscientiousness	Planful, controlled, & attentive to details
Intellectance	Intellect/Openness	Imaginative, creative, open-minded, & analytical
School Success	Intellect/Openness	Staying up-to-date on business & technical matters

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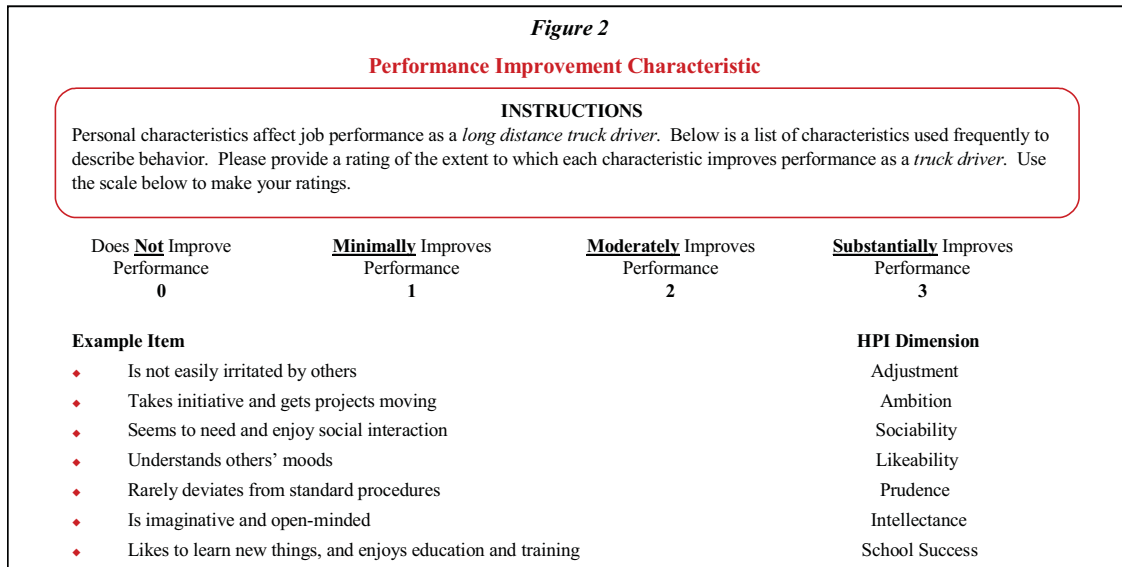
Internal Psychometrics

Table 1 presents the PIC scales, descriptive statistics, internal consistency, and test-retest reliabilities. As seen, the internal consistency reliabilities range from .76 (Adjustment) to .87 (Likeability) with an average alpha of .81. Test-retest reliabilities of ratings gather on the secretary job over a three-month interval ranged for .60 (School Success) to .84 (Intellectance) with an average of .72. The PIC scales are all intercorrelated with r's ranging from .2 to .6 and although this positive manifold is not unusual, lower scale to scale correlations would have been desirable.

Table 1
Descriptive Statistics and Reliabilities for the Performance Improvement Characteristics

N = 822

Scale Name	Number of Items	Mean	SD	Alpha	Inter-Item r	R_{tt}*	SE
Adjustment	9	19.13	4.39	.76	.26	.64	.16
Ambition	7	15.92	4.04	.83	.40	.80	.14
Sociability	6	7.67	4.15	.83	.44	.73	.15
Likeability	6	12.91	3.86	.87	.53	.69	.14
Prudence	8	18.50	3.89	.82	.36	.69	.14
Intellectance	7	10.68	5.08	.85	.44	.84	.18
School Success	5	11.44	2.86	.84	.52	.60	.12

* n = 79

Nevertheless, the factor structure of the item correlations supports a seven factor solution. We evaluated the PIC's factor structure using principal axis procedures with varimax rotation. As shown in Table 2, the PIC's internal structure is consistent with its conceptual model (i.e., the Hogan Personality Inventory). In nearly every case (94%), the items written to map a specific construct loaded most heavily on the correct factor. Only two items failed to have their primary loading on the conceptual factor and only one item (item 1) failed to load (either through primary or secondary loading) on the proper scale. Overall, the factor analytic results support the seven-factor model that the PIC was designed to measure. The data also provide additional evidence, at least in terms of internal structure, supporting the congruence between the PIC and HPI. No other job analytic and predictor tool(s) that we are aware of possess such similar features.

Table 2
PIC Factor Structure Loadings

| Adjustment	Ambition	Sociability	Likeability	Prudence	Intellectance	School Success
.58 (4)	.67 (14)	.75 (18)	.74 (25)	.72 (33)	.70 (39)	.62 (44)
.58 (3)	.64 (10)	.69 (22)	.71 (23)	.72 (35)	.70 (41)	.58 (48)
.53 (8)	.64 (12)	.68 (21)	.68 (28)	.61 (36)	.57 (42)	.57 (45)
.51 (7)	.57 (13)	.66 (17)	.65 (24)	.58 (34)	.55 (38)	.55 (46)
.34 (6)	.51 (11)	.62 (19)	.63 (27)	.44 (31)	.42 (37)	.47 (47)
.26 (5)	.50 (15)	.60 (16)	.60 (26)	.44 (32)	.33 (43)	
.25 (2)	.30 (16)	.36 (20)		.41 (30)	.30 (40)	
.23 (9)*				.25 (29)*		
(1)**						

Note. Item numbers are shown in parentheses. *Secondary loading on primary factor; ** Failed to load on primary factor.

Applications

To date, we have gathered over 4,000 PICs across more that 210 jobs. Our samples of jobs roughly represent the base rate of occupational types in the U.S. economy as reported by Gottfredson and Holland (1996): Realistic (66.7%), Conventional (13.4%), Enterprising (11.1%), Social (4.6%) Investigative (3.0%), and Artistic (1.2%). In all studies, subject matter experts (SMEs) complete the PICs using paper-and-pencil forms or electronic files on the internet.

As a new methodology, we focused on basic applications to evaluation job differentiation, reliability of ratings across raters and jobs, and validity of results. Three research questions and example applications are presented next.

Differentiating among Jobs. Any useful job analysis must be sensitive enough to identify valid differences in job requirements. We hypothesized that, for the majority of jobs, Adjustment and Prudence would improve performance (cf. Hogan & Holland, in press; Ones, Viswesvaran, & Schmidt, 1993) whereas the remaining personality constructs would be differentially important by job. To evaluate the discriminating power of the PIC, we compared jobs from the major occupational types in Holland's (1997) vocational theory. For PIC Adjustment and Prudence personal requirements, there was approximately a standard deviation range across SME job ratings; the remaining PIC scale ratings varied as much as one and a half standard deviations. Figure 3 shows the comparison of PIC profiles for selected jobs. Contrasts between sales and mail processing jobs are particularly distinctive and informative. The dispersed SME ratings for the mail processing job suggest that rater tendencies halo, leniency, and central tendency are not operating.

Figure 3

PIC Profile Comparisons
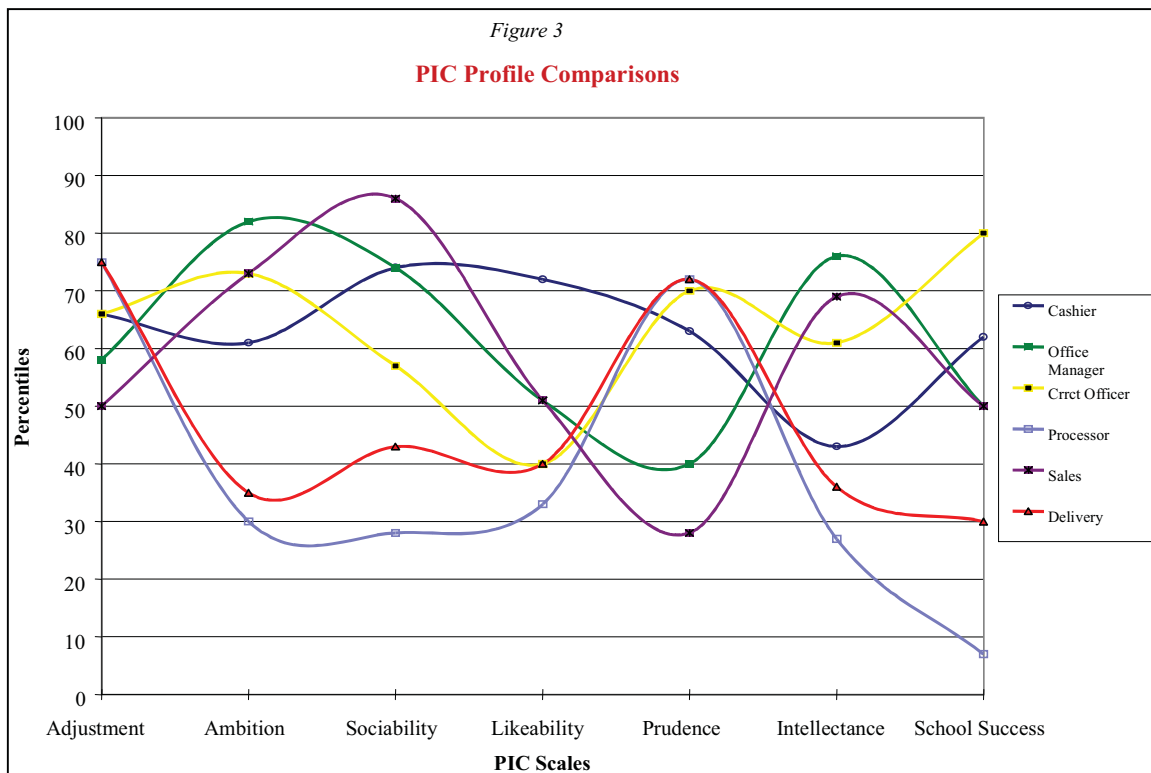
Reliability of Job Ratings across Locations. To evaluate the consistency of SME PIC ratings for the same job in different locations, data from a large utility company in the southeastern U.S. were gathered from first line supervisors. SMEs ($N > 10$) from five locations evaluated the personality-based requirements of the supervisor job. Figure 4 shows these profiles. As seen in Figure 4 for the various locations, the profile shapes are quite consistent with high scores for Adjustment, Ambition, and Intellectance and low average scores for the other scales. A one-way ANOVA indicated one significant difference within the scales for the Adjustment mean ratings ($F (4, 90) =$

3.46, p. < .01); post hoc analysis revealed that the only PIC mean rating differences were between locations with the highest and lowest mean Adjustment ratings. With substantial congruence of mean PIC ratings within scales, the results suggest that the personality-based requirements of the supervisor job in this company are the same regardless of geographic or operating location.

Figure 4

PIC Profiles for Supervisors in Different Locations
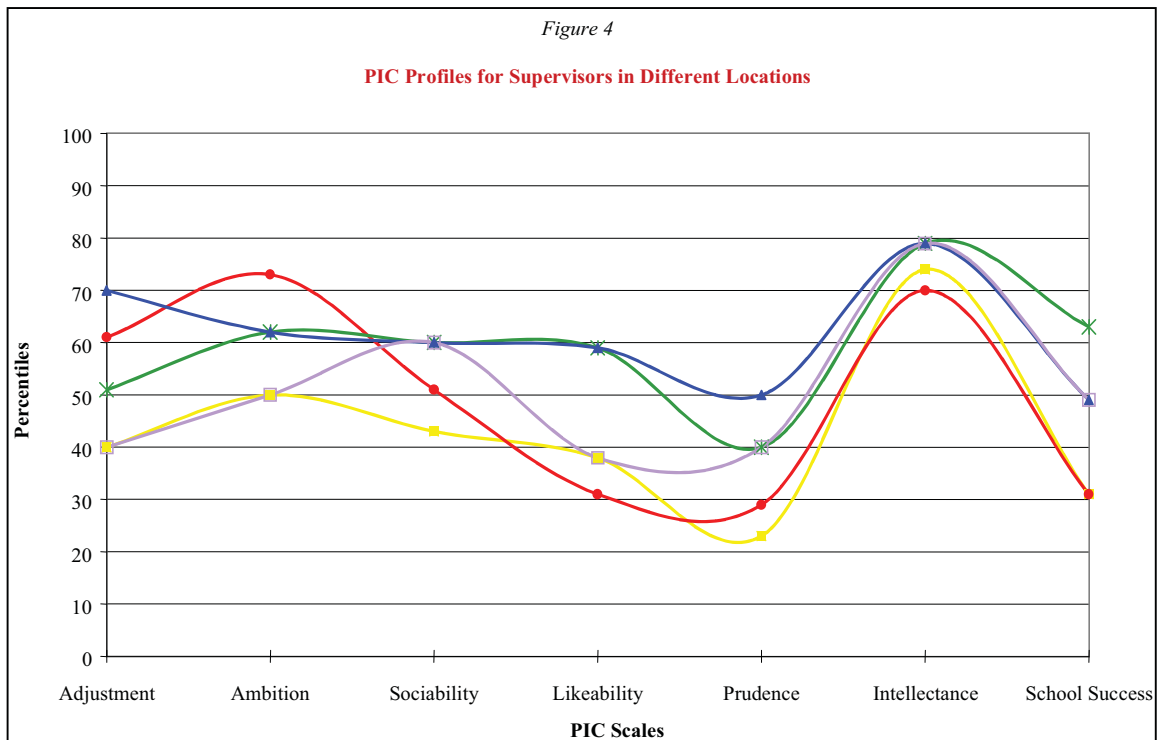
Validity of the PIC for Differentiating Job Performers

If PIC results are valid, then SMEs ratings should provide the personality profiles of effective job performers. These profiles should be distinctive from ineffective job performers. For this evaluation, it is necessary to have PIC job analysis data, personality predictor data from incumbents using the same personality constructs, and criterion data reflecting adequacy of overall job performance. Although a number of these validation studies exist (cf. Tett, Holland, & Hogan, 2002), one example with well developed criterion data illustrates the general findings. Figure 5 shows three personality profiles for convenience store cashiers—one summarizes SMEs mean PIC ratings for the personality-based job requirements, and the other two are HPI mean scale scores for top and bottom performing store cashiers. The PIC and the HPI profiles of the top performers are similar and the HPI profile of the bottom performers is quite different. The PIC profile indicates that the requirements for improved performance include Adjustment, Ambition, Sociability,

Likeability, and Prudence. This translates into being calm under pressure, being action-oriented, meeting the public well, and being dependable and reliable. The HPI profile of the highest rated cashiers closely parallels the PIC requirements and is significantly different from the lowest rated cashiers on HPI Adjustment, Ambition, and Prudence. In the concurrent validation research, HPI Adjustment ($r = .50$, $p < .01$), Ambition ($r = .36$, $p < .05$), and Prudence ($r = .43$, $p < .05$) significantly predicted cashier job performance. This provides some preliminary evidence that the PIC yields profiles that closely match the characteristics of workers who are seen as effective.

Figure 5

Cashier Profiles for the PIC and HPI Profiles for Top and Bottom Performers
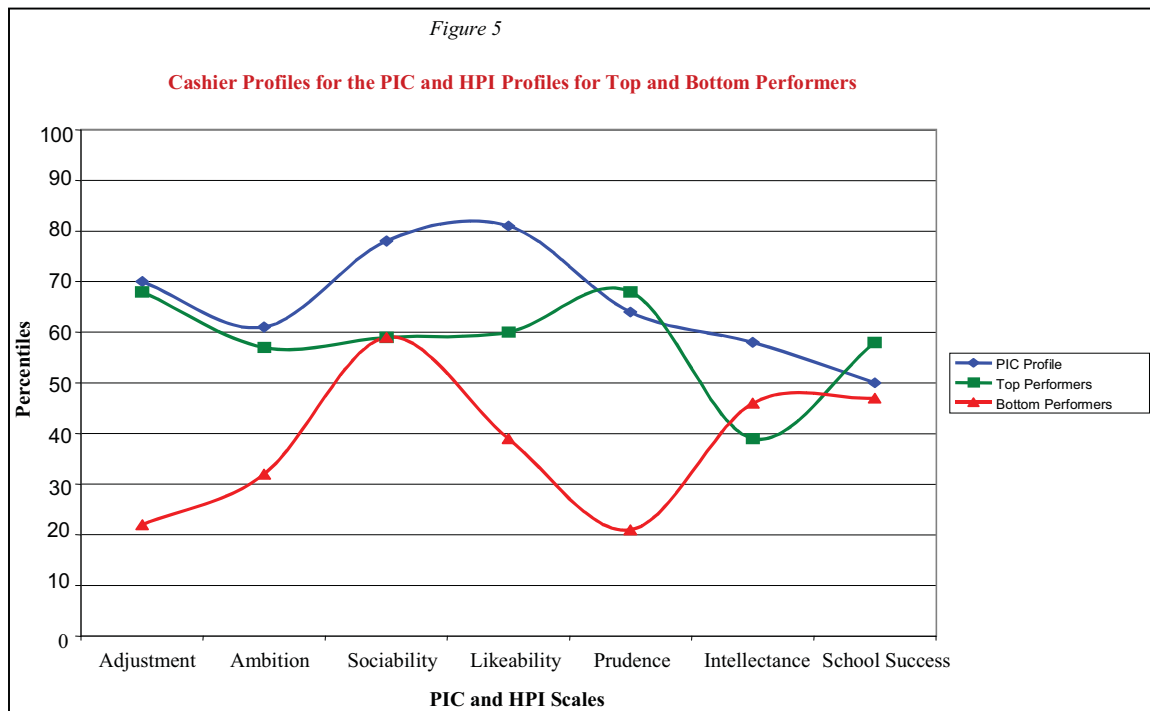
Summary

      To summarize, the PIC is a worker-oriented job analysis method designed to evaluate personality-related job requirements. It is designed primarily for use in conjunction with test validation research for personnel selection. PICs are scored by aggregating SME ratings to form a seven dimension profile. These results can then be used to develop hypotheses about personality measures that, potentially, are valid predictors of job performance. Results to date suggest the instrument is reliable and can yield valid results. Continued research is needed to extend the database with additional jobs and more applications.

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