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# Core Abilities Assessment

## Evidence of Reliability and Validity



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### Internal Consistency Reliability

The internal consistency reliability estimate for the *Core Abilities Assessment* total raw score was .85 in the standardization sample of 314 individuals. (See the Appendix for more details regarding the composition of the sample.) This reliability estimate indicates that the total raw score on the *Core Abilities Assessment* possesses good internal consistency reliability as provided in the guidelines of the U.S. Department of Labor (1999) for interpreting a reliability coefficient.

### Content Validity

In an employment setting, evidence of content validity is demonstrated by measuring competencies that are required for the job. The competencies measured by the *Core Abilities Assessment* (i.e., general mental ability, inductive and deductive reasoning, verbal reasoning, numerical ability, and abstract reasoning) are required for a broad range of jobs. For example, the Department of Labor's O\*NET™ database lists over 500 jobs for which inductive reasoning ability was rated as being important, very important, or critical for success (O\*NET OnLine, 2007). To confirm the relevance of the *Core Abilities Assessment* for the job you are hiring for, we recommend that you compare your job description and other sources of job information to the competencies measured by the assessment. For legal defensibility, the assessment solution must show relevance for the position for which it is used.

### Convergent Validity

Evidence of convergent validity is provided when scores on an assessment relate to scores on other assessments that claim to measure similar traits or constructs. Convergent validity for the *Core Abilities Assessment* is supported by part-whole correlations with the *Differential Aptitude Tests for Personnel and Career Assessment* (DAT for PCA; Bennett, Seashore, & Wesman, 1991), DAT for PCA convergent validity research, and results from the *Core Abilities Assessment* standardization study.

## Part-Whole Correlations with the DAT for PCA

Convergent validity for the *Core Abilities Assessment* is supported by correlations among *Core Abilities Assessment* items and the DAT for PCA tests that the items were drawn from. As presented in Table 1, these correlations range from .85 to .90, providing evidence that the abbreviated item sets from the *Core Abilities Assessment* measure the same constructs as the corresponding DAT for PCA full-length tests.

**Table 1. Correlations between Core Abilities Assessment and DAT for PCA Tests**

<i>Core Abilities Assessment</i>		DAT for PCA		
Item Subset	Number of Items	Test	Number of Items	$r_{\text{part-whole}}$
Verbal Reasoning	6	Verbal Reasoning	30	.87
Numerical Ability	7	Numerical Ability	25	.90
Abstract Reasoning	7	Abstract Reasoning	30	.85

*Note.*  $n = 569$  for Verbal Reasoning correlation;  $n = 1057$  for Numerical Ability correlation;  $n = 1695$  for Abstract Reasoning correlation. All correlations are significant at the .001 level.

## DAT for PCA Convergent Validity Studies

Years of previous studies on the DAT for PCA support its convergent validity, and by extension, the convergent validity of the tests comprising the *Core Abilities Assessment*. For example, scores on the DAT Verbal Reasoning and Numerical Ability composite correlate in the range of .38 to .79 with SAT scores and .68 to .94 with ACT scores (Bennett, et al., 1991). Similarly, DAT Abstract Reasoning scores correlate highly with general mental ability scores on assessments such as the *General Aptitude Test Battery* ( $r = .64$  with General Learning Ability) and the *Armed Services Vocational Aptitude Battery* ( $r = .69$  with the Armed Forces Qualification Test).

## Core Abilities Assessment Standardization Study — Convergent Validity

The *Core Abilities Assessment* standardization study provides further evidence for the assessment's convergent validity. In the standardization study, *Core Abilities Assessment* scores correlated .84 with *Wonderlic Personnel Test* scores (Wonderlic, 1992;  $n = 205$ ) and .56 with *Differential Aptitude Test Mechanical Reasoning* scores (DAT MR; Bennett, et al., 1991;  $n = 123$ ). The *Wonderlic Personnel Test*, like the *Core Abilities Assessment*, measures general mental ability, and the DAT MR measures mechanical aptitude, which typically correlates moderately to strongly with general mental ability (Bennett, 2006).

## Criterion-Related Validity

Criterion-related validity addresses the inference that individuals who score better on an assessment will be more successful on some criterion of interest. Criterion-related validity for the *Core Abilities Assessment* is supported by three lines of research, including validity generalization, DAT for PCA criterion-related validity studies, and the *Core Abilities Assessment* standardization study.

## Validity Generalization

Criterion-related validity for general mental ability tests like the *Core Abilities Assessment* is supported by validity generalization. The principle of validity generalization refers to the extent that inferences from accumulated evidence of criterion-related validity from previous research can be generalized to a new situation.

There is abundant evidence that measures of general mental ability, such as the *Core Abilities Assessment*, are significant predictors of overall performance across jobs. For example, in its publication on the *Principles for the Validation and Use of Personnel Selection Procedures*, the Society for Industrial and Organizational Psychology (2003) notes that validity generalization is well-established for cognitive ability tests. Schmidt & Hunter (2004) provide evidence that general mental ability “predicts both occupational level attained and performance within one’s chosen occupation and does so better than any other ability, trait, or disposition and better than job experience” (p. 162). Prien, Schippmann, and Prien (2003) observe that decades of research “present incontrovertible evidence supporting the use of cognitive ability across situations and occupations with varying job requirements” (p. 55). Many other studies provide evidence of the relationship between general mental ability and job performance (e.g., Kolz,

McFarland, & Silverman, 1998; Kuncel, Hezlett, & Ones, 2004; Ree & Carretta, 1998; Salgado, et al., 2003; Schmidt & Hunter, 1998; Schmidt & Hunter, 2004).

## **DAT for PCA Criterion-Related Validity Studies**

In addition to inferences based on validity generalization, findings from numerous studies provide evidence of criterion-related validity for the DAT for PCA tests that compose the *Core Abilities Assessment*. For example, of the 36 uncorrected validity coefficients obtained across 15 studies on DAT Verbal Reasoning (Bennett, et al., 1991), all met the U.S. Department of Labor (DOL) criterion (1999) for an assessment that is “likely to be useful” (i.e., validity coefficients ranging from .21 to .35) and 20 met the highest DOL standard, “very beneficial” (i.e., validity coefficients greater than .35). Similarly, for DAT Numerical Ability, 29 of 29 uncorrected validity coefficients obtained across 13 studies met the DOL “likely to be useful” criterion, and 11 met the highest standard of “very beneficial.” For DAT Abstract Reasoning, 24 of 24 uncorrected validity coefficients obtained across 21 studies met the DOL “likely to be useful” criterion, and 16 met the highest standard of “very beneficial.” The *DAT for PCA Manual* (Bennett, et al., 1991) provides additional details on these studies.

## **Core Abilities Assessment Standardization Study — Criterion-Related Validity**

The *Core Abilities Assessment* standardization study provides further evidence for the assessment’s criterion-related validity. In the standardization study, *Core Abilities Assessment* scores correlated .32 (uncorrected) with supervisor ratings of problem-solving behavior for a group of 115 plant mechanics at a national manufacturing company.

## **Importance of Local Validation**

The validity information presented in this guide is not intended to serve as a substitute for locally obtained validity data. Local validity studies, together with locally derived norms, provide a sound basis for determining the most appropriate use of *Core Abilities Assessment* scores. Therefore, whenever technically feasible, users of the *Core Abilities Assessment* should study the validity of the assessment at their own location or organization.

# Appendix

## Description of the Sample

The information provided in the following tables is based on *Core Abilities Assessment* data collected during the period December, 2006 through June, 2007.

### Appendix 1. Composition of the Sample by Job Title (*n* = 288\*)

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#### Occupation

Administrative Assistant	2.1%
Clerk	2.1%
Engineer	1.0%
Human Resources Occupations	1.0%
Information Technology Occupations	1.0%
Maintenance	2.1%
Manager	3.8%
Operations Planner	1.0%
Plant Mechanic	67.7%
Purchasing	1.4%
QC Specialist	1.4%
Sales Representative (Non-Retail)	5.2%
Supervisor	4.2%
Team Leader	1.0%
Vice President	1.0%
Other	4.0%

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\*Twenty-six individuals did not provide a response about their job title.

## Appendix 2. Composition of the Sample by Position Level (n = 288\*)

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<b>Position Level</b>	
Executive; Director	1.4%
Manager	3.8%
Supervisor	4.2%
Professional/Individual Contributor	13.9%
Skilled Trades	71.9%
Hourly/Entry-Level	4.9%

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\*Twenty-six individuals did not provide a response about their position level.



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