

Issues in Implementing Small-Scale Personnel Selection Programs

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Ray Colangelo

United States Department of Labor

Bureau of Labor Statistics

Background

- **A federal agency is using a cognitive test based on the logic-based measurement (LBM) model to select entry-level economists since January 2002.**
 - **LBM tests rely on the rules of formal logic and a taxonomy of logical forms as the basis for item development (Colberg, 1985).**
- **LBM tests are in wide use in the federal sector and have been shown by meta-analysis to be valid for selection in a wide variety of professional and administrative positions (Hayes & Reilly, 2002).**
- **Top management supported developing the test, and it was an initiative in the agency's strategic plan.**
- **The organization projects hiring requirements at about 100-150 economists per year, from an applicant pool ranging from 700 to 1,500.**

Background (cont'd)

Evidence of job relatedness

- **Construct and content validity were important elements of test development strategy (Colberg and Varon Cobos, 2001).**
- **Four recent job analyses have shown reasoning skills to be essential components of the job of government economist.**
- **The test was developed with participation and review of 11 SMEs, five of whom took the finished version of the test.**

Description of test

- **50 multiple-choice items total -- 25 verbal logical reasoning, 25 quantitative reasoning. Test takes 3 hours including setup. The test is paper-and-pencil, machine-scored.**
- **The verbal logical reasoning items require the test taker to read short paragraphs and draw valid conclusions by identifying the correct inference.**
- **The quantitative items are mathematical word problems requiring arithmetic operations actually used on the job.**
- **Item content is drawn from agency publications and documents.**

Conducting the pre-test

Issue: should the agency pre-test?

Technical perspective

- **Professional guidance in the testing community (e.g., SIOP Principles, 4th Ed. Draft, 2002) does not require pretesting when available pretest samples are small and unrepresentative.**

Organizational perspective

- **Pretesting public data collection instruments is standard practice of the organization -- a major federal statistical reporting agency.**
- **Internal stakeholders (e.g., mid-level managers and/or recruiters) expressed a preference for a pretest.**

Practical considerations:

- **Labor union objected to using an incumbent group, the only sample large enough for a reliable pretest.**

The decision:

- **Conduct pretest as a stakeholder confidence building measure.**

More on the pre-test

- **Two pretests were conducted, using half versions (odd/even split) of the test,**
 - **25 agency managers (odd/even item split),**
 - **41 college junior and senior economics majors (odd items only).**
- **College pretest sample was small and from a single college.**
- **The college pretest sample probably differed from real applicants in motivation because the incentives were weaker,**
 - **Pretest sample participants receive a small reward (\$50), and it is paid regardless of test score (low stakes testing),**
 - **Job applicants' potential reward is large (a job), and selection is top-down ("best qualified") based on the test score (high stakes testing).**
- **The college pre-test results played an important role in setting the cut score.**

Setting the cut score

Issue: How should the cut score be set?

Technical concerns:

- **Statistical and legal defensibility, utility/return-on-investment**
- **In top-down selection, applicable in government settings, the importance of the cut score is reduced and indirect (Cascio et al., 1988). The cut score affects Return on Investment by its impact on the average score of those selected.**
- **Angoff or Nedelsky subject-matter-expert (SME) methods of setting the cut score were not considered because of**
 - **the likely delay to test implementation,**
 - **low prospect of acceptance by internal stakeholders (cumbersome, time-consuming for SMEs, especially for a long test),**
 - **The diminished importance of the cut score in top-down selection.**
- **A commonly used variant of “norm-referenced” methods (Cascio et al., 1998) was the starting point for discussion.**
 - **set the cut score at the expected average (mean or median) score of applicants, with college sample as the proxy for applicants.**

More on the cut score

Organizational stakeholders' concerns:

- **Maintaining a large pool of applicants for near-term hiring,**
- **Filling positions in “geographically undesirable” locations,**
- **Not chilling the interest of future applicants due to “word of mouth” on college campuses that passing the test is difficult,**
- **Avoiding adverse impact.**

The decision:

- **An initial minimum passing score (cut score) was set based on the projected number of hires and applicants, and an assumed acceptance rate, but with a large cushion, in case the pass rate for applicants was much lower than the college sample.**
- **The minimum passing score was set with the goal that 60% of applicants would pass. The college pre-test sample was the proxy for the applicants and the basis for determining the minimum number of items correct.**

Comparison of College and Applicant Samples

	<u>Sample</u>	
	Pretest (College Students)	Job Applicants
Sample Size	41	822
Mean (% Correct)	51	62
SD (% Correct)	15	15
% Passing Test	60	82
Reliability (KR-20)	.74*	.84

*Spearman-Brown adjusted. Unadjusted reliability was .59

Common threads

Multiple perspectives about the selection process

- **Selection professional emphasized**
 - Maximizing the quality of applicants selected
 - Avoiding false positives, make correct hires
 - Selecting based on objective measures
- **Other internal stakeholders emphasized,**
 - Avoiding impairment of long term recruitment
 - Avoiding false negatives (e.g., losing good applicants who perform poorly on cognitive tests)
 - Retaining a key role for stakeholder judgment

Contrasting perspectives about selection

Selection Professional

- **Avoid false positives**
- **Hire only the best**
 - **Maintain standards and quality of those hired**
 - **Maximize the individual productivity of hired applicants**
- **There is a linear relationship between a valid ability test and individual employee productivity (Coward & Sackett, 1990)**
- **Select using objective procedures based on job analysis and validity evidence**
- **Evaluate based on validity evidence and return on investment**
- **Construct, content, and criterion related validity evidence are important.**

Other stakeholders

- **Avoid false negatives**
- **Hire enough candidates, fast enough**
- **Maintain the applicant pipeline & long-term recruitment prospects**
- **Score differences on objective tests of ability do not matter above a minimum threshold**
- **Select based on interviews and consensus of stakeholder judgment about applicants**
- **Evaluate a selection procedure based on applicant and hiring official acceptance**
- **Face validity and predictive validity evidence are important.**

Conclusions

- **Psychometric analysis is only one factor in decisions about implementing a selection procedure.**
- **There are multiple perspectives, emphases, and sensitivities of stakeholders regarding how applicants should be selected.**
- **Organizational preferences, values, and constituencies will weigh more heavily in decisions where statistics are inconclusive, as often happens in small-scale selection situations where sample sizes are small.**
- **Use of a cognitive ability test tends to intensify internal stakeholders' concerns.**

Lessons Learned

The selection professional should —

- **Obtain top management support for key decisions and maintain it.**
- **Implement the test with change management as well as technical issues in mind. Use internal OD consultant strategies and skills.**
- **Collaborate with internal stakeholders who have diverse perspectives about hiring. Meld, balance, and integrate the various perspectives.**
- **Think beyond the selection “stovepipe”. Think and plan based on overall strategic human resources and workforce planning.**
- **Communicate with and market to internal stakeholders whenever possible.**
- **Preserve credibility and influence as the technical expert by acknowledging the statistical limitations of the small-scale hiring situation when providing advice to management and other stakeholders.**
- **Evaluate test implementation broadly, taking into account stakeholder satisfaction as well as validity and return on investment analysis.**

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- Note: The opinions expressed here are solely the author's and do not necessarily reflect those of the U. S. Department of Labor, the Bureau of Labor Statistics, nor any other agency of the United States Government. Questions about this paper may be directed to the author via email at colangelo.raymond@bls.gov.