Screening for Attrition and Performance with Non-Cognitive Measures

Presented to:

Military Operations Research Society Workshop

Working Group 2 (WG2): Retaining Personnel

27 January 2010

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1. REPORT DATE 27 JAN 2010
2. REPORT TYPE 3. DATES COVERED 00-00-2010 to 00-00-2010
4. TITLE AND SUBTITLE Screening for Attrition and Performance with Non-Cognitive Measures
5a. CONTRACT NUMBER
5b. GRANT NUMBER
5c. PROGRAM ELEMENT NUMBER
5d. PROJECT NUMBER
5e. TASK NUMBER
5f. WORK UNIT NUMBER
6. AUTHOR(S) 7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) U.S. Army Research Institute for the Behavioral and Social Sciences, Arlington, VA, 22202
8. PERFORMING ORGANIZATION REPORT NUMBER
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)
10. SPONSOR/MONITOR’S ACRONYM(S)
11. SPONSOR/MONITOR’S REPORT NUMBER(S)
12. DISTRIBUTION/AVAILABILITY STATEMENT Approved for public release; distribution unlimited
14. ABSTRACT
15. SUBJECT TERMS
16. SECURITY CLASSIFICATION OF: a. REPORT unclassified b. ABSTRACT unclassified c. THIS PAGE unclassified
17. LIMITATION OF ABSTRACT Same as Report (SAR)
18. NUMBER OF PAGES 16
19a. NAME OF RESPONSIBLE PERSON

Standard Form 298 (Rev. 8-98) Prescribed by ANSI Std Z39-18
ARI Selection and Assignment Research

Goal: Develop and validate non-cognitive measures against performance/attitudinal outcomes to enhance selection and assignment

Personnel Selection Tests

- Armed Services Vocational Aptitude Battery (ASVAB)
  - Cognitive measures
    - AFQT (math, verbal)
    - Technical (e.g., mechanical)

  + ARI non-cognitive measures
    - Temperament
    - Person-environment fit

Outcomes

- Training
- Leader Development
- Education
- Mentoring
- Operational experience

Performance
- Knowledge
- Skills
- Leadership

Attitudes
- Army values
- Warrior ethos
- Career intent

Whole-person assessment = cognitive + non-cognitive measures
Organization of this Presentation

• Non-cognitive measures for enlisted Soldiers
  • Tier Two Attrition Screen
  • TAPAS Screen and TOPS program
  • Way ahead

• Non-cognitive measures for officers
Tier Two Attrition Screen (TTAS)

• Educational Tier 2 (mostly GEDs) enlistments have historically been capped at 10% because Tier 2 have about 50% higher first-term loss rates than Tier 1

• U.S. Army Research Institute developed the Tier Two Attrition Screen (TTAS) to identify Tier 2 with loss rates more similar to Tier 1

• TTAS combines predictors of first-term enlisted attrition for “whole-person” assessment
  – Cognitive: Subtests from Armed Services Vocational Aptitude Battery
  – Motivation: Assessment of Individual Motivation (AIM)
  – Physical: Gender-normed Body Mass Index

Scores from these measures are combined into a TTAS score

Higher TTAS Score = Lower Likelihood of Attrition
Assessment of Individual Motivation (AIM)

- 27-item, non-cognitive test for measuring Dependability, Adjustment, Physical Conditioning, Leadership, Work Orientation, and Agreeableness
  - Special Army test at MEPCOM; 25 minutes

- 2 responses made for each 4-statement item: behaviors/preferences most and least like respondent

- Predicts attrition and “will do,” motivational aspects of performance (e.g., indiscipline, job effort)

- Scale scores have a low correlation with minority group status and gender
How comparable are loss rates for Tier 2 passing TTAS and loss rates for Tier 1?

![Bar chart showing loss rates for Tier 1, Tier 2 Passing TTAS, and Tier 2 Falling TTAS for 6, 18, and 30 month periods.]

Note: Sample sizes, from left to right, are:
6-Month – 166055, 25325, 21524; 18-Month – 114272, 17445, 15146; 30-Month – 68010, 9552, 8353
Way Ahead: Tier 2 Screening

- Computerized AIM Implementation on the ASVAB platform at all MEPS
  - Added mode will make it easier to accomplish AIM testing

- Improve TTAS Prediction of Attrition and Performance
  - Close gap between loss rates of Tier 2 passing TTAS and Tier 1
  - FY10 testing of Tier 2 applicants on Tailored Adaptive Personality Assessment System (TAPAS) and AIM and follow-up analyses of prediction of attrition and performance
TAPAS: Tailored Adaptive Personality Assessment System

- 15 dimensions including:
  - Achievement
  - Non-delinquency
  - Even-tempered
  - Intellectual efficiency
  - Optimism
  - Physical conditioning
  - Attention seeking

- Computer-adaptive test delivered on the CAT-ASVAB platform at MEPS

- Paired forced-choice self-descriptors

- TAPAS provides two scores for each applicant
  - “Can do” predicts AIT grades, training graduation rates, job knowledge
  - “Will do” predicts APFT scores, job effort, indiscipline rate, attrition

- Females score slightly higher than males
- Blacks and Hispanics score slightly higher than Whites

Note: Forced choice measures provide no obvious best/worst answer options.

Which of these statements is most like you?

- I like roller coasters.
- I enjoy parties.

Which of these statements is most like you?
# AIM and TAPAS Constructs

<table>
<thead>
<tr>
<th>AIM CONSTRUCTS</th>
<th>TAPAS CONSTRUCTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dependability</td>
<td>Non-delinquency</td>
</tr>
<tr>
<td>Adjustment</td>
<td>Optimism</td>
</tr>
<tr>
<td>Physical Conditioning</td>
<td>Physical Conditioning</td>
</tr>
<tr>
<td>Leadership</td>
<td>Dominance</td>
</tr>
<tr>
<td>Work Orientation</td>
<td>Achievement</td>
</tr>
<tr>
<td>Agreeableness</td>
<td>Even Tempered</td>
</tr>
</tbody>
</table>

- Generosity
- Excitement Seeking
- Intellectual Efficiency
- Orderliness
- Tolerance
- Cooperation
- Sociability

TAPAS assesses these unique constructs.
Research Approach: Validating TAPAS

- Administered non-cognitive selection measures (TAPAS) to enlisted Soldiers from all components at Reception BNs (approx 11K in 2007)
- Tracked Soldiers to completion of AIT/OSUT
- Collected outcome data in Initial Entry Training (IET)
  - Attrition (RA only), AIT course grades (subset of MOS), graduation rates
  - For 6 targeted MOS (11B, 19K, 31B, 63B, 68W, 88M):
    - Job knowledge test
    - Self-report: APFT scores; Disciplinary rates; Career intent
    - Job performance ratings from drill sergeants and peers
- Continuing to track through first term of enlistment
Tier 1 NPS CAT IIIB Soldiers passing TAPAS screen perform similar to or better than Soldiers in Higher AFQT Categories.
IOT&E: Tier 1 Performance Screen (TOPS)

Testing and Screening Process

• Administer TAPAS in MEPS to Army and Air Force applicants; phased in May-Aug 09
  • All Tier 1 (high school diploma graduates) NPS applicants
    – Exception: CAT I-IIIB applicants arriving at MEPS with valid ASVAB score
  • All Tier 2 (non high school diploma graduates) NPS applicants starting Mar 10

• Use TAPAS to screen out a small number of low motivated CAT IV Army applicants (no screening for Air Force)

• Screen at the 10\textsuperscript{th} percentile; ~ bottom 13\% are ineligible

IOT&E concept endorsed by Secretary of the Army, 6 Jan 09
Implementation plan approved by Army G-1, 11 Mar 09
Supported by CG, USAAC, 24 Mar 09
Implementation memo signed by DMPM, 3 Apr 09
Testing and Evaluation Process

• Administer TAPAS in 7 MEPS (began 4 May 09)
  • All Tier 1 (high school diploma graduates) NPS applicants
    – Exception: CAT I-IIIB Soldiers arriving at MEPS with valid ASVAB score
  • Phased implementation of TAPAS testing will have reached all MEPS by 17 July

• Track Soldiers to completion of Initial Entry Training (IET) and evaluate performance outcomes across AFQT categories
  – Attrition (AC only), AIT grades (as available), graduation rates
    ⇒ Job knowledge test
    ⇒ Self report: APFT scores; disciplinary rates; career intent
    ⇒ Job performance ratings from drill sergeants

• Review at 6 month intervals for evaluation/modification

IOT&E concept endorsed by Secretary of the Army, 6 Jan 09
Way Ahead:
Non-cognitive Measures for Enlisted Personnel

<table>
<thead>
<tr>
<th>Year</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
</tr>
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<tbody>
<tr>
<td>Phase</td>
<td>Research Longitudinal Validation</td>
<td>In-service Validation</td>
<td>Classification Validation</td>
<td>Tier One Performance Screen (TOPS) Longitudinal Evaluation</td>
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<tr>
<td>Details</td>
<td>• Track Soldiers; assess at 18 and 36 m. TIS • Validate non-cognitive measures for selection against first term performance</td>
<td>• Validate TAPAS to select NCOs for special assignments (recruiter, drill sergeant)</td>
<td>• Validate non-cognitives for MOS classification</td>
<td>• Administer TAPAS at MEPS • Track Soldiers; Assess at end of training, 18 m., and 36 m. TIS • Validate operational TAPAS for selection against first term performance</td>
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- **Research Training Validation**
  - Identified/administered non-cognitive measures to new Soldiers in a research setting
  - Validated non-cognitive measures for training criteria
  - Validated TAPAS as potential screening tool

- **Completed Research**
  - Research evaluation
  - Operational evaluation
ARI Research: Non-cognitive Measures for Officers

Research goal: Develop/refine and validate non-cognitive measures to predict attitudinal and performance outcomes: Career continuance, Junior officer performance, and Senior leader potential.

Initial research findings: ARI non-cognitive measures increase prediction of ROTC continuation and OCS career intentions, beyond traditional screening measures.

Predictors of ROTC Continuation

<table>
<thead>
<tr>
<th>Assessment Percentile Scores</th>
<th>Disenrollment</th>
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<tbody>
<tr>
<td>Current</td>
<td>25%</td>
</tr>
<tr>
<td>Non-Cog</td>
<td>20%</td>
</tr>
<tr>
<td>0-25%</td>
<td>15%</td>
</tr>
<tr>
<td>26-50%</td>
<td>10%</td>
</tr>
<tr>
<td>51-75%</td>
<td>5%</td>
</tr>
<tr>
<td>76-100%</td>
<td>0%</td>
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</tbody>
</table>

Current System: Overall Whole Person Score
Non-Cog Measure: Cadet Background Evaluation Form

Predictors of Career Intentions in OCS

<table>
<thead>
<tr>
<th>Enlistment Option</th>
<th>Army ID</th>
<th>Work Values</th>
<th>RBI</th>
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<tbody>
<tr>
<td></td>
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Non-cogs add value to AFQT

Validity Coefficients

Army ID: Strength, ability and depth of Army identification
Work Values: Work-related desires and priorities
RBI (Rational Biodata Inventory): Job-related temperaments
Way Ahead: Non-cognitive Measures for Officer Screening

Development of Officer Predictor Measures (ROTC/OCS)

Officer Job Analysis

Development of Criterion Measures of Officer Job Performance (ROTC/OCS)

Predictive Validity of New Measures

Analyses to refine Branch Assignment - Subject to available funding

Transition of validated measures to AAC/TRADOC for officer accessioning - Subject to available funding

Final Products
- Specification of officer performance requirements across rank & branch
- Validated tests for officer candidate selection and branch assignment