

Personality Assessment Questionnaire as a Pre-Accession Screen for Risk of Mental Disorders and Early Attrition in U. S. Army Recruits

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Personality assessment tools have been studied as predictors of performance in civilian and military work settings. The Tailored Adaptive Personality Assessment System (TAPAS) was developed to improve selection of new military recruits by predicting motivational outcomes such as job effort, physical fitness, and drive to perform at high standards. The purpose of this study is to examine the utility of TAPAS as a predictor of psychiatric morbidity and early discharge in a sample of 15,082 Army, active duty, enlisted, nonprior service recruits. Associations between TAPAS personality dimension score quintiles and mental disorder diagnoses, attrition, and health care utilization in United States Army recruits who took TAPAS in the fiscal year 2010 were analyzed using multivariate logistic regression and log-linear modeling. TAPAS physical conditioning dimension scores were predictive of mental disorder diagnosis and attrition, with TAPAS scorers in the lowest quintile at increased odds of early discharge (odds ratio [OR]: 2.08, 95% CI 1.73, 2.51), mental disorder diagnosis (OR: 1.41, 95% CI 1.20, 1.66) and greater mental health care utilization (1.61, 95% CI 1.46, 1.78) compared with TAPAS scorers in the highest quintile. Results indicated that TAPAS may have an important use as a mental health fitness screening tool for those who wish to serve in the military by identifying a limited high risk group of applicants for mental health diagnostic evaluation. TAPAS may augment current cognitive and educational screens and potentially reduce the burden of mental disorders and premature attrition.

Keywords: mental health, personality tests, job performance, military health, preemployment screening

In the civilian workplace setting, mental disorders are associated with a variety of adverse outcomes including absenteeism, reduced productivity, unemployment, disability, and high health care utilization (Henderson, Harvey, Overland, Mykletun, & Hotopf, 2011; Johnson, Weissman, & Klerman, 1992; Kessler & Frank, 1997; Narrow, Regier, Rae, Manderscheid & Locke, 1993; Sanderson & Andrews, 2006). In the military, mental disorders, potentially service-related, are the leading cause of hospitalization in men and second leading cause in women, exceeding injuries and musculoskeletal conditions, and are associated with early dis-

charge from service (Hoge et al., 2002; Hoge et al., 2005; Wilson, Messer, & Hoge, 2009). Psychiatric disorders are also among the top 10 causes of discharges for medical conditions that existed prior to service and disability discharges among new recruits every year, representing a significant loss to the new military workforce (AMSARA AR, 2011).

Current screening for psychological fitness in applicants for military service consists of three parts: educational achievement, math and verbal cognitive testing, and a medical examination for gross psychological pathology (Cardona & Ritchie, 2007). This

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process relies on applicants' self-report of symptoms and diagnoses that may be disqualifying for military service. The United States military medical screening literature from World War I to the present describes a long history of mental disorders presenting during recruit training and the first tour of duty despite trial with a variety of programs and instruments (Cardona & Ritchie, 2006). Most mental health screening tools have not been designed with modern psychometric characteristics or evaluated in post-Vietnam War volunteer force military applicants, thus limiting their effectiveness (Avasthi et al., 2008; Jones, Hyams, & Wessely, 2003; Lung & Lee, 2008; Mueller et al., 2009). Military applicants, unlike patients seeking care for self-perceived symptoms, have an incentive to appear well to qualify for service. The military now focuses on identifying and treating existing mental disorders prior to and just after deployment, rather than predicting propensity for mental health problems later in military career (Hicks, 2011; Jones, Hyams, & Wessely, 2003; Rona, Hyams, & Wessely, 2005).

Personality assessment tests have been studied as predictors of job performance and as tools for personnel selection in civilian and military work settings (Knapp & Heffner, 2010; Knapp & Heffner, 2011; Penney, David, & Witt, 2011; Rothstein & Goffin, 2006). The Army Research Institute of the Behavioral and Social Sciences (ARI) has shown that noncognitive attributes such as personality or temperament, interests, and values are effective in predicting entry-level soldier performance and retention (Knapp & Tremble, 2007). ARI developed the Tailored Adaptive Personality Assessment System (TAPAS) to improve selection of new recruits and increase personnel management flexibility by predicting motivational outcomes, such as job effort, physical fitness, and drive to perform at a high standard (Knapp & Heffner, 2010; Knapp & Heffner, 2011). TAPAS is an adaptive computerized personality measure that assesses both proficiency and motivational aspects of military career performance. Psychometric properties of TAPAS are designed to be resistant to the respondents' desire to answer the question favorably (Stark, Chernyshenko, & Drasgow, 2005) and increase the likelihood of being accepted for military service (Knapp & Heffner, 2010; Knapp & Heffner, 2011).

The physical conditioning scale was first introduced as a military relevant attribute in addition to traditional personality traits in an early noncognitive test, the Assessment of Background and Life Experiences, as predictor of first-term enlisted attrition in U. S. Army applicants (White, Young, & Rumsey, 2001). The Assessment of Individual Motivation, a noncognitive personality assessment test given to non-high-school-graduate U. S. Army applicants, also included a physical conditioning subscale. Study of the Assessment of Individual Motivation found that both a composite personality score and the physical conditioning subscale in particular had an inverse, dose-response relationship with the risk of mental disorder diagnosis and attrition (Gubata et al., 2012). Other research by the authors has demonstrated that preaccession physical fitness and motivation to serve is associated with risk of attrition (Niebuhr et al., 2008) and that a correlation exists between military applicants' self-reported physical activity and preaccession physical fitness testing (Gubata, Cowan, Bedno, Urban, & Niebuhr, 2011).

Because TAPAS was developed to assess personality traits associated with motivation and job performance, it may have an important alternate use as a predictor of mental health fitness for military duty. Noncognitive personality tests such as TAPAS,

which include the military relevant physical conditioning dimension, may have the potential to augment the current cognitive and educational achievement-based screening process by identifying at-risk military applicants for more in-depth mental health diagnostic evaluation prior to enlistment. The purpose of this study is to examine personality facets and physical conditioning in particular as measured by TAPAS dimensions as predictors of mental disorder morbidity and early discharge in the first 6 months of military service.

Method

Design

A retrospective cohort study of U. S. Army accessions was conducted to determine whether TAPAS personality dimension scores are associated with mental disorder diagnoses and attrition in the first 6 months of service. The study was approved by the Walter Reed Army Institute of Research Institutional Review Board as a minimal-risk protocol utilizing existing administrative and healthcare data with a waiver of informed consent.

Measures

Built on the foundational work of earlier noncognitive personality tests developed by ARI, TAPAS was developed by Drasgow Consulting Group, under the Army's Small Business Innovation Research program. TAPAS is a personality assessment tool that measures narrow personality constructs, beyond general cognitive ability, that are known to predict performance in civilian and military work settings (Barrick & Mount, 1991; Knapp & Heffner, 2010; Knapp & Heffner, 2011; Penney, David, & Witt, 2011; Roberts, Chernyshenko, Stark, & Goldberg, 2005; Rothstein & Goffin, 2006; Schmidt & Hunter, 1998) and incorporates features designed to promote resistance to faking. These features include a large pool of computer-generated tailored questions, with paired response statements that are independent and require forced-choice entry timed responses. The response pairs address different personality traits and are matched in terms of social desirability. The computer-adaptive testing system also helps to reduce faking by limiting the testers' exposure to each personality statement or response (Knapp & Heffner, 2010; Knapp & Heffner, 2011; Stark, Chernyshenko, & Drasgow, 2005).

TAPAS has undergone successful validations and has been administered to Army applicants at all 65 military enlistment processing stations since October of 2009. TAPAS is automated on the Armed Services Vocational Aptitude Battery testing platform, featuring paired forced-choice self-descriptors in 15 personality dimensions, including achievement, adjustment, dominance, non-delinquency, even-temperedness, intellectual efficiency, optimism, generosity, cooperation, self-control, sociability, order, tolerance, attention seeking, and physical conditioning. ARI previously has examined associations between dimension scores and job performance measures to identify high-scoring recruits who could be screened in or low-scoring recruits who could be screened out, depending on the needs of the Army. Details of TAPAS have been provided elsewhere (Knapp & Heffner, 2010; Knapp & Heffner, 2011).

Subjects

Individuals included in the study were all fiscal year 2010 TAPAS test takers who were U. S. Army active duty enlisted accessions with no prior military service ($N = 15,082$). Individuals without a secondary school certificate or unknown education credentials were excluded ($n = 27$). Although some individuals' scores were flagged for answering questions too quickly ($n = 593$), they were not excluded from the analysis. As shown in Table 1, the study population was primarily male, high school graduates, under age 25, and White, with a body-mass index (BMI) in the normal or overweight categories. Individuals aged 17 to 20 years and Whites had higher TAPAS scores compared with other groups. Lower TAPAS scores were also associated with female sex, medical diagnosis at application for service, and accession conduct waivers.

Data Sources

Accession. ARI provided 15 personality dimension scores for each individual, who then was matched to accession data

from U. S. Military Entrance Processing Command and the Defense Manpower Data Center. Accession factors of interest for their historical association with military morbidity and attrition included sex, age, race, BMI category, Armed Forces Qualification Test (AFQT) score, medical conditions present at application for military service, medical waivers (waivers allowing enlistment for those individuals who do not meet accession medical standards due to a medical condition identified at the entrance medical examination), and conduct (including criminal or legal offenses) waivers. Only medical waiver considerations for accession disqualifying conditions (U. S. Department of the Army, 2007) that were reviewed by the U. S. Army waiver authority within 2 years prior to accession were included in this study. The 2-year period for waivers allows time for waived applicants in the Delayed Entry Program (e.g., high school juniors) to enlist.

Attrition. Training discharge dates and reasons for discharge known as Separation Program Designator codes from the U. S. Army Center for Accessions Research were used to measure attrition in the first 6 months of service. Separations due to officer

Table 1

Study Subjects Demographic Characteristics by TAPAS Physical Conditioning Dimension Quintile (Q)

	Q1 % ($n = 3,001$)	Q2 % ($n = 3,043$)	Q3 % ($n = 2,912$)	Q4 % ($n = 3,154$)	Q5 % ($n = 2,972$)	Chi-squared p-value
Sex						
Male	80.2	85.6	87.5	89.4	93.0	< .0001
Female	19.8	14.4	12.5	10.6	7.0	
Age at Enlistment (years)						
17–20	44.2	48.8	50.0	54.3	57.1	< .0001
21–25	37.1	35.7	35.4	32.8	32.0	
26–30	11.5	9.6	9.5	8.1	7.7	
> 30	7.2	6.0	5.1	4.8	3.3	
Race						
White	75.7	76.0	77.4	78.4	82.2	< .0001
Black	14.0	12.7	12.0	12.0	8.9	
Other	10.3	11.4	10.7	9.6	8.6	
BMI						
Underweight	1.9	1.6	1.3	1.0	0.4	< .0001
Normal	44.6	45.7	46.6	46.7	44.5	
Overweight	39.5	38.6	38.8	37.7	41.6	
Obese	14.0	14.0	13.4	14.6	13.4	
Education						
Alternate degree*	5.1	5.3	5.0	4.5	4.4	.0069
HS Diploma	74.5	76.0	75.5	77.6	75.9	
Some College	13.2	11.7	12.1	10.3	10.9	
Bachelor's and above	7.2	7.0	7.4	7.6	8.8	
AFQT Percentile						
11–29	0.8	1.5	2.5	1.6	0.5	< .0001
30–49	29.8	33.2	32.7	34.5	29.5	
50–64	22.7	24.1	23.3	21.1	24.1	
65–92	37.2	33.3	33.2	35.2	37.3	
93–99	9.5	8.0	8.2	7.5	8.5	
Medical Conditions						
No	88.2	88.4	88.9	90.1	90.5	.0126
Yes	11.8	11.6	11.1	9.9	9.5	
Medical Waiver						
No	94.0	93.9	93.9	94.8	94.4	.4361
Yes	6.0	6.1	6.1	5.2	5.6	
Conduct Waiver						
No	92.7	92.3	93.6	94.4	93.7	.0113
Yes	7.3	7.7	6.4	5.6	6.3	

Note. AFQT = Armed Forces Qualification Test; BMI = body mass index; Q = Dimension quintile; GED = general educational development.

* Alternate degree includes individuals with alternate credentials such as GED, home school certificates, occupational program certificates, etc.

commissioning, combat and duty related disability, completion of required active service, and death were not defined as attrition. Attrition was also divided into five different categories of attrition based on Separation Program Designator codes: performance (e.g., failure to meet physical fitness standards or weapons qualifications), medical (e.g., medical conditions, discharges for conditions that existed prior to service), failure to meet standards (e.g., failure to meet medical, physical, or procurement standards), behavior (e.g., misconduct, fraudulent entry, personality disorders), and other (e.g., pregnancy, erroneous entry).

Morbidity. The Military Health Systems Data Repository provided ambulatory health care data from the Standard Ambulatory Data Record, for all visits at military treatment facilities between October, 2009 and May, 2011. Mental disorders were defined according to the International Classification of Diseases, ninth revision (United States National Center for Health Statistics, 2009), as having a diagnosis limited to ICD-9 codes between 290 and 319 in any diagnosis position, excluding 305.1 (tobacco use disorder). Mental health status and service codes (V codes) were excluded. Guided by the Diagnostic and Statistical Manual of Mental Disorders, (4th ed., text rev.; *DSM-IV-TR*; American Psychiatric Association, 2000) mental disorders were divided into the following diagnostic categories: psychotic, affective, adjustment, anxiety, personality, substance use, and other mental disorders. All ICD-9 medical disorders were also included as an outcome. To examine health care utilization, a mental health care visit was defined by appointment date as a single visit per day with an ICD-9 code between 290 and 319 in any diagnostic position.

Statistical Analysis

As with previous noncognitive tests developed by ARI (Gubata et al., 2011; Stark et al., 2011), individuals were placed into approximate quintiles for each TAPAS dimension in order to identify the low-risk and high-risk groups for mental disorder diagnoses and attrition, with Quintile 1 (Q1) the lowest, and Quintile 5 (Q5) the highest scorers. As supporting analyses, we also report results for TAPAS scores analyzed as continuous scores and as dichotomous scores (comparing the scorers in the lowest 20% with scorers in the highest 80%) for both the first 6 and 12 months of service. All attrition and morbidity outcomes were dichotomous. In the specific-cause attrition analysis, individuals who were not discharged were compared with those in each specific-cause category of attrition. All medical and mental disorder diagnoses presented were counted within the first 6 months of service. Although each mental disorder category was mutually exclusive, individuals could be included in more than one diagnostic category if they had more than one diagnosed mental disorder within the study period. Individuals with no mental disorder diagnoses were compared with those in each mental disorder diagnosis category.

Chi-square tests and Cochran-Armitage tests of trend were used to analyze categorical data and identify which TAPAS dimension scores were associated with morbidity and attrition. Adjusted odds ratios (ORs) were calculated using multivariate logistic regression for all attrition and morbidity outcomes. The accession factors sex, age, race, BMI, AFQT score, medical conditions present at application, medical waiver, and conduct waiver were included in the regression model. Parsimonious models were developed using

backward stepwise regression and covariates with a p value of less than or equal to 0.05 remained in the model. Health care utilization rates and utilization rate ratios were calculated by log-linear modeling, assuming a Poisson distribution. A number needed to screen analysis as a measure of effect size or absolute risk difference was performed on TAPAS dimension scores to examine their potential as military applicant screening tools. Dimension scores were separated into deciles to determine the number of military applicants needed to screen to prevent one case of a recruit diagnosed with a mental disorder and one case of recruit attrition in the first 6 months of military service (Rembold, 1998). All statistical analyses were performed using SAS software version 9.2 (SAS Institute Inc., Cary, NC).

Results

A total of 15,082 subjects were included in this study. The physical conditioning dimension was the only TAPAS dimension with significant findings for mental disorder diagnoses and attrition in the first 6 months of service. The results are restricted to this dimension and are presented as score quintiles in tables and figures. High scoring individuals on the physical conditioning dimension respond that they tend to engage in activities to maintain their physical fitness and are likely to participate in vigorous sports or exercise.

Attrition

TAPAS scorers in the lowest physical conditioning quintile had the highest rates of attrition (12.7%) and high scorers had the lowest rates of attrition (6.3%; see Figure 1). There was a significant linear trend for decreasing risk of attrition with increasing TAPAS physical conditioning score (Cochran-Armitage test $p < .0001$). The most common types of attrition were performance (including physical fitness testing), failure to meet standards, and medical. More than half of attrition was performance-related (52%), with a trend for decreasing risk of attrition with increasing physical conditioning score (Cochran-Armitage test $p < .0001$).

As shown in Table 2, the lowest physical conditioning score quintiles were associated with overall-, performance-, medical-,

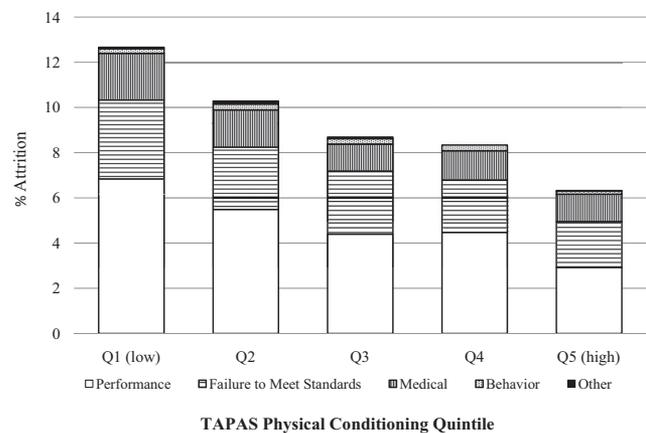


Figure 1. Attrition rate in the first 6 months of service by TAPAS Physical Conditioning Dimension quintile (Q).

Table 2

Odds Ratios for Attrition in the First 6 Months of Military Service by TAPAS Physical Conditioning Dimension Quintile (Q)

Physical Conditioning Quintile	Overall Attrition OR (95% CI)	Performance Attrition OR (95% CI)	Medical Attrition OR (95% CI)	Failure to Meet Standards Attrition OR (95% CI)	Behavior Attrition OR (95% CI)
Q1 (low)	2.08 (1.73, 2.51)	2.52 (1.96, 3.26)	1.62 (1.09, 2.42)	1.69 (1.22, 2.33)	1.22 (0.49, 3.06)
Q2	1.64 (1.36, 1.99)	1.99 (1.54, 2.59)	1.27 (0.84, 1.92)	1.32 (0.95, 1.84)	1.24 (0.51, 3.02)
Q3	1.38 (1.13, 1.68)	1.55 (1.18, 2.04)	0.88 (0.56, 1.38)	1.32 (0.94, 1.85)	1.42 (0.59, 3.39)
Q4	1.32 (1.08, 1.60)	1.50 (1.15, 1.96)	1.00 (0.65, 1.54)	1.12 (0.80, 1.58)	1.27 (0.53, 3.03)
Q5 (high)	REF	REF	REF	REF	REF

Note. Odds ratios were adjusted for significant covariates. TAPAS = Tailored Adaptive Personality Assessment; Q = Dimension quintile.

and failure-to-meet-standards attrition, but not behavior, in models adjusted for significant covariates. Individuals scoring in the lowest quintile had 2 times the odds of overall attrition and 2.5 times the odds of performance-related attrition compared to the highest scoring quintile (ORs $p < .05$). Stratified analysis by sex found similar trends for men and women. Similar trends and associations were found when the analysis was repeated for attrition at 12 months.

When analyzed as a continuous score, the 6-month attrition adjusted OR for the physical conditioning score was 0.77 (95% CI: 0.73, 0.82) and the 12-month attrition adjusted OR was 0.80 (95% CI: 0.76, 0.84). As a dichotomous variable the 6-month attrition adjusted OR comparing the lowest 20% to the highest 80% was 1.55 (95% CI: 1.36, 1.76) and the 12-month attrition adjusted OR was 1.46 (95% CI: 1.30, 1.64).

Mental Disorder Diagnoses

Overall, 87.7% of the study population had at least one ambulatory medical visit with a medical diagnosis, and 7.2% of the

study population had a mental disorder diagnosis in the first 6 months of service. Among individuals with a mental disorder diagnosis in the first year of service, 68% had their first diagnosis within 6 months of accession. Figure 2 shows that rates of mental disorder diagnoses decreased with increasing physical conditioning dimension scores, with a significant linear trend (Cochran-Armitage test $p < .0001$). A similar trend was seen for all medical diagnoses (Cochran-Armitage $p = .03$). Adjustment disorders (5.1%) and affective disorders (1.7%) were the most common diagnoses overall and across quintiles. Approximately 43% of individuals with an adjustment disorder diagnosis had additional mental disorder diagnoses, including 21.3% with affective disorder diagnoses and 16% with anxiety disorder diagnoses. Except for personality disorders and psychoses, each category of mental disorder had a significant (Cochran-Armitage test $p < .05$) linear trend across the physical conditioning quintiles.

As shown in Table 3, the lowest physical conditioning dimension score quintiles had increased odds for all types of medical and mental disorders compared with the highest score quintile, after

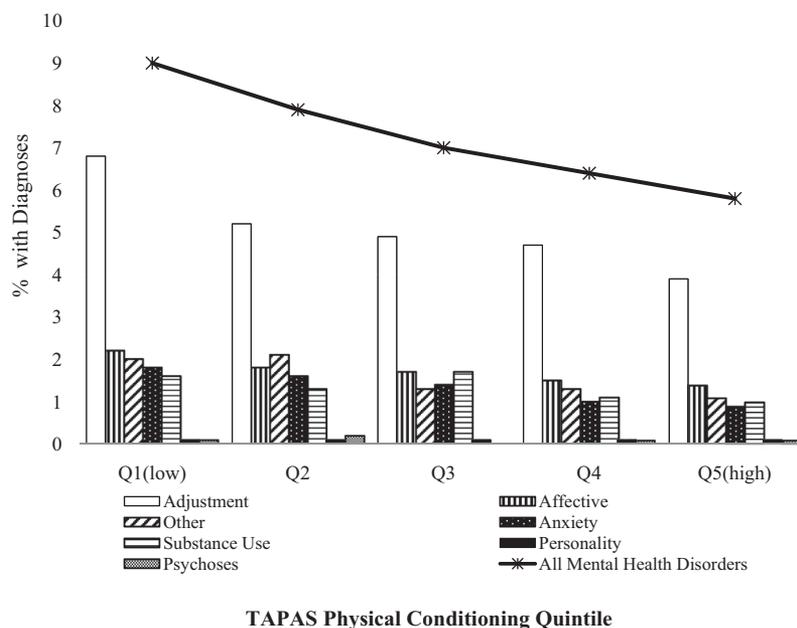


Figure 2. Proportion of study subjects with ambulatory mental disorder diagnoses by TAPAS Physical Conditioning Dimension quintile (Q).

Table 3

Odds Ratios for Ambulatory Mental Disorder Diagnoses in the First 6 Months of Service by TAPAS Physical Conditioning Dimension Quintile (Q)

Physical Conditioning Quintile	All Medical Diagnoses OR (95% CI)	All Mental Disorder Diagnoses OR (95% CI)	Adjustment Diagnoses OR (95% CI)	Anxiety Diagnoses OR (95% CI)
Q1 (low)	1.41 (1.20, 1.66)	1.49 (1.22, 1.82)	1.74 (1.37, 2.21)	1.68 (1.05, 2.68)
Q2	1.21 (1.04, 1.40)	1.32 (1.08, 1.62)	1.32 (1.03, 1.69)	1.63 (1.02, 2.60)
Q3	1.26 (1.08, 1.47)	1.18 (0.96, 1.46)	1.25 (0.97, 1.61)	1.45 (0.90, 2.36)
Q4	1.06 (0.92, 1.23)	1.10 (0.89, 1.35)	1.18 (0.92, 1.52)	1.07 (0.64, 1.78)
Q5 (high)	REF	REF	REF	REF

Note. Odds ratios were adjusted for significant covariates. TAPAS = Tailored Adaptive Personality Assessment; Q = Dimension quintile.

adjustment for sex, race, age, education, medical conditions, and medical and conduct waivers (ORs $p < .05$). Individuals scoring in the lowest quintile had 41% increased odds of general medical diagnosis and 49% increased odds of mental disorder diagnosis in the first 6 months of service when compared to the highest scorers (ORs $p < .05$). Physical conditioning scores were most highly associated with adjustment disorder diagnosis and anxiety disorder diagnoses, with lowest scorers having 74% and 68% increased odds of diagnosis, respectively, when adjusted for significant covariates (ORs $p < .05$). Similar trends and associations were found when the analysis was extended to 12 months.

As a continuous variable, the 6-month mental disorder diagnosis adjusted OR for the physical conditioning score was 0.86 (95% CI 0.80, 0.91) and the 12-month mental disorder adjusted OR was 0.88 (95% CI 0.83, 0.93). When the physical conditioning score was analyzed as a dichotomous variable comparing the lowest 20% versus the highest 80%, the 6-month mental disorder diagnosis adjusted OR was 1.29 (95% CI: 1.11, 1.49) and the 12-month mental disorder diagnosis adjusted OR was 1.22 (95% CI: 1.08, 1.38).

Health Care Utilization

As shown in Table 4, utilization rates for ambulatory care were associated with physical conditioning dimension scores, in a model adjusted for significant covariates. The lowest quintile had increased rates of ambulatory care encounters for all medical conditions in the first 6 months of service with a utilization rate ratio 1.36 (95% CI: 1.33, 1.40) when compared with testers in the highest quintile. The utilization rate ratio for mental disorder care was 1.61 (95% CI: 1.46, 1.78), comparing the lowest quintile to the highest.

Number Needed to Screen

TAPAS physical conditioning dimension scores were separated into deciles to determine the number of applicants needed to screen to detect recruits at increased risk of mental disorders and of attrition as a measure of effect size and absolute difference in risk. Using the lowest quintile (bottom 20%) as a cutpoint, 43 applicants would need to be tested with TAPAS in order to identify one recruit with a mental disorder diagnosis and 24 applicants would need to be tested in order to identify one recruit at risk of attrition.

Discussion

In this retrospective cohort study of 15,082 first-time Active Duty U. S. Army recruits who primarily were young, White, male

high school graduates, the physical conditioning dimension of a noncognitive personality test was shown to be predictive of mental disorder diagnosis and premature discharge in the first 6 months of military service. TAPAS scorers in the lowest quintile had the highest rates of attrition, with performance attrition most common, and had two times the odds of all-cause attrition compared with the highest scorers. Nine percent of low scorers ($n = 270$), compared with six percent of high scorers ($n = 178$) had a mental disorder diagnosis. Adjustment and affective disorders were most common. Individuals scoring in the lowest quintile had 41% increased odds of general medical diagnosis, 49% increased odds of mental disorder diagnosis, and about 70% increased odds for both adjustment and anxiety disorder diagnoses. Finally, individuals scoring in the lowest quintile of the TAPAS physical conditioning dimension had increased utilization of general medical and mental health care, with a 61% higher rate of utilization of mental health care. The U. S. Army historically screens more than 80,000 applicants per year. The number needed to screen analysis predicts that approximately 2,000 and 4,000 applicants at risk of a mental disorder diagnosis and premature attrition, respectively, less than five percent of the applicant pool, would be identified using TAPAS as a mental fitness screen.

This study is the first to demonstrate the utility of a noncognitive personality test as a potential screening tool for mental health

Table 4
Health Care Utilization Rates (UR) and Rate Ratios (URR) of Ambulatory Visits by TAPAS Physical Conditioning Dimension Quintile (Q)

	Utilization	1000 p-d*	UR	URR (95% CI)
All Ambulatory Visits				
Q1 (Low)	15,368	499.45	30.77	1.36 (1.33, 1.40)
Q2	13,517	514.31	26.28	1.22 (1.19, 1.26)
Q3	11,834	495.85	23.87	1.13 (1.10, 1.16)
Q4	12,684	540.47	23.47	1.14 (1.11, 1.17)
Q5 (High)	10,169	512.85	19.83	REF
Mental Disorder				
Ambulatory Visits				
Q1 (Low)	1,090	499.45	2.18	1.61 (1.46, 1.78)
Q2	871	514.31	1.69	1.27 (1.15, 1.41)
Q3	738	495.85	1.49	1.14 (1.03, 1.27)
Q4	803	540.47	1.49	1.15 (1.04, 1.28)
Q5 (High)	653	512.85	1.27	REF

Note. Models adjusted for sex, age, race, medical conditions at enlistment, education, moral waiver, medical waiver, and BMI. TAPAS = Tailored Adaptive Personality Assessment; BMI = body mass index.

* p-d, rate per 1000-person-days.

fitness in U. S. Army recruits with a high school diploma. Strengths of this study include the large study population, cohort study design, and the comprehensive data capture for accession factors, ambulatory care encounters, and attrition data. Unlike current cognitive military applicant screening tools (i.e., AFQT math/verbal scores and educational achievement), TAPAS focuses on personality facets associated with motivational aspects of performance such as job effort and physical fitness. The TAPAS tool also incorporates features to promote resistance to faking “good,” which is of primary importance in the military applicant population, which has a strong incentive to appear well or qualified for service.

A potential weakness of this study is that only Army applicants were tested and followed, which may limit the application of these findings to other military services. The relatively large study sample size increases the likelihood of finding spurious statistically significant associations (type II errors). This possibility is less likely given the findings that TAPAS score was a statistically significant predictor as both a continuous and dichotomous variable, and a dose effect association was shown with risk of mental disorder and attrition. Recruit physical fitness scores during training were not available to compare with TAPAS self-reported physical conditioning scores. Finally, although adjustment disorder diagnoses in study subjects may be service related, in our study the majority of subjects had additional mental disorder diagnoses. Existing medical encounter data does not allow determination of whether the condition preexisted enlistment.

Mental disorders are a leading cause of medical and occupational morbidity in active duty military personnel (Hoge et al., 2002), and are associated with separation from service due to a variety of causes including medical disability, misconduct/legal problems, and unauthorized work absences (Hoge et al., 2005). High rates of mental health care utilization and separation from service have also been shown to be correlated with combat duty while deployed (Hoge, Auchterlonie, & Milliken, 2006). Despite an extensive medical history and physical examination at application for service, psychiatric hospitalization and early discharge for preexisting mental disorders are relatively common compared with other medical conditions in the first year of service and associated with substantial cost (AMSARA AR, 2011). Researchers need a mental health screening tool that can predict mental disorders and related discharges in the first tour of duty, while remaining effective in a population that has a strong incentive to appear qualified for service. Studies of the personality-performance relationship indicate that several motivational aspects influence workplace performance, and that these relationships are broadly defined (Penney, David, & Witt, 2011). TAPAS’s inclusion of the personality dimension physical conditioning, a key aspect of military training and career success, may explain its ability to identify enlistees at high risk of mental disorders and of premature attrition prior to the stressors of basic combat training and deployment.

Further research is needed to establish the effectiveness of noncognitive personality tests as screening tools for mental health fitness, including fielding these tests in applicants to other branches of service, examining longer periods of follow-up post-accession and performing cost-effectiveness analysis. ARI is developing a new scoring algorithm based on a composite of the dimensions score that is designed to be predictive of attrition and potentially of mental disorders. A study has been proposed to

assess the utility of TAPAS as a mental health fitness screen identifying applicants at increased risk for mental disorder diagnosis and premature attrition. TAPAS scores can be used identify a high-risk group for mental health consultation and structured clinical interview prior to enlistment.

During economic and geopolitical periods when the supply of military applicants is inadequate to meet the requirements for recruits (e.g., in a strong economy with low unemployment), noncognitive personality tests like TAPAS may be used to identify applicants with disqualifying medical conditions at low risk for mental disorders and related attrition for potential medical waiver consideration. Alternately, when the supply of military applicants exceeds the requirement for recruits (e. g., during peacetime in a weak economy with high unemployment), these tests may be used to identify applicants at high risk for mental disorders and related attrition for additional diagnostic evaluation and potential medical disqualification.

This study demonstrates the use of a noncognitive personality test to predict mental disorder diagnosis and early attrition in the first 6 months of military service. Noncognitive tests such as TAPAS, which was designed to assess motivational aspects of military career performance, may have important alternate uses as screening tools for mental health fitness to serve in the military, complementing existing cognitive screens and potentially reducing the burden of undiagnosed or concealed preexisting mental disorders in new recruits. Further analysis of TAPAS is needed to examine longer periods of follow-up, its use in other branches of service, and its utility as a targeted screen for mental health consultation prior to enlistment. Similarly designed preemployment personality assessment tools that include a physical conditioning personality dimension may have utility in other physically and mentally demanding occupations such as law enforcers, fire fighters, and emergency responders.

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