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AIR FORCE HUMAN RESOURCES LABORATORY

CLASSIFICATION OF AIR FORCE JOBS INTO APTITUDE CLUSTERS

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This report has been reviewed and is approved for publication.

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Each military service groups its entry-level jobs into clusters based on similarity of aptitude requirements. The configuration of these systems differs by service. The Air Force has four job clusters, labeled Mechanical-M, Administrative-A, General-G, and Electronics-E, which have been used in only slightly modified form since the early 1950s. The purpose of this report is to describe results from an application of a new procedure for homogeneous clustering of regression equations in an Air Force Armed Services Vocational Aptitude Battery (ASVAB) validity study involving 155,000 recruits in 211 technical training programs. Empirical clusters are derived and explained in terms of specialty composition and aptitude profiles. Other potential applications of the procedure are briefly discussed.

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SUMMARY

Each military service groups its entry-level jobs into clusters based on similarity of aptitude requirements. The configuration of these clustering systems differs by service and ranges in number from four in the Air Force to 11 in the Navy. Some of the systems have been in existence for some time despite changes in selection tests and job content. The Air Force has used essentially the same four composite groupings (Mechanical-M, Administrative-A, General-G, and Electronics-E) since the early 1950s. The purpose of this report is to apply a new procedure for homogeneous clustering of entry-level jobs, based on similarity of prediction equations, to a recent set of Air Force entrant data. Specific interest was directed at whether or not the four-group M, A, G, and E solution would emerge from the empirical relationships.

Individual training records were assembled for all persons entering Air Force technical training who took the Armed Services Vocational Aptitude Battery (ASVAB) Forms 8, 9, and 10. Subtest scores in standard score form were recorded, together with final school grade. After editing for missing data, there were 154,000 cases, representing each of 211 technical training programs. Regression equations were obtained within each program using the 10 ASVAB subtests as predictors and final school grades as criteria. The individual equations were then hierarchically clustered based on similarity of the regression weights. Once the terminal clusters had been formed, composite regression equations were obtained to examine the profiles of abilities required within each cluster. Baseline equations were also obtained for comparative purposes within each of the four existing M, A, G, and E job clusters.

Results focused on discussion of the last six stages of the hierarchical solution. Four of the six groups were approximately equivalent to the current M, A, G, and E clusters in terms of both job content and profiles of regression weights. The fifth and sixth groups identified were notable in a number of respects. The fifth group was composed of a mixed set of specialties with one characteristic in common; namely, performance in training was not well predicted by any of the ASVAB subtests. Regression weights were uniformly low for all subtests in this equation. Further inspection of this group revealed schools of three basic types: (a) those with little or no cognitive demands, (b) those with significant cognitive demands presumably outside the scope of the present ASVAB, and (c) advanced training schools. The latter two types were seen to offer the most fertile ground for expanding the coverage of the current battery or for developing special purpose selection instruments. The final (sixth) group was noteworthy in that it contained relatively few specialties--primarily those in the areas of tactical and strategic aircraft maintenance. Based on the salient weights for the subtests, these specialties appeared to require ability across the whole spectrum of the battery. Success in training was essentially a joint function of the technical subtests normally associated with these occupations (i.e., Auto and Shop Information, Mechanical Comprehension) and the more academically oriented subtests such as Arithmetic Reasoning, Word Knowledge, and Paragraph Comprehension. This was interpreted to be evidence of an emerging requirement for "generalists" who demonstrate a relatively broad range of talents across the whole domain of abilities as measured in the ASVAB. Implications for changes in the classification structure, test content, and composite configurations are discussed.

PREFACE

The Air Force Human Resources Laboratory is tasked by Air Force Regulation 35-8, Air Force Military Personnel Testing System, with conducting research and development in support of the Armed Services Vocational Aptitude Battery (ASVAB). The current effort was accomplished under Project 7719, Force Acquisition and Management System, Task 771918, Personnel Qualifications Tests, and Work Unit 77191846, Development and Validation of Enlisted Selection Methodologies.

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