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OCCUPATIONAL LEARNING DIFFICULTY: A STANDARD FOR
DETERMINING THE ORDER OF (U) AIR FORCE HUMAN RESOURCES
LAB BROOKS AFB TX J WEEKS NOV 84 AFHRL-SR-84-26

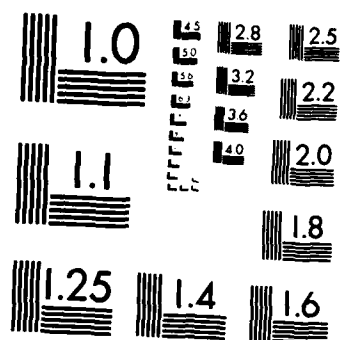
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AD-A147 410

**OCCUPATIONAL LEARNING DIFFICULTY: A STANDARD
FOR DETERMINING THE ORDER OF
APTITUDE REQUIREMENT MINIMUMS**

By

Joe Weeks

**MANPOWER AND PERSONNEL DIVISION
Brooks Air Force Base, Texas 78235-5000**

November 1984

Final Report for Period January 1980 - September 1984

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This report has been reviewed and is approved for publication.

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Unclassified

SECURITY CLASSIFICATION OF THIS PAGE

REPORT DOCUMENTATION PAGE

1a. REPORT SECURITY CLASSIFICATION			1b. RESTRICTIVE MARKINGS		
2a. SECURITY CLASSIFICATION AUTHORITY Unclassified			3. DISTRIBUTION/AVAILABILITY OF REPORT Approved for public release; distribution unlimited.		
2b. DECLASSIFICATION DOWNGRADING SCHEDULE					
4. PERFORMING ORGANIZATION REPORT NUMBER(S) AFHRL-SR-84-26			5. MONITORING ORGANIZATION REPORT NUMBER(S)		
6a. NAME OF PERFORMING ORGANIZATION Manpower and Personnel Division Air Force Human Resources Laboratory		6b. OFFICE SYMBOL (If applicable) AFHRL/MO		7a. NAME OF MONITORING ORGANIZATION	
6c. ADDRESS (City, State and ZIP Code) Brooks Air Force Base, Texas 78235-5000			7b. ADDRESS (City, State and ZIP Code)		
8a. NAME OF FUNDING SPONSORING ORGANIZATION Air Force Human Resources Laboratory		8b. OFFICE SYMBOL (If applicable) HQ AFHRL		9. PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER	
8c. ADDRESS (City, State and ZIP Code) Brooks Air Force Base, Texas 78235-5000			10. SOURCE OF FUNDING NOS.		
			PROGRAM ELEMENT NO. 62703F		PROJECT NO. 7719
			TASK NO. 19		WORK UNIT NO. 11
11. TITLE (Include Security Classification) Occupational Learning Difficulty: A Standard for Determining the Order of Aptitude Requirement Minimums					
12. PERSONAL AUTHOR(S) Weeks, Joe					
13a. TYPE OF REPORT Final		13b. TIME COVERED FROM Jan 80 TO Sep 84		14. DATE OF REPORT (Yr., Mo., Day) November 1984	
15. PAGE COUNT 26					
16. SUPPLEMENTARY NOTATION					
17. COSATI CODES			18. SUBJECT TERMS (Continue on reverse if necessary and identify by block number)		
FIELD	GROUP	SUB. GR.			
05	09		Armed Services Vocational Aptitude Battery (ASVAB)		
05	10		aptitude requirements		
			occupational analysis		
19. ABSTRACT (Continue on reverse if necessary and identify by block number)					
Entry into Air Force enlisted job specialties is largely governed by aptitude requirements. Specification of aptitude requirements involves two separate decisions: an aptitude type (i.e., the Mechanical, Electronics, General, or Administrative aptitude index of the Armed Services Vocational Aptitude Battery) is identified; then, a minimum level of aptitude (i.e., a percentile score cutoff) is determined. Although identification of the appropriate aptitude type is relatively straightforward, determination of the aptitude minimum is complicated by several considerations. The problem which served as the basis of this research was the need for a quantitative method for determining percentile score cutoffs. A method for determining aptitude minimums based on occupational survey information is described. For job specialties having a common aptitude requirement type, measures of occupational learning difficulty are proposed as a frame of reference for determining the order of aptitude minimums. Rather than representing how difficult a task is to perform, a measure of occupational learning difficulty for a given specialty represents how much time it takes to learn to perform associated tasks. It is recommended that percentile score cutoffs be established so that the order of the cutoffs corresponds to the order of specialties in terms of occupational learning difficulty. Assuming high-aptitude enlistees learn faster than low-aptitude enlistees, the recommended procedure will ensure that job specialties which require the most time to learn are manned by enlistees who learn the fastest.					
20. DISTRIBUTION/AVAILABILITY OF ABSTRACT			21. ABSTRACT SECURITY CLASSIFICATION		
UNCLASSIFIED/UNLIMITED ☒ SAME AS RPT. ☐ DTIC USERS ☐			Unclassified		
22a. NAME OF RESPONSIBLE INDIVIDUAL Nancy A. Perrigo Chief, STINFO Office			22b. TELEPHONE NUMBER (Including Area Code) (512) 536-3877		22c. OFFICE SYMBOL AFHRL/TSR

Unclassified

SECURITY CLASSIFICATION OF THIS PAGE

Item 18 (Continued):

occupational learning difficulty
personnel classification

Item 19 (Continued)

To produce measures of occupational learning difficulty, comprehensive occupational analyses were conducted for more than 200 job specialties and over 10,000 job types. ^{3-M/1111} Comparisons of the order of aptitude minimums (i.e., percentile score cutoffs) with the order of specialties in terms of learning difficulty indicates that aptitude minimums for some specialties are seriously misaligned. Some specialties high in learning difficulty have low minimums, and other specialties low in learning difficulty have high minimums. Such misalignments suggest that the talent available to the Air Force is not being allocated in the most optimal manner.

Unclassified

SECURITY CLASSIFICATION OF THIS PAGE

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**OCCUPATIONAL LEARNING DIFFICULTY: A STANDARD FOR
DETERMINING THE ORDER OF APTITUDE REQUIREMENT MINIMUMS**

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CRAB	☐
CRAC	☐
CRAD	☐

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This is a Special Report prepared for the Air Force Manpower and Personnel Center, Directorate of Assignments.

EXECUTIVE SUMMARY

Requirement

The R&D was conducted in response to a request for personnel research (RPR 73-13) submitted by the Air Force Manpower and Personnel Center (AFMPC) to the Air Force Human Resources Laboratory (AFHRL). The objective of the R&D was to develop a method for the evaluation of minimum aptitude scores required for entry into enlisted specialties.

Research and Development

The method proposed for evaluating aptitude requirements was based on the assumption that the most difficult job specialties should have the highest aptitude requirement minimums. The R&D consisted of the design, development and application of a procedure for measuring occupational difficulty. The procedure was based on the survey technology employed by the Air Force Occupational Measurement Center. Rather than representing how difficult tasks are to perform, a measure of occupational difficulty for a given specialty represents how much time it takes to learn to perform associated tasks. Once measures of occupational learning difficulty were available for job specialties in each aptitude area, they were proposed as a standard for determining the order of aptitude requirement minimums.

Results of evaluating aptitude requirements by reference to measures of occupational learning difficulty indicated that some specialties high in difficulty have relatively low aptitude requirements and other specialties low in difficulty have high aptitude requirements. Such misalignments in aptitude requirement minimums suggest that the talent available to the Air Force is not being allocated in the most optimal manner.

Recommendations

Recommend minimum aptitude scores required for entry into enlisted specialties be established by reference to measures of occupational learning difficulty, as well as to information concerning training and recruiting activities.

PREFACE

This Special Report concludes the Air Force Human Resources Laboratory research and development effort in response to Request for Personnel Research (RPR) 73-17, Minimum Aptitude Requirements for Air Force Enlisted Specialties. The research was accomplished through the following work units: 2313T102, 2313T104, 2313T105, 77340703, 77340704, 77340707, 77340708, 77340710, 77340712, 77340713, 77340714, 77191905, 77191906, 77191907, 77191908, 77191910, and 77191911. The objective of the effort was to develop a method for the evaluation of aptitude requirement minimums for Air Force enlisted specialties.

Dr. Raymond Christal of the Air Force Human Resources Laboratory (AFHRL) deserves special credit for practical and technical guidance during the design and development of the method. Drs. William Alley and Hendrick Ruck, also of AFHRL, provided critical guidance concerning management applications of resulting data. Among numerous organizations that supported the project, the Occupational Measurement Center (USAFOMC) made one of the more important contributions. Occupational data for over 200 enlisted career fields were obtained through surveys conducted by the Center. Special credit is also due the Air Force Manpower and Personnel Center, Directorate of Assignments (AFMPC/MPCR), Assignment Policy Division (AFMPC/MPCR), and USAF Classification Branch (AFMPC/MPCRQ) for support of the project under RPR 73-17.

This report has been under development while the USAF Classification Branch (AFMPC/MPCRQ) has proceeded to utilize information issuing from this new procedure for the purpose of evaluating aptitude requirement minimums. As a result of these evaluations, aptitude requirement adjustments were accomplished and first published in the April 1982 revision of Air Force Regulation 39-1.

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OCCUPATIONAL LEARNING DIFFICULTY: A STANDARD FOR DETERMINING THE ORDER OF APTITUDE REQUIREMENT MINIMUMS

I. INTRODUCTION

One of the major organizational goals of the Air Force is the optimal allocation of talent. This goal can be achieved by ensuring that the most talented enlistees are assigned to the most demanding job specialties (i.e., occupations). If high-ability personnel enter specialties which have lower ability requirements, talent will be wasted. On the other hand, if low-ability personnel enter specialties which have higher ability requirements, poor job performance will result. To the extent that available talent is not optimally allocated, operational readiness and mission effectiveness will be adversely affected.

Talent allocation is accomplished through the occupational assignment process. Enlistees are assigned to job specialties on the basis of job requirements published in Air Force Regulation 39-1. Job requirements are stated in terms of mental and physical standards that are considered minimally necessary for satisfactory job performance. If job requirements do not correspond to the actual mental and physical demands of specialties, the occupational assignment process will not result in the optimal allocation of talent.

In determining job requirements for a selected specialty, the first step, logically and chronologically, is to conduct an occupational analysis (Thorndike, 1947). The objective of such an analysis is to identify work activities, the circumstances under which the work activities are performed and the personnel characteristics necessary to perform them. The Air Force Human Resources Laboratory (AFHRL) has conducted occupational research and development (R&D) with the assistance of the Occupational Measurement Center (USAFOMC) to derive measures of the mental demands of enlisted specialties. The R&D was initiated in response to a request for personnel research (RPR 73-17) by the Classification Branch of the Air Force Manpower and Personnel Center (HQ AFMPC/MPCRPQ). This report describes the use of measures of occupational mental demand for the purpose of establishing aptitude requirements for Air Force enlisted specialties.

Problem

Aptitude requirements are stated in terms of percentile scores on the Mechanical, Administrative, General, and Electronics aptitude indexes (AIs) of the Armed Services Vocational Aptitude Battery (ASVAB) (Weeks, Mullins, & Vitola, 1975). Determination of the aptitude requirement for a given specialty consists of two separate decisions. First, the appropriate type of aptitude is identified. This involves selecting one of the four AIs of the ASVAB. The second decision consists of determining the appropriate aptitude requirement minimum. This involves specification of a percentile score cutoff on the selected AI. Both decisions are extremely important for determining

aptitude requirements; however, it is the latter decision concerning specification of the aptitude requirement minimum which is the subject of this report.

Decision rules for identifying the appropriate aptitude type are relatively straightforward and based on one central objective; that is, to minimize the costs associated with resident technical training. The process consists of selecting the ASVAB AI that is most predictive of success in training. For example, for a given specialty a representative sample of enlistees who have completed resident training are identified and the relationships between their scores on ASVAB AIs and measures of their performance in training (i.e., final school grade) are examined. The AI exhibiting the highest relationship with training performance is considered most indicative of training success and, therefore, most appropriate for stating the aptitude requirement type for the associated specialty. Relationships obtained between measures of training performance and aptitude test scores on the ASVAB (and its predecessors) are documented in a report by Weeks, Mullins, and Vitola (1975).

Once the aptitude type is identified, then the aptitude requirement minimum (i.e., percentile score cutoff) is determined. Historically, determination of aptitude minimums has been problematic because associated decision rules have been poorly defined, and numerous objectives have influenced decisions. For example, decisions concerning aptitude minimums have been made to upgrade the quality of personnel in various commands, to accommodate technological changes, to minimize recruiting short-falls, and to minimize training elimination rates (Maginnis, Uchima, & Smith, 1975a,b,c). Although determination of aptitude minimums on the basis of such practical considerations is reasonable, the decision process has not included systematic reference to standardized measures of occupational mental demand. Due to the lack of such an empirical, job-centered referent for integrating decisions, aptitude minimums have been established and modified unsystematically. The problem identified in RPR 73-17, which served as the basis for this R&D, was the need for a quantitative method for determining aptitude minimums (i.e., percentile score cutoffs) for enlisted specialties.

II. APPROACH

The recommended solution to the problem identified by RPR 73-17 is to employ measures of occupational mental demand as a standard for determining the order of percentile score cutoffs. Although exact percentile score cutoffs are not directly produced by this procedure, reference to measures of occupational mental demand would indicate (a) the general rank order of aptitude minimums, and (b) those specialties which should have similar and those which should have dissimilar aptitude minimums. Assuming such an implementation strategy, information concerning occupational mental demand was first obtained at the task level based on judgments of task difficulty by senior-level technicians and independent occupational experts. The concept of task difficulty represents a complex task property; consequently, a number of R&D efforts were devoted to the determination of an acceptable, standard definition.

A Definition of Task Difficulty

Although many definitions were considered, task difficulty was initially defined in terms of task performance difficulty; that is, in terms of the difficulty of performing a task satisfactorily under normal conditions. Research by Madden (1962), however, indicated that senior-level technicians did not perceive task performance difficulty as an independent task property but rather as dependent on physical working conditions and/or interpersonal relations. As a result, senior-level technicians did not always agree in terms of the difficulty of a given task. As an alternative, task difficulty was expressed in terms of learning time. Task-learning difficulty was defined as the time it takes to learn to perform a task satisfactorily (i.e., the higher the learning difficulty, the more time required to learn to perform the task). Numerous studies (Leczmar 1971; Mead 1970a, 1970b; Mead & Christal, 1970) demonstrated that senior-level technicians could achieve high levels of agreement when rating task-learning difficulty. As a result, this definition was adopted for the purpose of obtaining judgments of task difficulty.

A Basic Assumption

The central assumption associated with the recommended approach is that aptitude (i.e., aptitude minimums) and learning time (i.e., task learning difficulty) are related. Both direct and indirect evidence indicating the presence of such a relationship are available.

Christal (1976) argued that indirect evidence in support of the relationship issues from training research. He indicated that when learning time is constant, aptitude is related to the amount of material mastered. However, when students are trained to a standard of performance and are allowed to progress through training at their own rate, the amount of material mastered is constant because it is based on a common training standard. In the latter situation, aptitude is related to the amount of time (i.e., learning time) required to reach the training standard, so that high-aptitude students require less time to reach the standard than do low-aptitude students.

Direct evidence in support of the relationship between aptitude and learning time is readily available in the area of educational research. Studies by Krumboltz (1965), Block and Anderson (1975), Cronbach and Snow (1977), and Gettinger and White (1979) all lend support to the notion that aptitude is related to learning time. Perhaps the most compelling evidence obtained in the Air Force environment came from research by Fugill (1972, 1973). He reported high relationships between independent judgments of the time needed to learn tasks and judgments of the aptitude required to ensure satisfactory task performance. Fugill (1972) concluded that relative task aptitude is conceptually inseparable from relative task difficulty when difficulty is defined in terms of learning time.

The Measurement Procedure

Once the strategy for determining the order of aptitude minimums from indices of occupational learning difficulty was adopted, it was necessary to design, develop and apply a standardized measurement procedure to derive indices of occupational learning difficulty. The procedure that was developed is based on the occupational survey methodology used by the USAFOMC and has been described in detail elsewhere (Burtch, Lipscomb & Wissman, 1982; Weeks, 1981; Weeks, & Wissman, 1980). The measurement procedure consists of three major phases. It begins with a detailed, task-level perspective in phase one, progresses through a less detailed, position-level perspective in phase two, and ends with a global, occupational-level perspective in the final phase.

For each specialty studied, phase one of the procedure began with measurement at the task level. Approximately 50 to 100 senior-level technicians and 14 occupational experts independently provided ratings of task learning difficulty. These data were then subjected to standard quality control checks. Task difficulty ratings were evaluated for both reliability and validity. If analyses for a given specialty indicated either low interrater agreement or a lack of convergence between independent ratings of task learning difficulty by senior-level technicians and occupational experts, then the specialty was identified for further analysis and the data were held in abeyance.

Phase two of the procedure involved processing occupational data at the position level. For the selected specialty and a specified incumbent position within the specialty, task-learning difficulty was multiplied by the percentage of time the incumbent spent performing the associated task. These values were then summed for all tasks performed by the incumbent thus deriving an index of learning difficulty uniquely characteristic of that position. This procedure was repeated for every incumbent position for which task time-spent data were available. Typically, for enlisted specialties consisting of less than 3,000 incumbents, USAFOMC surveys 100 percent of the incumbent population to obtain task time-spent data. For specialties consisting of more than 3,000 incumbents, a stratified random sample is surveyed. For all surveys, incumbents in technical training programs and in the process of permanent change of station transfers and those having been less than 6 weeks in specialties are excluded from participation. In general, 75 to 95 percent of the surveys mailed out are returned for processing (J. L. Mitchell, personal communication, July 27, 1983).

Phase three of the procedure involved derivation of an occupational-level index of learning difficulty. For a selected specialty, this phase of the procedure consisted of averaging position-level indices of learning difficulty for incumbent subgroups indicated as appropriate for a given application. The procedure is extremely flexible and permits development of indices of learning difficulty depending on the needs of Air Force management. For example, separate indices of learning difficulty can be produced for job types within a specialty, first-term positions, second-term positions, or the total incumbent group for which data are available. Such measures of occupational learning difficulty provide personnel managers with an empirical, job-centered frame of

reference which can be used not only to determine the order of aptitude requirement minimums (i.e., percentile score cutoffs) but also to support other critical management decisions. Alternative management applications are described by Weeks (1982) and in section V of this report.

III. FINDINGS

Occupational analyses were conducted to determine the learning difficulty of more than 200 enlisted specialties. This involved the evaluation of learning difficulty for over 100,000 tasks and the derivation of learning difficulty indices for more than 170,000 incumbent positions. Results of analyses at the task level, and in particular, information concerning the reliability and validity of task-level judgments of learning difficulty, are available in a technical report by Burtch, Lipscomb, and Wissman (1982).

Findings presented in this report issued from phase three of the measurement procedure; that is, analyses at the occupation or specialty level. Figures 1, 2, and 3 present aptitude requirement minimums (i. e., percentile score cutoffs) as stated in the April 1981 version of Air Force Regulation 39-1 and the average learning difficulty of first-term positions for samples of specialties in the general/administrative, mechanical and electronics aptitude areas. Although occupational learning difficulty can not be meaningfully compared across these figures, examination of the data within each figure permits evaluation of aptitude minimums with regard to the learning difficulty of the associated specialty (Note. Aptitude minimums presented in all figures are no longer current as a result of management initiatives to align the order of minimums with occupational learning difficulty).

Figure 1 is adapted from Burtch et al. (1982) and presents aptitude requirement minimums and average learning difficulty for first-term positions in a sample of six general and six administrative specialties. General and administrative specialties are presented together in Figure 1 because tasks within specialties in these aptitude areas were found to be sufficiently similar to permit combining them for the purpose of determining learning difficulty (Fugill, 1972). The horizontal line next to each specialty represents plus and minus one standard deviation about the average learning difficulty for first-term positions in the specialty. This line provides a graphic representation of the variance in learning difficulty. The vertical hashmark in the middle of the line represents average learning difficulty for first-term positions. The magnitude of difficulty is represented by the horizontal dimension with lines located on the right indicating higher learning difficulty than those on the left.

Comparisons of the order of aptitude minimums with the order of specialties in terms of learning difficulty indicate misalignments in aptitude minimums with respect to learning difficulty. For example, the Weather specialty is assigned a higher aptitude minimum than is the Contracting specialty even though the average learning difficulty for first-term Weather specialist positions is lower than that for Contracting specialist positions.

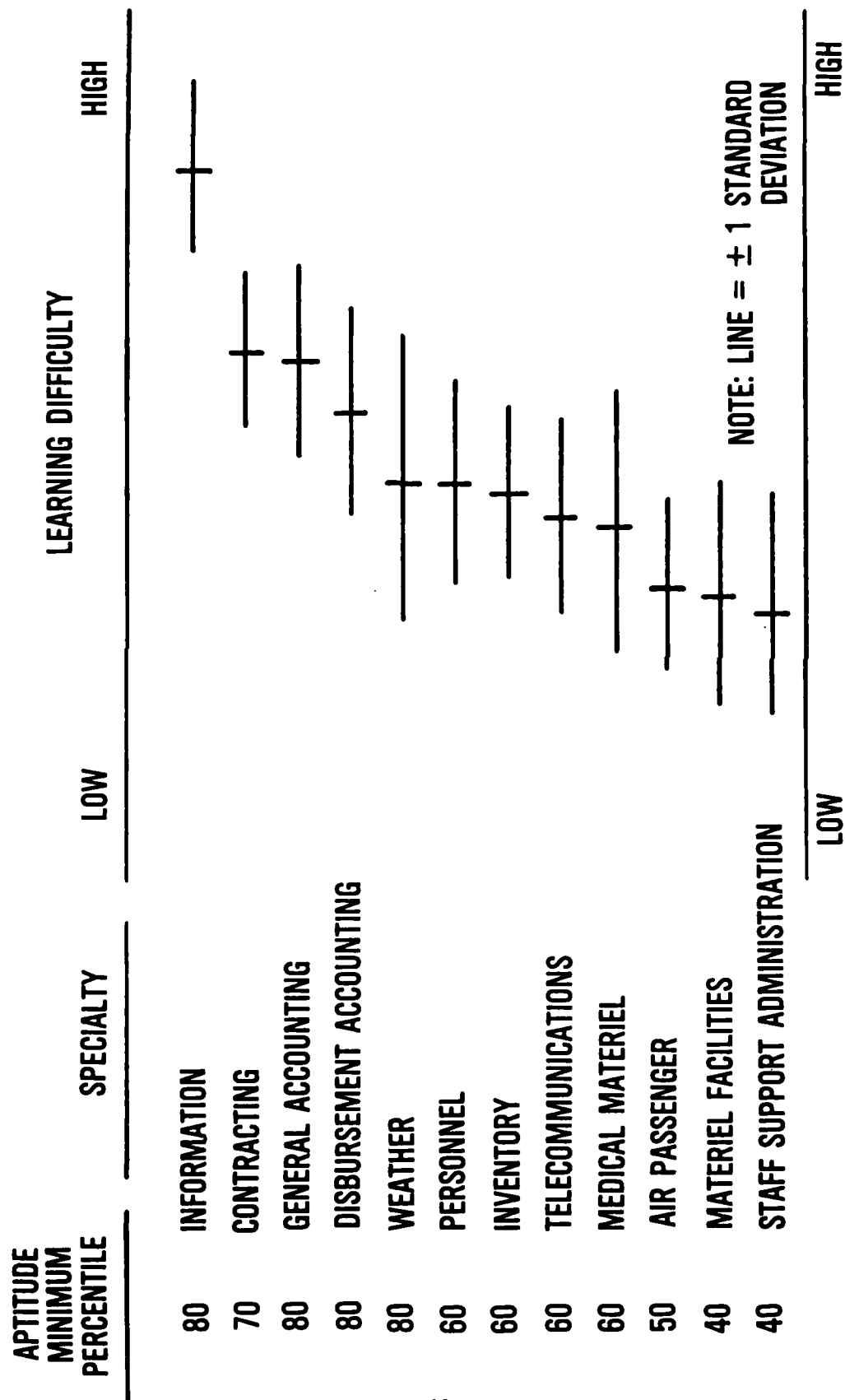


FIGURE 1. APTITUDE MINIMUM PERCENTILES AND AVERAGE LEARNING DIFFICULTY
FOR FIRST-TERM POSITIONS IN A SAMPLE OF GENERAL/ADMINISTRATIVE
SPECIALTIES

In addition, the learning difficulty of the Air Passenger specialty and the Materiel Facilities specialty are approximately the same, yet associated aptitude minimums are different. This latter example is useful for demonstrating the major limitation associated with the recommended approach for determining aptitude minimums. Although occupational learning difficulty can be used to infer differences and order relations among aptitude minimums, information concerning exact percentile scores is not directly produced. As a result, it can be concluded from the learning difficulty data that aptitude minimums for the Air Passenger and Materiel Facilities specialties should be the same; however, no legitimate inferences can be made concerning whether the aptitude minimums should be percentile scores of 40 or 50.

Figure 2 presents aptitude requirement minimums and average learning difficulty for first-term positions in a sample of mechanical job specialties. Comparisons of the order of aptitude minimums with corresponding measures of learning difficulty indicate misalignments in aptitude minimums with respect to learning difficulty. Even though the average learning difficulty of first-term positions for Jet Engine Mechanic is higher than that for Missile Maintenance, the aptitude minimum for Jet Engine Mechanic is lower. Furthermore, even though the difficulty levels of first-term positions for Tactical Aircraft Maintenance and Air Cargo are lower than that for General Purpose Vehicle Mechanic, aptitude minimums for these two specialties are higher than that for Vehicle Mechanic.

Figure 3 presents aptitude requirement minimums and average learning difficulty of first-term positions for a sample of electronics specialties. Examination of learning difficulty for these specialties indicates substantial differences in learning difficulty, yet associated aptitude minimums are uniformly high. For example, the average difficulty of the Avionics Aerospace Ground Equipment specialty is highest and the average difficulty for the Missile Systems Maintenance specialty is lowest; however, the aptitude minimums for both specialties are the same (i.e., 80). It appears that few distinctions are made among electronics specialties for the purpose of establishing aptitude minimums even though large differences exist among these specialties in terms of occupational learning difficulty.

IV. CONCLUSIONS

Burtch et al. (1982) provided evidence in support of the reliability and validity of task-level ratings of learning difficulty. This report describes the results of analyses of learning difficulty at the occupation level. For specialties having a common aptitude requirement type, comparisons of the order of aptitude minimums with the order of specialties in terms of occupational learning difficulty permitted evaluation of aptitude requirement minimums. On the basis of these comparisons, it is concluded that some aptitude minimums are seriously misaligned. This was demonstrated by showing that:

1. Some specialties high in learning difficulty have low minimums (e.g., Jet Engine Mechanic).

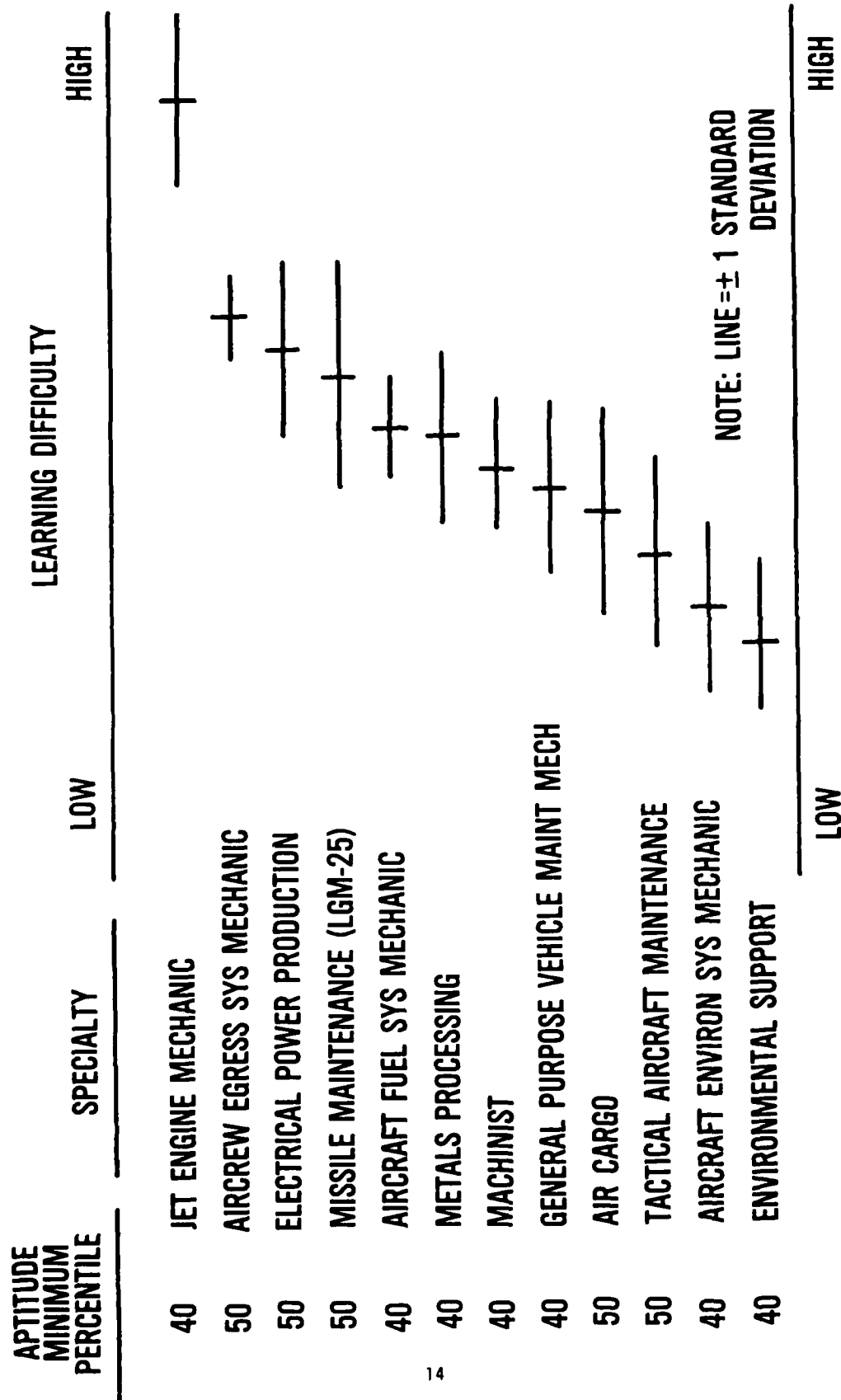


FIGURE 2. APTITUDE MINIMUM PERCENTILES AND AVERAGE LEARNING DIFFICULTY
FOR FIRST-TERM POSITIONS IN A SAMPLE OF MECHANICAL SPECIALTIES

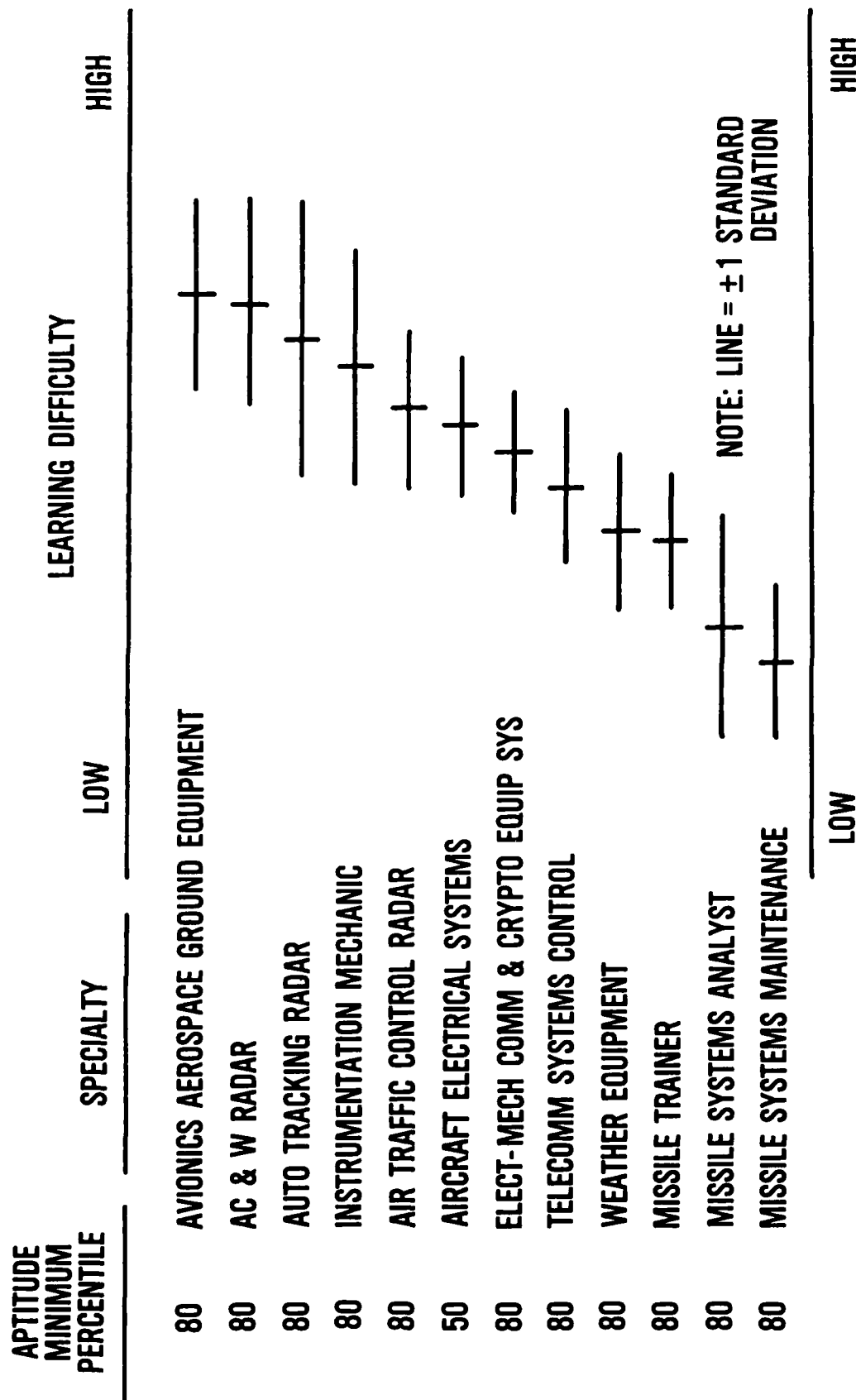


FIGURE 3. APTITUDE MINIMUM PERCENTILES AND AVERAGE LEARNING DIFFICULTY
FOR FIRST-TERM POSITIONS IN A SAMPLE OF ELECTRONICS SPECIALTIES

2. Some specialties low in learning difficulty have high minimums (e.g., Tactical Aircraft Maintenance).

3. Some specialties of equivalent learning difficulty have different minimums (e.g., Air Passenger and Materiel Facilities).

4. Some specialties widely differing in learning difficulty have the same minimums (e.g., Avionics Aerospace Ground Equipment and Missile Systems Maintenance).

Such misalignments in aptitude minimums suggest that the talent available to the Air Force is not being allocated in the most optimal manner. It is generally recognized that individuals vary a great deal in terms of their learning rate. High-aptitude personnel learn faster than low-aptitude personnel given the same subject matter. Occupational analyses have indicated that specialties vary in terms of learning difficulty; that is, in terms of the time required to learn to perform associated tasks. As Christal (1981) has recommended, the fastest learners should be assigned to those specialties having the highest learning difficulty. The Air Force cannot afford to select high-aptitude personnel and assign them to low-difficulty specialties for the result is a waste of talent and the feeling on the part of the person being assigned that his or her talents are not being fully utilized. The use of occupational learning difficulty for determining the order of aptitude requirement minimums would ensure that individuals having the highest aptitudes are assigned to specialties having the highest learning difficulty. Such an approach would contribute to optimal talent allocation and effective utilization of manpower.

V. APPLICATIONS

To facilitate the alignment of aptitude minimums with occupational learning difficulty, a two-variable plot as described in Figure 4 can be constructed to provide a convenient visual guide. The vertical axis represents the scale of aptitude (i.e., percentile scores) for a particular aptitude requirement type. The horizontal axis represents the scale of occupational learning difficulty. A specialty can be represented by a point located at the intersection of the applicable aptitude minimum and the associated level of occupational learning difficulty. Once points representing all specialties having the same aptitude requirement type are placed in the body of the plot, aptitude minimums (i.e., percentile scores) can be adjusted so that they are in general alignment with occupational learning difficulty. This would involve positioning points on the vertical dimension such that specialties higher in learning difficulty have higher aptitude minimums than do specialties which are lower in learning difficulty. If such an alignment procedure is adopted, the points corresponding to specialties should form an elliptical cluster extending from the bottom left to the top right corner of the plot (i.e., labeled as A in Figure 4).

In the process of adjusting aptitude requirement minimums by this graphic procedure, there are two particular types of misalignments which are

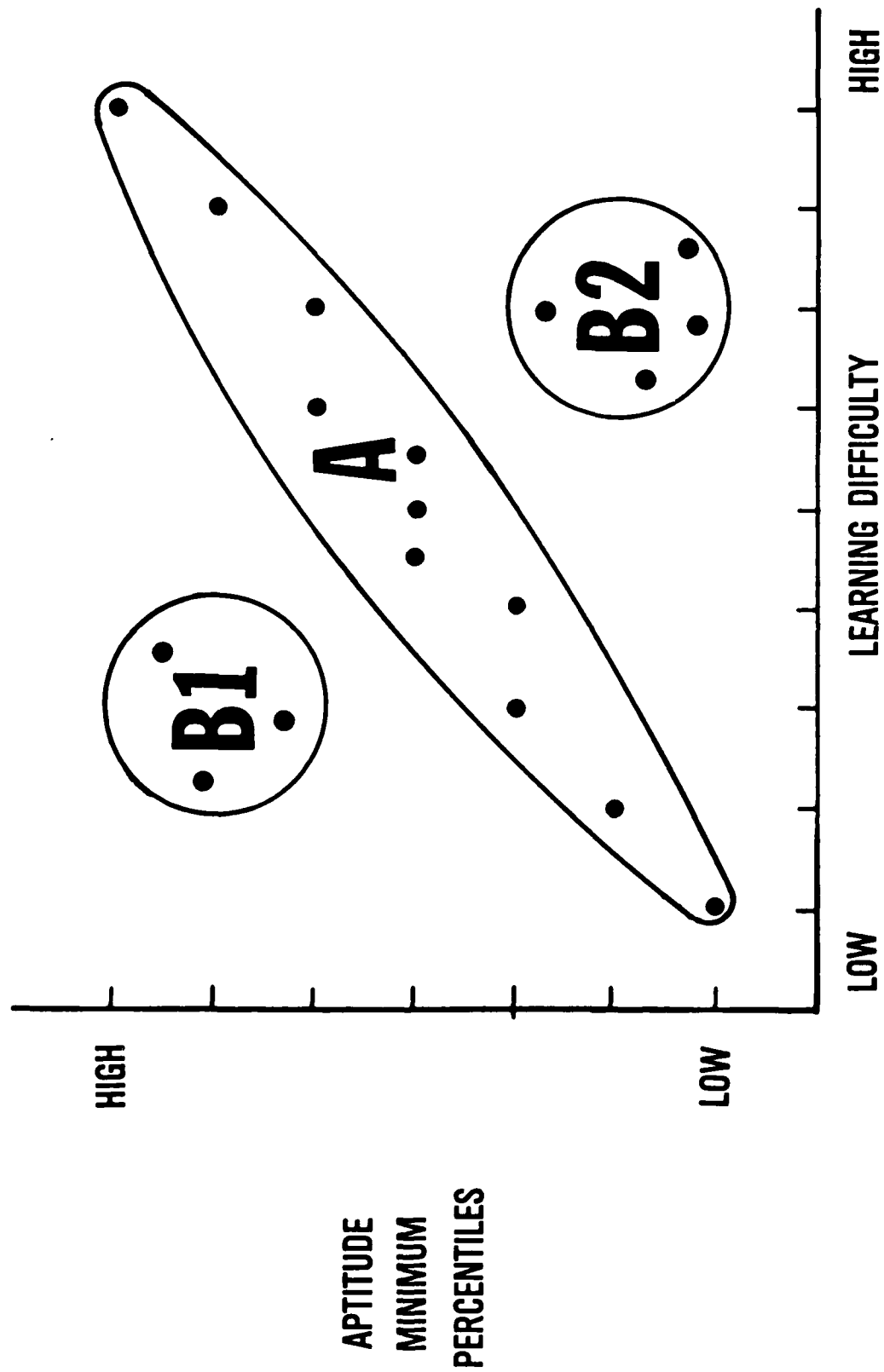


FIGURE 4. TWO-VARIABLE PLOT ILLUSTRATING THE ALIGNMENT OF APTITUDE
MINIMUM PERCENTILES WITH LEARNING DIFFICULTY

especially detrimental to optimal talent allocation and which are easily detected. First, points located in the top left corner of Figure 4 (i.e., within the circle labeled B1) represent specialties having low learning difficulty and high aptitude minimums. This type of misalignment is most frequently encountered in the electronics aptitude area. In the absence of contraindications, it is recommended that aptitude minimums for such specialties be decreased. Second, points located in the bottom right corner of Figure 4 (i.e., within the circle labeled B2) represent specialties having high learning difficulty and low aptitude minimums. This type of misalignment is most frequently encountered in the mechanical and general aptitude areas. It is recommended that aptitude minimums for such specialties be increased, assuming, of course, the absence of contraindications.

Although occupational learning difficulty is recommended as a standard for determining the order of aptitude requirement minimums, conditions associated with the application of these data should be carefully considered. The first condition relates to the currency of the occupational survey, on the basis of which task learning difficulty is derived. The value of indices of occupational learning difficulty is dependent on both the accuracy and currency of occupational survey data. Although task structures for most specialties are relatively stable over time (Driskill & Bower, 1978), task structures for some specialties occasionally undergo substantial transformations due to occupational restructuring or task reengineering. If tasks of higher or lower learning difficulty are added to or deleted from a specialty after the data used in deriving the index of learning difficulty are collected, then the index will not accurately represent the learning difficulty of the specialty. Indices of learning difficulty which are based on obsolete occupational survey data are not recommended for application. If occupational learning difficulty information is routinely referenced in determining the order of aptitude minimums, the currency of associated occupational survey data should be consistently monitored and indices of occupational learning difficulty should be updated as required.

A second condition associated with the use of indices of occupational learning difficulty for evaluating aptitude requirements involves the relative importance of learning difficulty information as compared to information concerning technical training or recruiting activities. Although it is recommended that learning difficulty be used as a standard for determining the order of aptitude minimums, it is not recommended that learning difficulty be used exclusively or that relevant recruiting or training information be ignored. Rather, it is proposed that occupational learning difficulty be used to establish a general ordering of aptitude minimums for a particular aptitude requirement type. Given this general ordering, adjustment of aptitude minimums for some specialties may be contraindicated, depending on training problems and/or the recruiting environment.

Indices of occupational learning difficulty were developed for determining the order of aptitude minimums; however, there are other potential applications which could contribute to efficient utilization of manpower. One of the more important applications would involve the use of indices of occupational learning difficulty for the purpose of determining occupational

assignments. Presently, most enlistees are assigned to specialties at military entry processing stations on the basis of the person-job-match (PJM) algorithm (Hendrix, Ward, Pina, & Haney, 1979). For a given enlistee, the PJM system produces a list of potential specialties based on consideration of both enlistee characteristics and Air Force needs. Although the PJM system ensures that enlistees are offered only those specialties for which they are qualified, it does not offer specialties so as to optimize the distribution of qualified talent beyond ensuring that minimum aptitude requirements are met. For example, in the present system, two qualified enlistees having Electronics AI scores at the 80th and 95th percentile would have an equal chance of being offered electronics specialties with aptitude requirement minimums at the 80th percentile, regardless of the learning difficulty of the specialties. The use of occupational learning difficulty in the PJM system would result in different job offers wherein the most difficult specialties among those having aptitude requirements at the 80th percentile would be offered to qualified enlistees having higher aptitudes and the less difficult electronics specialties would be offered to qualified enlistees having lower aptitudes.

Another important application of occupational learning difficulty would involve its use as a contingency plan, given talent shortages. For example, given the favorable recruiting environment of the early 80s, decreases in minimums for electronics specialties of low learning difficulty may be inadvisable. However, if the recruiting environment becomes less favorable and recruitment of sufficient numbers of high-aptitude personnel becomes progressively difficult, indices of occupational learning difficulty could serve as a contingency guide to selectively decrease aptitude minimums for electronics specialties. Such a procedure would help ensure optimal allocation of available manpower given shortages in higher level talent.

VI. RECOMMENDATIONS

Recommend aptitude requirement minimums be established by reference to indices of occupational learning difficulty, as well as to information concerning training and recruiting activities.

If occupational learning difficulty information is routinely referenced in determining the order of aptitude requirement minimums, recommend the currency of associated occupational surveys be consistently monitored and indices of occupational learning difficulty be updated as required.

VII. EPILOGUE

In February 1981, an aptitude requirements working group was established by direction of AFMPC/CC and ATC/CC. The working group was composed of representatives from AFMPC, ATC, and AFHRL. The objectives of the working group were (a) to evaluate aptitude requirement minimums for all enlisted job specialties, with specific attention devoted to employment of measures of occupational learning difficulty in defining aptitude minimums and (b) to explore methods for measuring the impact on training and recruiting resources

of changes in aptitude requirement minimums. As a result of evaluation of aptitude requirement minimums by the working group, a decision was made to adjust minimums incrementally (i.e., + 5 percentile points) on a yearly basis until an aptitude requirement goal is reached for each job specialty. Although aptitude requirement goals were ultimately based on management policy, measures of occupational learning difficulty and information concerning training and recruiting activities played pivotal roles in determining aptitude requirement goals. Aptitude requirements recommended by the working group were first published in the April 1982 revision of Air Force Regulation 39-1.

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