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ARMED SERVICES VOCATIONAL APTITUDE BATTERY (ASVAB): VALIDATION FOR CIVILIAN OCCUPATIONS USING NATIONAL LONGITUDINAL SURVEY OF YOUTH (NLSY) DATA

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This report has been reviewed and is approved for publication.

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The Armed Services Vocational Aptitude Battery (ASVAB) is a multiple-aptitude test battery used by all of the military services to determine the qualifications of candidates for enlistment and assign enlistees to military occupations. It is also administered annually to thousands of high school and college students, and represents a potentially important source of information for career guidance. The present effort examines the relationships between ASVAB scores and actual career choices for a nationally representative sample of youth and young adults. Discriminant analyses were performed to assess the extent to which ASVAB scores could be used to differentiate individuals in different occupations or occupational groups. The ASVAB-based discriminant functions resulted in a significantly greater number of individuals being correctly classified than would be expected by chance. In particular, ASVAB scores were most effective in predicting occupational membership for jobs that involved higher, or lower, degrees of complexity of work with data. Additional analyses were performed to assess the extent to which ASVAB scores could differentiate individuals who were satisfied with their occupational choices. No pattern of significant relationships between ASVAB scores and job satisfaction was found. The results support the validity of the ASVAB for predicting membership in civilian occupations. Additional measures would be useful for extending the range of jobs for which membership can be effectively predicted.

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SUMMARY

The present investigation used an existing data set to assess the predictive validity of the Armed Services Vocational Aptitude Battery (ASVAB) for civilian occupations. The ASVAB is administered annually to thousands of high school and college students, and represents a potentially important source of information for career guidance. The value of the ASVAB as a guidance tool, however, rests on the extent to which ASVAB scores are valid predictors of entry into and success in civilian, as well as military, occupations. The present effort examined the relationships between ASVAB scores and actual career choices for a nationally representative sample of youth and young adults. Discriminant analyses were performed to assess the extent to which ASVAB scores could be used to differentiate individuals in different occupations or occupational groups. The ASVAB-based discriminant functions resulted in a significantly greater number of individuals being correctly classified than would be expected by chance. In particular, ASVAB scores were most effective in predicting occupational membership for jobs that involved higher, or lower, degrees of complexity of work with Data. Additional analyses were performed to assess the extent to which ASVAB scores could differentiate individuals who were satisfied with their occupational choices. Results showed no pattern of significant relationships between ASVAB scores and job satisfaction. The results, however, do support the validity of the ASVAB for predicting membership in civilian occupations. Additional measures may be useful for extending the range of jobs for which membership can be effectively predicted.

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PREFACE

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ARMED SERVICES VOCATIONAL APTITUDE BATTERY (ASVAB):
VALIDATION FOR CIVILIAN OCCUPATIONS
USING
NATIONAL LONGITUDINAL SURVEY OF YOUTH (NLSY) DATA

I. INTRODUCTION

The Armed Services Vocational Aptitude Battery (ASVAB) is a multiple-aptitude test battery used by all of the military services to determine the qualifications of candidates for enlistment and assign enlistees to military occupations. Since 1968, the Department of Defense (DoD) has administered the ASVAB free of charge to interested 10th, 11th, and 12th grade students in high schools and to students in postsecondary schools. Schools use ASVAB test results to provide educational and career counseling for students. In exchange, the military is allowed to use the information in recruiting for a limited period of time.

In spite of the potential of the ASVAB as a counseling tool, many schools have been reluctant to use it. A major reason for their reluctance is that the available validity information is primarily related to those test forms currently in use only by the military, and to criteria specific to military occupations. Weiss (1978) and Cronbach (1979) called attention to this problem as it pertained to Form 5 of the ASVAB. Weiss expressed his concern about use of Form 5 for high school counseling by stating, "The major technical deficiency of the ASVAB, however, is a very serious lack of validity data." About the same form, Cronbach noted that existing data provided only hints regarding its validity for choice of civilian occupational fields. Subsequently, several studies have sought to provide estimates of the validity of the ASVAB for civilian occupations through extrapolations from other test batteries such as the General Aptitude Test Battery (Hunter, 1985a). In a review of ASVAB Form 14, Jensen (1985) noted that although the test battery was "attractive, impressive, and probably unmatched by any commercially available test," it could be considerably enhanced as a tool for vocational counseling in high schools by providing more complete information on the levels and ranges of scores typical of persons successful in different civilian occupations (Jensen, 1985, p. 32). In their June 1983 Biennial Report, the Defense Advisory Committee on Military Personnel Testing noted, "There is clearly a need for evidence of ASVAB validity for civilian occupations, in order to support guidance uses of the ASVAB in the High School Testing Program," and recommended that such studies be initiated as soon as possible (Office of the Assistant Secretary of Defense, 1983, p. 5).

In an effort to enhance the usefulness of the ASVAB, the Air Force Human Resources Laboratory (AFHRL) initiated a series of studies designed to assess the validity of the ASVAB for civilian occupations. A preliminary investigation (Armstrong, Chalupsky, McLaughlin, & Dalldorf, 1988) assessed the validity of the ASVAB for predicting entry into 12 civilian occupations. The present investigation was designed to build upon that effort. Using data from the National Longitudinal Survey of Youth (NLSY), the present effort sought to examine a wider range of occupations and to assess the extent to

which ASVAB scores could predict job success and job satisfaction, as well as membership in those occupations. In doing so, the present investigation also sought to assess the utility of this data base for carrying out such validity studies.

Background

The ASVAB was initially developed for use by the military for personnel selection and classification, and in the mid-1970s was adopted for use by all of the armed services. The battery consists of 10 subtests: General Science, Arithmetic Reasoning, Word Knowledge, Paragraph Comprehension, Numerical Operations, Coding Speed, Auto and Shop Information, Mathematics Knowledge, Mechanical Comprehension, and Electronics Information. Each of the military services has developed a set of composite aptitude scores based on these subtests, intended to predict performance in particular groups of occupations.

Since its adoption as the operative test battery for all of the armed services, the ASVAB has also been administered to high school students through the Department of Defense Student Testing Program. Test results are made available to the military for use in recruiting; results are also made available to schools for career guidance purposes. Rather than providing the subtest scores, a series of academic and occupational composite scores have been developed for reporting to the schools:

Academic Composites
- Academic Ability
- Verbal
- Math

Occupational Composites
- Mechanical and Crafts
- Business and Clerical
- Electronics and Electrical
- Health, Social and Technology

Not surprisingly, given its widespread use, the ASVAB has been the subject of hundreds of validation studies, which seek to demonstrate the extent to which ASVAB scores are predictive of occupational performance or success.[1] However, the vast majority of these studies have focused on military occupations and on the validity of the ASVAB for predicting success in military occupations. Until recently, relatively little was known, or could be said, regarding the validity of the ASVAB for predicting success in civilian occupations.

Validity of the ASVAB for Military Occupations

Although the criterion of interest has been success in military occupations, most of the validation studies have used success in military

[1]In addition, some studies (cf. Douglas, 1986) have examined the validity of the ASVAB for predicting academic performance and success.

training programs as a proxy for successful job performance. Each of the services has carried out numerous studies designed to assess individual ASVAB subtest validities, as well as the validities of the composite scores. The ASVAB Test Manual summarizes validity data for eight different occupational groups (e.g., electronic equipment repairmen, craftsmen, functional support and administration), concluding that "the validities reported across all job families by all Services are sufficiently strong to provide effective predictors of training success" (U. S. Department of Defense, 1984a, p. 54). Each of the various occupational composite scores was found to be a significant predictor of performance in the related occupations.

McLaughlin, Rossmeissl, Wise, Brandt, and Wang (1984) made the following observation concerning the composites used by the Army, "In general, there was almost no tendency among MOS [military occupational specialties] for the currently assigned composite to have a higher validity than other current composites" (McLaughlin et al., 1984, p. 106). They then proceeded to identify an alternative set of four composites which had better absolute predictive validities, as well as better differential validity, than did the composites currently in use. Further analyses revealed that two factors were sufficient to account for most of the variance in job performance, with the first factor accounting for approximately 60% of the variance and the second, approximately 15%.

Hunter (1985b) carried out a meta-analysis of prior research on the validity of military test batteries for predicting success in military occupations. Noting that prior studies had revealed that the individual subtests of the ASVAB were valid for all jobs, Hunter used exploratory and confirmatory factor analytic models to identify the factor structure underlying the data and to assess the relationships among the factors identified and the criterion measures of job performance. Four factors were found to underlie the ASVAB subtests: Verbal, Quantitative, Technical, and Speed. Of these, the first three factors shared a common causal antecedent: general cognitive ability (commonly referred to as the "g" factor). Further analyses revealed that, with the exception of clerical jobs, general cognitive ability had high validity as a predictor of performance in every work area. The only evidence for differential validity was found in the clerical job family, where the Speed composite had higher validity than did general cognitive ability.

An ongoing study supported by the Army Research Institute for the Behavioral and Social Sciences (L. L. Wise, personal communication, 1990) is attempting to assess the validity of the ASVAB using actual job performance as the criterion. They are finding strong evidence of differential validity, with the Verbal and Math composites being predictive of success in some jobs, and the Auto and Shop Information subtest and the Mechanical and Electronics composites more predictive of other jobs. Their findings are somewhat contrary to Hunter's conclusions. However, the Hunter studies tended to use performance in military schools as the criterion measure, and it may be that general cognitive ability is indeed more important for such performance. However, when actual job performance is examined, other abilities may have greater predictive value.

Validity of the ASVAB for Civilian Occupations

Considerably less is known about the validity of the ASVAB for civilian jobs, due to the lack of data on performance in civilian occupations. Initial efforts to demonstrate the validity of the ASVAB for civilian occupations, therefore, were based on extrapolations from other similar test batteries and from data on related military occupations.

Hunter (1985a) has argued that because of the similarity in factor structures between the General Aptitude Test Battery (GATB) and the ASVAB, one can generalize from data on the validity of the GATB and draw conclusions regarding the ASVAB. Employing the techniques of meta-analysis, Hunter examined the results of 515 separate GATB validation studies, looking at predictions of job proficiency and training success for different occupational groups. He found that the dimension that best differentiated the occupations being examined was job complexity, as indicated by the complexity of work with Data and, to a lesser extent, with Things (Fine, 1955). As with military jobs, he found that general cognitive ability (g) was a strong predictor of success in all occupations. However, the validity of this dimension decreases as job complexity decreases. At the same time, the validity of psychomotor ability measures (available for the GATB but not currently measured by the ASVAB) increases as job complexity decreases. This suggests that there are at least two significant factors that need to be taken into account in predicting success in a variety of occupations based on the GATB (and, by implication, the ASVAB): psychomotor ability and g.

A second major assessment of the validity of the ASVAB for civilian occupations was made possible by the development of the Military-Civilian Occupational Crosswalk Manual (U. S. Department of Defense, 1984b), which links military occupations to many of the civilian jobs listed in the Dictionary of Occupational Titles (U. S. Department of Labor, 1977). This linkage makes it possible to generalize from validity data for military occupations.

Hunter (1985a) examined data regarding the relationship of the high school occupational composite scores to success in military jobs. Each of the composites proved to be a significant predictor of job performance in all areas, suggesting a common underlying factor (i.e., general cognitive ability) that crosses the various aptitude composites. There was little evidence for differential validity except for clerical jobs, where the Business and Clerical composite had higher validity than did general cognitive ability. Extrapolating from these studies of military occupations, Hunter concluded that ". . . the four occupational composites are valid predictors of civilian job performance as well as of military job performance. To the extent that each composite correlates highly with General Cognitive Ability, each is as valid a predictor as General Cognitive Ability." (Hunter, 1985a, p. 131.)

Prediger (1987) reported on an attempt to assess directly the validity of the ASVAB for civilian occupations. Using occupational choice as the criterion, he compared the ASVAB high school composites with experimental ability composites, in terms of their ability to differentiate choices among different occupational groups. Though he found the ASVAB composites to be

significant predictors of occupational choice, he believed it was the level of the score on the various dimensions, rather than the pattern of scores across dimensions, that differentiated occupational choices. Prediger concluded that this was indicative of a general ability factor underlying the various composites. On the other hand, when he examined a wider range of abilities[2] using a series of experimental composites based on self-assessment of abilities, he found evidence of differential validity. It should be borne in mind, however, that his analyses focused on occupational choice among a sample of 11th and 12th graders, rather than actual occupation 1 incumbents. However, Prediger's findings are compatible with Hunter's research using the GATB data, which found evidence of differential validity when additional scales (e.g., psychomotor ability) were included.

Test reviews have also been cautious regarding the predictive validity of the ASVAB for civilian occupations. Jensen concluded that the value of the ASVAB lay in its assessment of general ability, but that "little stock should be put in the profile aspects of the ASVAB composites for individual counseling" (Jensen, 1985, p. 36). He also noted the importance of interests as a complement to ability measures in career guidance and occupational choice.

ASVAB Civilian Validation Study

In parallel to the work by Hunter involving meta-analysis and validity generalization procedures, the American Institutes for Research, under contract to AFHRL, began a study to assess the validity of the ASVAB for civilian occupations using data on actual job performance as the criterion (Armstrong et al., 1988). The study focused on 12 different civilian occupations and consideration was limited to jobs which did not require a 4-year college degree and which each accounted for at least 150,000 employees nationwide. The occupations selected for study were licensed practical nurse, electronics technician, word processing machine operator, bookkeeper and accounting clerk, computer operator, firefighter, cosmetologist, diesel mechanic, electronics assembler, operating engineer, line installer, and bus driver. Collectively, these occupations represented 8 of the 10 occupational groups defined by the first digit of the Dictionary of Occupational Titles (DOT) Job Codes (U. S. Department of Labor, 1977).

The original design of the Armstrong et al. study called for identifying samples of individuals in each of the 12 occupations, administering the ASVAB Form 14 to those individuals, and collecting information from them and their employers regarding job performance. However, subsequent modifications to the study design resulted from prohibitions by the Office of Management and Budget (OMB) which precluded collecting job performance ratings. The study was thus restricted to analyzing relationships among ASVAB Form 14 scores and occupational membership. Occupational membership was defined as having held a

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[2]While Prediger called the constructs for which he obtained self-assessed values "abilities," a number of them were not the sort of constructs that most psychologists think of as abilities. For example, he included scales for such constructs as "sales ability."

job in the occupation for at least 3 months prior to the date on which the ASVAB was administered.

A total of 1,328 individuals took ASVAB Form 14 as part of the initial study. Multivariate analyses of variance (MANOVAs) were performed to determine whether ASVAB Form 14 subtest scores (rather than composites) were related to gender and, within gender, whether they were related to occupation. Four vectors were found to significantly differentiate occupations; the most salient dimension of variation was the difference between Auto and Shop Information (AS) subtest scores and Verbal (VE) composite scores. Discriminant analyses were performed to identify the specific clusters of occupations differentiated by ASVAB Form 14 scores. A total of six clusters were so identified. Predictive validities were assessed through linear regression analyses; the Cleman's lambda statistic indicated that incumbents in 11 of the 12 occupations could be significantly differentiated from their peers in other occupations. In sum, the initial study demonstrated significant relationships between ASVAB scores and membership in selected civilian occupations, and provided some evidence for differential validity of the ASVAB scales. However, because of the lack of performance rating data, no conclusions could be drawn regarding relationships between ASVAB scores and success in the occupations. In 1989, a second contract was awarded by the DoD to AIR to continue this study, collecting the necessary performance data and assessing the validity of the ASVAB for predicting performance in this set of civilian occupations. The results of this study are not yet available.

Purpose and Objectives of the Present Investigation

The present investigation represents an attempt to assess the validity of the ASVAB for civilian occupations via secondary analysis of extant data. Data from the National Longitudinal Survey of Youth (which also served as the National Norming Sample for ASVAB Form 14) were used for selected exploratory analyses of occupational membership in the initial ASVAB Civilian Validation Study (Armstrong et al., 1988). The present effort examined the utility of this NLSY data set for carrying out more extensive validation analyses.

The study reported here sought to build upon and extend the earlier study in two ways. First, it examined a wider range of occupations. As noted above, the Armstrong et al. study provided an in-depth analysis of 12 carefully chosen occupations. However, for career guidance purposes, it would be important to demonstrate the validity of the ASVAB for a wider range of occupations. Also, previous work by Hunter (1985a, 1985b) suggested that predictive validities may differ for jobs with varying levels of complexity, as well as for different jobs. The present study thus sought to examine data for a more representative subset of jobs, including those requiring some college as well as non-college jobs, and those which represent the full range of job complexity.

Second, the criterion measures were expanded to include indicators of success in and satisfaction with the occupation, as well as occupational membership. Occupational membership is viewed as an initial screen which identifies the broad subset of people who might pursue a given job. This set

of individuals can be subsequently refined, using the additional criteria of success and satisfaction to identify those most likely to persist and succeed. Though performance and satisfaction tend to be correlated, they represent somewhat different, partly independent constructs. Success reflects an individual's level of performance, whereas satisfaction reflects the fit between the content and conditions of the job and the individual's interests and values. From a guidance perspective (as contrasted to a selection perspective), it is important to consider both factors.

Using the data available from the NLSY data set, the present effort addressed the following questions:

1. To what extent do ASVAB scores effectively differentiate incumbents in different occupations or clusters of related occupations?

2. To what extent do ASVAB scores further differentiate incumbents who are satisfied with their jobs?

3. To what extent do ASVAB scores further differentiate incumbents who are more successful in their jobs?

II. METHODS

Data Sources

Data for this study were obtained from the National Longitudinal Survey of Youth (NLSY), an ongoing longitudinal study of a nationally representative sample of 12,686 young adults who were 14 to 21 years old in 1979, when that study began (Center for Human Resource Research, 1986). Participants have been surveyed annually since 1979, providing extensive information about their employment experiences as well as information regarding their backgrounds, plans and aspirations, education, marriage and childbearing histories, income and expenditures, health, and other aspects of their lives. The response rate to the follow-up surveys has averaged approximately 95%, an extremely high response rate for a study of this sort.

The Profile of American Youth Study

The NLSY sample provided the basis for the Department of Defense- and Department of Labor-sponsored Profile of American Youth Study of 1980 (Sellman & Laurence, 1981). In this study, the ASVAB Form 14 was administered to members of the NLSY sample; 94% of the original sample completed the tests, for a total of 11,914 individuals. The purpose of the Profile of American Youth Study was to obtain data on the vocational aptitudes of contemporary youth and to update the norms for the ASVAB. The NLSY data base contains 33 ASVAB-related variables from this study, including raw scores, standard scores, and standard errors for each of the 10 ASVAB subtests, as well as sampling weights, and high school status at the time of the ASVAB testing.

Because it contains both ASVAB data as well as data on subsequent employment for a large, nationally representative sample of men and women, the NLSY data set represents a unique resource for analyses of the relationships between ASVAB scores and success in civilian occupations.

Analysis Samples

The analyses reported here used subsets of the NLSY sample. The following considerations guided the selection of the analysis samples:

1. **Availability of ASVAB Data.** Analysis samples were necessarily restricted to those cases for whom ASVAB data were available.

2. **Employment Status.** Analysis samples were also restricted to those individuals who were employed at the time of the follow-up surveys. Because each follow-up survey collected more complete and more precise data on the current job than prior jobs, analyses focused on the jobs the respondents held at the time of the follow-up. More specifically, the analyses were limited to individuals holding full-time jobs (i.e., working 35 or more hours per week) at the time of the survey. Individuals having a full-time job but not at work during the survey week due to vacation or illness were also included in the analyses.[3]

3. **Availability of Outcome Data.** Because of differences in the data collected during the various follow-up surveys, the analyses focused on the data from two survey years: 1982 and 1986. The 1982 follow-up survey was the last year in which detailed job satisfaction information was obtained. The 1982 survey results thus provided an opportunity to examine data for youths who have completed school, entered the work force, and settled into an occupation, while still providing somewhat detailed information on job satisfaction. The 1986 follow-up survey data were selected for analysis because 1986 was the only year in which information on starting salary was obtained, and thus the only year in which salary growth could be measured.

Analysis Variables

Three sets of variables were used in this study: ASVAB Form 14 scores, data on occupational membership, and data on occupational satisfaction and success. For some analyses, the gender of participants (as reported in the 1979 base-year survey) was taken into account.

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[3]It is recognized that limiting the analysis samples to individuals who were employed at the time of a given follow-up survey may introduce a degree of selection bias. This is compensated for, to some extent, by examining data for two different follow-up cohorts (i.e., respondents to the 1982 and the 1986 surveys).

ASVAB Form 14 Scores

As previously indicated, 94% of the NLSY participants took the ASVAB Form 14 in 1980. For each of these individuals, raw scores were available on the 10 ASVAB subtests:

General Science (GS)
Arithmetic Reasoning (AR)
Word Knowledge (WK)
Paragraph Comprehension (PC)
Numerical Operations (NO)
Coding Speed (CS)
Auto and Shop Information (AS)
Math Knowledge (MK)
Mechanical Comprehension (MC)
Electronics Information (EI)

For use in the present study, each of these ASVAB subtest raw scores was converted to a standard score, with a mean of 50 and a standard deviation of 10.

In addition to the standard scores, one of the analyses employed four ASVAB composite scores. These composites were developed as a part of a major, multi-year, U. S. Army Research Institute-supported program designed, in part, to study the validity of the ASVAB for military use (L. L. Wise, personal communication, 1989). These experimental composites differ from the traditional ASVAB academic and occupational composites in that they are non-overlapping, and therefore likely to have substantially greater predictive value. These experimental composites are formed from ASVAB subtests as follows:

QUANT = Arithmetic Reasoning + Math Knowledge
VERBAL = Paragraph Comprehension + Word Knowledge + General Science
TECH = Auto and Shop Information + Mechanical Comprehension + Electronics Information
SPEED = Numerical Operations + Coding Speed

Occupational Membership

In the 1979 survey and as part of each of the follow-up surveys, NLSY participants have provided information regarding their current employment status and occupation. (Questionnaire items are reproduced in Appendix A.) They also provided information about other jobs held during the past year (i.e., since the prior survey). The data base uses Bureau of the Census 3-digit occupation codes, as well as Census industry codes, to identify occupations. As a result, specific jobs may be grouped together under a single occupation code.

The original design for the present investigation proposed to examine specific occupations as defined by the Census 3-digit occupation codes. However, a review of the NLSY follow-up data revealed that the 4,175

respondents who had taken the ASVAB Form 14 in 1980 and who were working at least 35 hours per week at the time of the 1982 follow-up survey held jobs in a wide variety of occupations -- specifically, 288 different Bureau of the Census 3-digit occupation categories. As a result, few occupations had sufficient numbers of incumbents to warrant analyses. Only two of the occupation categories had as many as 100 incumbents (salespersons and sales clerks, and secretaries not elsewhere classified), and few occupation categories had as many as 65 incumbents. Analyses based on the Census 3-digit occupation codes are, therefore, necessarily limited to those few occupations with sufficient numbers of respondents (though the respondents in each occupation can be assumed to be relatively homogeneous).

Due to the problem of small samples within occupations, an alternative job classification approach was also used that would permit all of the NLSY follow-up survey respondents to be included in at least some of the analyses. Following Hunter (1985a), the focus shifted to job complexity as a dimension underlying all occupations, and one which has been found to be associated with differential patterns of ASVAB scores. The Dictionary of Occupational Titles (DOT), published by the U. S. Department of Labor (1977), classifies each of the approximately 12,000 occupations in the U.S. economy using a three-dimensional model of job complexity (Fine, 1955).

This classification system is based on the premise that every occupation requires a worker to function to some degree with respect to Data, People and Things. The DOT indicates that the degree to which a given job requires a worker to function with respect to each of these dimensions can vary "from the relatively simple to the complex in such a manner that each successive relationship includes those that are simpler and excludes the more complex." The Data dimension consists of seven values ranging from ***comparing*** (6) to ***synthesizing*** (0); the People dimension has nine values ranging from ***taking instruction-helping*** (8) to ***mentoring*** (0); and the Things dimension, with eight values, ranges from ***handling*** (7) to ***setting-up*** (0). For each dimension, the lower number represents the more complex end of the scale. Thus, each occupation in the DOT can be classified using a three-digit code. These three-digit codes are referred to as the "DPT codes."

Neither the Department of Labor nor the Bureau of the Census has assigned DPT codes to the Census 3-digit occupation categories that were used to classify the jobs held by the NLSY follow-up survey respondents. However, in a study sponsored by the National Academy of Sciences (Miller, Treiman, Cain, & Roos, 1980), the DPT codes were estimated for each of the Census occupation categories. These estimates were based on the average values of the DOT codes subsumed under each Census occupation category. Because these average Data, People and Things codes are reported to one decimal point rather than just as whole numbers, a greater level of differentiation is possible among the different Census 3-digit occupation categories.

The DPT estimates developed as a part of the National Academy of Sciences study were used in the present effort to assign DPT codes to those jobs held by the 4,175 NLSY respondents at the time of the 1982 follow-up. Then the frequency distributions of these DPT codes were obtained across all

4,175 respondents. These frequency distributions formed the basis for the job grouping variable used in this study, as follows:

1. The frequency distributions for the Data, People and Things dimensions were each split into approximately equal parts. These parts were classified as either High, Medium or Low depending upon that part of the dimension's complexity scale to which it corresponded. Thus, the job held by each of the follow-up respondents could be classified as High, Medium or Low on each of the dimensions.

2. When the three dimensions were combined to create a single job grouping variable, 27 different categories, ranging from HHH (High, High, High) to LLL (Low, Low, Low), were formed. These 27 DPT categories served as the basis for many of the analyses.

Job Satisfaction

Although the specific questions asked have varied somewhat from year to year, the NLSY data base contains reasonably detailed information on job satisfaction for the current job, at least for the first 4 years (1979 - 1982). In addition to a measure of global job satisfaction, individuals were asked to assess their satisfaction with each of several job dimensions (e.g., the extent to which the job provides an opportunity to do what one does best, provides valuable experience, provides a good income, etc.). Unfortunately, after the 1982 survey only the global job satisfaction measure was included. See Appendix A for the complete text of the items.

Scores on each job satisfaction item included in the survey can be examined individually, or combined to produce a composite index. For the present analyses, four job satisfaction variables were constructed, as follows:

1. **Global Job Satisfaction Variable (GJSAT).** Scores on this variable are based on the global job satisfaction question (see Question 39A in Appendix A). However the coded values are reversed so that a value of 4 represents the highest level of job satisfaction and a value of 1 represents the lowest level of job satisfaction.

2. **Composite Job Satisfaction Variable (CJSAT).** Scores on this variable are determined by the respondents' reported satisfaction with various dimensions of their jobs (see Questions 33A to 33J for employed respondents, and Questions 34A to 34G for self-employed respondents). Where necessary, the original coding for these items is reversed, so that a value of 4 always signifies a positive rating of the job (i.e., greater satisfaction), while a value of 1 indicates a negative rating, or lower satisfaction. For the questions that are answered, the sum of the coded values is divided by the number of questions answered. This results in a

value ranging from 1 to 4, with higher values indicating more positive aspects of the job and, at least theoretically, greater satisfaction with the job.

3. **Behavioral Job Satisfaction Variable (BJSAT).** This variable reflects the job-seeking behavior of the respondent. Scores are based on responses to questions that ask whether, if given a choice, the respondent would keep his or her current job; whether the respondent has been looking for a job during the past 4 weeks; and, if so, why (see Questions 35A, 41, and 44). Values for this variable range from 1 to 4, with 1 indicating a low degree of job satisfaction and 4 indicating a high degree of job satisfaction. See Appendix B for details regarding the construction of this variable.

4. **Total Job Satisfaction Variable (TJSAT).** This variable is computed as the average of the three previously described job satisfaction variables. Like the three variables on which it is based, its values range from 1 to 4, with a value of 1 representing a low level of job satisfaction and a value of 4 representing a high level of job satisfaction.

As a check on the degree to which the four job satisfaction variables were tapping different dimensions of job satisfaction, the correlations between the variables were calculated. The sample used was the 4,175 NLSY respondents who had taken the ASVAB Form 14 in 1980 and who were working at least 35 hours per week at the time of the 1982 follow-up survey. The correlation matrix is presented in Table 1.

Table 1. Correlations Between Job Satisfaction Variables

	GJSAT	CJSAT	BJSAT	TJSAT
GJSAT	1.000	0.546	0.441	0.867
CJSAT	0.546	1.000	0.343	0.736
BJSAT	0.441	0.343	1.000	0.774
TJSAT	0.867	0.736	0.774	1.000

Each of these correlation coefficients was statistically significant (the p value for each was equal to or less than 0.0001). At the same time, it appeared that each of the first three variables, which are not spuriously related to each other, was tapping a somewhat different dimension of job satisfaction. For this reason, all four of the job satisfaction variables were retained for inclusion in the analyses.

Job Performance/Success

The NLSY data base does not contain any measures of job performance per se. However, it does contain data regarding earnings on the job, which were thought to be a plausible proxy for success. The original study plan was to construct a measure of earnings growth, based on the data on job tenure, starting salary, and current salary. Further investigation showed that the data on job tenure related to each individual's tenure with a given employer, not in a specific occupation. Indeed, an individual might have held several occupations without changing employers. It was thus not possible to determine how long an individual had held a particular job. Similarly, the item regarding starting salary referred to the initial salary with that employer, not to the starting salary on the occupation. Thus, it was not possible to determine salary growth in an occupation, as a proxy for success in that occupation. Current salary alone was judged to be inadequate as a proxy for success, due to the number of confounding factors that also affect salary levels (e.g., regional differences in salary scales).

A careful review of the NLSY data base revealed no other items that might be considered plausible, unambiguous indices of job success. As a result, this line of analysis had to be discontinued.

Analysis Procedures

The analyses performed sought to answer two questions:

1. To what extent can ASVAB scores be used to predict entry into or membership in an occupation, or group of occupations?

2. To what extent can ASVAB scores be used to predict satisfaction with an occupation?

Different analysis procedures were employed to answer these questions.

Analyses of Occupational Membership

To investigate the relationship between ASVAB scores and occupational membership, 13 discriminant analyses were performed. Specifically, the NLSY respondents were classified into job groups or occupations, as described above; and discriminant functions were developed which maximally discriminated between the different occupations or job groups, based on the respondents' ASVAB scores. The resulting discriminant functions were then used to re-classify the respondents into occupations or job groups.

The criterion examined was the proportion of the sample that was correctly classified into the occupation or job group to which they actually belonged. The proportion of correctly classified individuals was examined by comparing the obtained proportion with the expected proportion of correctly classified individuals. The expected value was calculated as the proportion of the individuals who would have been correctly classified had they been

randomly assigned to the occupations or job groups in proportion to the number of individuals in the occupations or job groups. This is the traditional approach for determining the expected value. The hypothesis underlying these analyses was that the proportion of respondents correctly classified using the ASVAB-based discriminant functions would be significantly greater than would be expected by chance.

When using discriminant functions to classify individuals, it is necessary to specify the prior probabilities of membership in the various groups. Two approaches to defining prior probabilities were employed. In some analyses, prior probabilities were set to be equal across occupations or job groups; in other analyses, prior probabilities were set to be proportional to the number of cases originally in the respective groups. As a general rule, setting the prior probabilities proportional to the number of individuals originally in each group maximizes the proportion of correctly classified cases when the discriminant functions are applied to the sample upon which they were calculated. This is true because sample-specific variations, unrelated to the population of interest, are capitalized upon when proportional prior probabilities are used. Setting the prior probabilities proportional is appropriate when the sample upon which the discriminant functions are determined is a random sample from the population in which they will later be used. When the sample upon which the discriminant functions are determined is not a random sample from the population of interest and the characteristics of the population of interest are not well known, there is no rule to indicate whether equal or proportional probabilities should be used. Because this was the situation for the NLSY sample, both approaches to defining prior probabilities were used in the analyses.

The binomial test was used to compare the proportion of correctly classified respondents with the expected value for the proportion who would have been correctly classified if all the respondents had been assigned to occupational or job groups at random in proportion to the size of the occupational groups. The results of the binomial test are expressed as a standard normal deviate or z-score. Z-scores more extreme than 2.57, in either direction, are significant at the $p \leq .01$ level.

Analyses of Job Satisfaction

Two sets of analyses were carried out to investigate the relationship between ASVAB scores and job satisfaction. In the first set (6 analyses), multiple correlation coefficients between ASVAB standard scores and the four different measures of job satisfaction were calculated for each occupational group -- for males and females separately and for males and females combined. The hypothesis underlying these analyses was that for at least some of the occupations or job groups studied there would be a significant multiple correlation between ASVAB scores and job satisfaction.

The second set (2 analyses) used a somewhat different statistical approach, comparing the ASVAB score profiles of individuals to the mean profile for incumbents in an occupation or job group. The hypothesis underlying these analyses was that the more similar, as measured by Mahalanobis distances (Mahalanobis, 1927; Rao, 1952), an individual's ASVAB

score profile was to the mean ASVAB score profile of the job group to which the person belonged, the more satisfied the individual would be with his or her job. In other words, the hypothesis was for a negative correlation between the job satisfaction measures and Mahalanobis distances.

Analysis Summary

In summary, the analyses covered two broad areas: occupational membership and job satisfaction. Thirteen analyses were performed to assess the predictive validity of the ASVAB for occupational or job group membership. Eight analyses assessed the ability of the ASVAB to predict job satisfaction.

These analyses varied along a number of dimensions as follows:

1. **Definition of Occupation.** Membership both in occupations and in job groups was examined. Occupations were defined based on the Census 3-digit occupation codes; job groups were defined using the groupings derived from the Data/People/Things (DPT) ratings of occupations described in the previous section of this report.

2. **Analysis Samples.** Unless otherwise noted, the analyses were based on the data from the 1982 follow-up survey. However, at the time of the 1982 follow-up, many of the NLSY participants had not yet entered, or had only recently entered, the labor force. To obtain a more complete picture of occupational membership among this cohort of youth, one analysis utilized data from the 1986 follow-up. In both cases, analyses were limited to those respondents who were employed full-time at the time of the follow-up survey. For some analyses, the sample was further restricted to include only those respondents who reported being satisfied with their jobs. Finally, analyses were also performed separately by gender.

3. **ASVAB Scores.** Unless otherwise noted, the analyses used the 10 standardized ASVAB subtest scores to derive the discriminant functions. However, non-overlapping ASVAB composite scores were used in lieu of the subtest standard scores for one analysis to test the hypothesis that the subtest scores were better predictors. ASVAB profiles were used two of the job satisfaction analyses.

4. **Prior Probabilities.** As noted previously, the occupational membership analyses were performed both with prior probabilities set to be equal across the various occupations or job groups, and with prior probabilities set to be proportional to the actual size of the occupations or job groups.

III. RESULTS

Analyses of Occupational Membership: DPT Categories

A number of analyses were performed to assess the extent to which ASVAB scores were predictive of occupational membership. The first several analyses sought to predict membership in job groups based on the DPT categories. Analyses 1-3 examined occupational membership for all employed respondents. Analyses 4-5 examined occupational membership only for respondents indicating they were satisfied with their jobs. Analyses 6-9 examined occupational membership separately for all males and all females.

Occupational Membership -- All Employed Respondents

Analysis 1. A discriminant analysis using all 10 of the ASVAB subtest standard scores was performed to classify each of the 4,175 NLSY respondents into DPT categories. There were 23 of the 27 DPT categories represented; the number of individuals in each DPT category ranged from 15 to 540. Respondents were fairly evenly divided in terms of High, Medium, and Low levels of complexity with Data. The prior probabilities were set equal to each other. The expected, or chance, proportion of correct classifications was 0.070. In fact, the proportion of correctly classified individuals was 0.127 (532 of the 4,175 individuals). The z-score for this difference, based on the binomial test, is +14.43. This value (being greater than 2.57) is significant beyond the .01 probability level. The results for Analysis 1 are presented in Table 2.

Analysis 2. This analysis differed from Analysis 1 only in the following respect: Prior probabilities were set proportional to the number of cases in each of the DPT categories instead of being set equal. The expected, or chance, proportion of correct classifications was again 0.070. The actual proportion of correctly classified individuals was 0.220 (919 of the 4,175 individuals). Substantially more of the individuals with High or Low complexity on Data were correctly classified (33% and 27% , respectively) than were individuals with Medium complexity on Data (4%). The z-score for this difference is +37.98. The results for Analysis 2 are also presented in Table 2.

Analysis 3. This analysis was undertaken to confirm that using composites based on the ASVAB subtest standard scores would yield correct classification results that are inferior to the results obtained when all 10 of the ASVAB subtest standard scores are used independently. As with Analysis 1, both males and females were included in the analysis and the prior probabilities were set equal. The number of individuals in the DPT categories ranged from 15 to 540. Four ASVAB composite scores (QUANT, VERBAL, TECH, and SPEED) were used as the dependent variables. As was the case for Analysis 1, the expected proportion of correct classifications due to chance was 0.070. As predicted, the proportion of the NLSY respondents who were correctly classified into their correct DPT category was smaller than for Analysis 1. Only 7.4% (309 of the 4,175 individuals) were correctly classified. The

Table 2. Results for Discriminant Analyses of Membership in Data, People, Things (DPT) Groups: All Men and Women Combined

DPT category	Original number in category	Expected number correctly classified into category	Actual number correctly classified into category		
			Analysis 1	Analysis 2	Analysis 3
Low-Low-Low	294	20.7	49	54	64
Low-Low-Medium	540	69.8	24	284	3
Low-Low-High	76	1.4	32	5	24
Low-Medium-Low	70	1.2	15	4	3
Low-Medium-Medium	298	21.3	16	13	6
Low-Medium-High	19	0.1	19	3	9
Low-High-Low	44	0.5	11	1	4
Low-High-High	15	0.1	10	4	5
Medium-Low-Low	48	0.6	10	2	3
Medium-Low-Medium	75	1.4	18	4	3
Medium-Low-High	154	5.7	6	2	1
Medium-Medium-Low	246	14.5	14	16	1
Medium-Medium-Medium	220	11.6	16	13	4
Medium-Medium-High	201	9.7	9	4	0
Medium-High-Low	174	7.3	11	3	1
Medium-High-Medium	93	2.1	9	2	0
Medium-High-High	92	2.0	18	6	[illegible]
High-Low-High	230	12.7	71	59	5[illegible]
High-Medium-Medium	77	1.4	40	7	44
High-Medium-High	232	12.9	22	19	4
High-High-Low	509	62.0	21	292	0
High-High-Medium	124	3.7	21	5	12
High-High-High	344	28.3	70	117	51
Total	4,175	292.3	532	919	309
% Correctly classified		7.0%	12.7%	22.0%	7.4%
Z-score			+1[illegible].43	+37.98	+1.01

z-score for this difference is +1.01. This value is not statistically significant. The results for Analysis 3 are also presented in Table 2.

Occupational Membership -- Satisfied Employees Only

Analysis 4. This analysis (as well as Analysis 5) was limited to NLSY respondents who were satisfied with their job. A satisfied respondent was defined as anyone with a score of 3.00 or higher on the Total Job Satisfaction variable (TJSAT). Approximately 70% of the individuals included in Analyses 1 and 2 had TJSAT scores of 3.00 or higher, for a total of 2,907 individuals. The number of satisfied individuals in the DPT categories ranged from 9 to 416. Approximately 40% of these individuals had jobs with a High level of complexity on Data; the remainder were more or less evenly distributed between the Medium and Low levels. Using all 10 of the ASVAB subtest standard scores, a discriminant analysis was performed to classify each of the satisfied NLSY respondents into the DPT categories. Both males and females were included in the analysis and the prior probabilities were set equal. The expected proportion of correct classifications was 0.071. In fact, the proportion of correctly classified individuals was 0.151 (438 of the 2,907 individuals). The z-score for this difference is +16.79. The results for Analysis 4 are presented in Table 3.

Analysis 5. This analysis differed from Analysis 4 only in that the prior probabilities were set proportional to the number of cases in each of the DPT categories instead of being set equal. The expected proportion of correct classifications was again 0.071, but the actual proportion of correctly classified individuals was 0.247 (717 of the 2,907 individuals). The z-score for this difference is +36.95. Again, substantially more of the individuals with High and Low levels of complexity on Data were correctly classified (37% of the Highs, 26% of the Lows, and only 5% of the Mediums). The results for Analysis 5 are presented in Table 3.

Occupational Membership -- Males Only

Analysis 6. This analysis was similar to Analysis 1, but was limited to males. Using all 10 of the ASVAB subtest standard scores, a discriminant analysis was conducted to classify each of the 2,211 male respondents into DPT categories. All DPT categories with fewer than 40 male respondents were eliminated from the analysis. Thus, 16 of the 27 DPT categories were represented in the analysis. The number of individuals per DPT category ranged from 41 to 435. More males were categorized as having jobs with a Low level of complexity with Data (41%) than jobs with Medium or High levels (26% and 33%). The prior probabilities were set equal. The expected, or chance, proportion of correct classifications was 0.094 whereas the actual proportion of correctly classified individuals was 0.174 (384 of the 2,211 male NLSY respondents). The z-score for this difference is +12.86. The results for Analysis 6 are presented in Table 4.

Analysis 7. This analysis differed from Analysis 6 only in that the prior probabilities were set proportional to the number of cases in each of the DPT categories instead of being set equal. As in the previous analysis,

Table 3. Results for Discriminant Analyses of Membership in DPT Groups: Men and Women Who Were Satisfied with Their Jobs

DPT Category	Original number in category	Expected number correctly classified into category	Actual number correctly classified into category	
			Analysis 4	Analysis 5
Low-Low-Low	153	8.0	26	25
Low-Low-Medium	319	35.0	22	136
Low-Low-High	48	0.8	27	7
Low-Medium-Low	45	0.7	8	2
Low-Medium-Medium	185	11.8	17	23
Low-Medium-High	18	0.1	18	14
Low-High-Low	19	0.1	9	4
Low-High-High	9	0.0	9	9
Medium-Low-Low	32	0.4	10	1
Medium-Low-Medium	51	0.9	15	4
Medium-Low-High	119	4.9	5	4
Medium-Medium-Low	167	9.6	11	14
Medium-Medium-Medium	151	7.8	8	3
Medium-Medium-High	135	6.3	10	9
Medium-High-Low	119	4.9	7	2
Medium-High-Medium	63	1.4	7	2
Medium-High-High	62	1.3	18	8
High-Low-High	172	10.2	52	54
High-Medium-Medium	64	1.4	40	13
High-Medium-High	181	11.3	21	23
High-High-Low	416	59.5	24	252
High-High-Medium	100	3.4	22	7
High-High-High	279	26.8	52	101
Total	2,907	206.4	438	717
% Correctly classified		7.1%	15.1%	24.7%
Z-score			+16.79	+36.95

Table 4. Results for Discriminant Analyses of Membership in DPT Groups: Males

DPT category	Expected number original number in category	Correctly classified into category	Actual number correctly classified into category	
			Analysis 6	Analysis 7
Low-Low-Low	211	20.1	44	50
Low-Low-Medium	435	85.5	29	270
Low-Medium-Medium	219	21.7	18	21
Low-High-Low	41	0.1	15	3
Medium-Low-Medium	57	1.5	20	6
Medium-Low-High	66	2.0	16	3
Medium-Medium-Low	117	6.2	9	6
Medium-Medium-Medium	71	2.3	20	3
Medium-Medium-High	99	4.4	15	2
Medium-High-Low	94	4.0	20	6
Medium-High-Medium	75	2.5	13	2
High-Low-High	226	23.1	40	47
High-Medium-High	164	12.2	26	24
High-High-Low	192	16.7	42	93
High-High-Medium	70	2.2	29	9
High-High-High	74	2.5	28	13
Total	2,211	207.6	384	558
% Correctly classified		9.4%	17.4%	25.2%
Z-score			+12.86	+25.32

the expected proportion of correct classifications was 0.094. In actuality, 25.2% of the individuals (558 of 2,211) were correctly classified. The z-score for this difference is +25.32. Somewhat more men with a Low level of complexity with Data were correctly classified (38%) than were men with a High level of complexity with Data (26%). Males with a Medium level of Data complexity in their jobs were least likely to be correctly classified (5%). The results for Analysis 7 are presented in Table 4.

Occupational Membership -- Females Only

Analysis 8. This analysis was limited to females. Based on all 10 of the ASVAB subtest standard scores, a discriminant analysis was used to classify each of the 1,758 female respondents into DPT categories. All DPT categories with fewer than 40 female respondents were eliminated from the analysis. Thus, 16 of the 27 DPT categories were represented in the analysis. The number of individuals in the DPT categories ranged from 54 to 317. The prior probabilities were set equal. The expected proportion of correct classifications was 0.091, and the actual proportion of correctly classified individuals was 0.179 (315 of the 1,758 female NLSY respondents). The z-score for this difference is +12.71. Women were more likely to have jobs with a High level of complexity with Data (44%) than Medium (35%) or Low (21%) levels. The results for Analysis 8 are presented in Table 5.

Analysis 9. This analysis differed from Analysis 8 only in that the prior probabilities were set proportional to the number of cases in each of the DPT categories. As in the previous analysis, the expected proportion of correct classifications was 0.091. In actuality, 26.9% of the individuals (473 of 1,758) were correctly classified. The z-score for this difference is +25.88. Substantially more women with a High level of Data complexity in their jobs were correctly classified (42%) than women with Low or Medium levels of Data complexity (24% and 13%, respectively). The results for Analysis 9 are presented in Table 5.

Analyses of Occupational Membership: Census Occupation Codes

The remaining analyses sought to assess the extent to which ASVAB scores predicted membership in specific occupations, at least for those occupations having sufficient cases to warrant analysis. Census occupation codes with at least 60 NLSY respondents were retained for these analyses. Analyses 10 to 12 used 1982 survey data. Analysis 13 employed data from the 1986 survey. Results were as follows.

Occupational Membership Based on 1982 Data

Analysis 10. Only 10 of the Census 3-digit occupation code groups met the criterion for inclusion in these analyses. Data were available for 920 individuals from these 10 occupation code groups. Using all 10 of the ASVAB subtest standard scores, a discriminant analysis was conducted to classify each of the 920 individuals into their Census occupation code groups. Both males and females were included in the analysis and the prior probabilities were set proportional to the number of cases in each of the Census occupation

Table 5. Results for Discriminant Analyses of Membership in DPT Groups: Females

DPT category	Original number in category	Expected number correctly classified into category	Actual number correctly classified into category	
			Analysis 8	Analysis 9
Low-Low-Low	83	3.9	27	21
Low-Low-Medium	105	6.3	22	26
Low-Low-High	55	1.7	26	11
Low-Medium-Low	55	1.7	9	4
Low-Medium-Medium	79	3.5	21	14
Medium-Low-High	88	4.4	19	7
Medium-Medium-Low	129	9.5	15	19
Medium-Medium-Medium	149	12.6	8	19
Medium-Medium-High	102	5.9	16	11
Medium-High-Low	80	3.6	13	8
Medium-High-High	68	2.6	21	14
High-Medium-Medium	56	1.8	29	7
High-Medium-High	58	2.6	21	2
High-High-Low	317	57.1	21	178
High-High-Medium	54	1.7	13	5
High-High-High	270	41.5	34	127
Total	1,758	160.5	315	473
% Correctly classified		9.1%	17.9%	26.9%
Z-score			+12.71	+25.88

code groups. The expected, or chance, proportion of correct classifications was 0.108. In fact, the proportion of correctly classified individuals was 0.354 (326 of the 920 individuals). The z-score for this difference is +24.04. The results for Analysis 10 are presented in Table 6.

Analysis 11. This analysis differed from Analysis 10 only in that it was limited to males. Data were available for 444 males from 10 Census occupation code groups. The expected value for the proportion of correctly classified individuals was 0.140 whereas the actual proportion of correct classifications was 0.270 (120 of the 444 male NLSY respondents). The z-score for this difference is +7.89. The results for Analysis 11 are presented in Table 7.

Analysis 12. Analysis 12 was also similar to Analyses 10 and 11; however, Analysis 12 was limited to females. Data were available for 476 female NLSY respondents from nine Census occupation code groups. The expected value for the proportion of correctly classified individuals was 0.172, but the actual proportion of correct classifications was 0.431 (205 of the 476 female NLSY respondents). The z-score for this difference is +14.97. The results for Analysis 12 are presented in Table 8.

Occupational Membership Based on 1986 Data

Analysis 13. Data from the 1986 follow-up of NLSY participants were used for Analysis 13. This time, 22 of the Census occupation code groups met the criterion for inclusion in the analysis. Data were available for 2,147 individuals from these 22 occupation code groups. Based on all 10 of the ASVAB subtest standard scores, a discriminant analysis was used to classify each of the 2,147 individuals into their Census occupation code groups. Both males and females were included in the analysis and the prior probabilities were set proportional to the number of cases in each of the Census occupation code groups. The expected proportion of correct classifications was 0.050; the actual proportion of correctly classified individuals was 0.222 (476 of the 2,147 NLSY respondents). The z-score for this difference is +36.57. The results of Analysis 13 are presented in Table 9.

Analyses of Job Satisfaction

Six separate, but related, analyses were carried out, in which multiple correlations were computed between the 10 ASVAB standard scores and the 4 measures of job satisfaction. Analyses were performed separately by job group (DPT code) or by occupation (Census code). Within each grouping, three sets of analyses were performed: males and females combined, males only, and females only. All six of these analyses used data from the 1982 follow-up of NLSY participants since this was the last year for which all four of the job satisfaction measures were available.

Job Satisfaction Analyses: DPT Categories

Analysis 14. This analysis included data for both males and females. In this combined analysis, 23 of the possible 27 DPT categories were

Table 6. Results for Discriminant Analysis of Membership in Selected Occupations: All Respondents to 1982 Survey

Census occupation code	Occupation	Original number in category	Expected number correctly classified into category	Actual number correctly classified into category
280	Salespersons and sales clerks, not elsewhere classified	144	22.5	58
310	Cashiers	88	8.4	21
372	Secretaries, not elsewhere classified	143	22.2	104
381	Stock clerks and storekeepers	77	6.4	14
394	Miscellaneous clerical workers	80	7.0	15
690	Machine operatives, not elsewhere classified	80	7.0	30
705	Deliverypersons and routepersons	71	5.5	15
903	Janitors and sextons	67	4.9	12
912	Cooks, except private household	90	8.8	29
925	Nursing aides, orderlies, and attendants	80	7.0	28
	Total	920	99.4	326
	% Correctly classified		10.8%	35.4%
	Z-score			+24.04

Table 7. Results for Discriminant Analysis of Membership in Selected Occupations: Male Respondents to 1982 Survey

Census occupation code	Occupation	Original number in category	Expected number correctly classified into category	Actual number correctly classified into category
280	Salespersons and sales clerks, not elsewhere classified	83	15.5	52
310	Cashiers	20	0.9	0
372	Secretaries, not elsewhere classified	2	0.0	0
381	Stock clerks and storekeepers	53	6.3	0
394	Miscellaneous clerical workers	11	0.3	1
690	Machine operatives, not elsewhere classified	65	9.5	14
705	Deliverypersons and routepersons	71	11.4	16
903	Janitors and sextons	62	8.7	17
912	Cooks, except private household	64	9.2	20
925	Nursing aides, orderlies, and attendants	13	0.4	0
	Total	444	62.2	120
	% Correctly classified		14.0%	27.0%
	Z-score			+7.89

Table 8. Results for Discriminant Analysis of Membership in Selected Occupations: Female Respondents to 1982 Survey

Census occupation code	Occupation	Original number in category	Expected number correctly classified into category	Actual number correctly classified into category
280	Salespersons and sales clerks, not elsewhere classified	61	7.8	16
310	Cashiers	68	9.7	27
372	Secretaries, not elsewhere classified	141	41.8	97
381	Stock clerks and storekeepers	24	1.2	9
394	Miscellaneous clerical workers	69	10.0	16
690	Machine operatives, not elsewhere classified	15	0.5	9
903	Janitors and sextons	5	0.1	5
912	Cooks, except private household	26	1.4	9
925	Nursing aides, orderlies, and attendants	67	9.4	17
	Total	476	81.9	205
	% Correctly Classified		17.2%	43.1%
	Z-score			+14.97

Table 9. Results for Discriminant Analysis of Membership in Selected Occupations: All Respondents to 1986 Survey

Census occupation code	Occupation	Original number in category	Expected number correctly classified into category	Actual number correctly classified into category
1	Accountants	109	5.5	49
75	Registered nurses	65	2.0	29
230	Restaurant, cafeteria, and bar managers	83	3.2	8
231	Sales managers and department heads	122	6.9	8
245	Managers and administrators, not elsewhere classified	119	6.6	32
280	Salespersons and sales clerks, not elsewhere classified	173	13.9	24
305	Bookkeepers	73	2.5	11
310	Cashiers	71	2.3	16
372	Secretaries, not elsewhere classified	180	15.1	101
394	Miscellaneous clerical workers	102	4.8	14
415	Carpenters	70	2.3	14
473	Automobile mechanics	91	3.9	37
602	Assemblers	93	4.0	12
690	Machine operatives, not elsewhere classified	98	4.5	20
705	Deliverypersons and routeperson	70	2.3	8
715	Truck drivers	108	5.4	33
751	Construction laborers	79	2.9	20
762	Stockhandlers	116	6.3	5
903	Janitors and sextons	86	3.4	17
912	Cooks, except private household	99	4.6	17
915	Waiters	67	2.1	6
962	Guards and watchpersons	73	2.5	15
	Total	2,147	107.4	476
	% Correctly classified		5.0%	22.2%
	Z-score			+36.57

represented. The number of follow-up respondents in each of the DPT categories ranged from 15 to 540. A total of 92 multiple correlations were calculated. Of the 92 multiple correlation coefficients, only seven were significant at the .05 probability level. This is only two more significant correlations than would be expected by chance alone. After adjusting for expected shrinkage that is a function of the number of degrees of freedom (Darlington, 1968), the largest correlation coefficient was only 0.207, while the other six significant multiple correlation coefficients ranged from 0.031 to 0.062. Even the largest of these multiple correlation coefficients accounted for only slightly more than 4% of the variance in the job satisfaction measure for that job group, and the next largest accounted for less than 1% of the variance in the job satisfaction measure. These values were judged to be too low to be of any practical significance.

Analysis 15. This analysis used data for males only, and 23 of the 27 possible DPT categories were represented in the analysis. The number of individuals in each of the DPT categories ranged from 4 to 408. Thus, an attempt was made to calculate a total of 92 multiple correlations (6 could not be calculated because the number of independent variables was greater than the number of available cases). Of the multiple correlation coefficients that could be calculated, only nine were significant at the .05 probability level. After adjusting for expected shrinkage, the largest of these was 0.343. The other eight significant multiple correlation coefficients ranged from 0.023 to 0.066. Even the largest of these multiple correlation coefficients accounted for slightly less than 12% of the variance in the job satisfaction measure, and the next largest accounted for less than 1% of the variance in the job satisfaction measure. Again, these values were judged to be too low to be of practical significance.

Analysis 16. This analysis used data for females only. Again, 23 of the 27 DPT categories were represented. The number of individuals in each of the DPT categories ranged from 2 to 297. Thus, an attempt was made to calculate a total of 92 multiple correlations (10 could not be calculated because the number of independent variables was greater than the number of available cases). Of the multiple correlation coefficients that could be calculated, only four were significant at the .05 probability level. After adjusting for expected shrinkage, the largest of these was 0.278, and the other three ranged from 0.074 to 0.176. Even the largest of these multiple correlation coefficients accounted for slightly less than 8% of the variance in the job satisfaction measure, and the next largest accounted for just slightly more than 3% of the variance in the job satisfaction measure. Thus, these values were judged to be too low to be of practical significance.

Job Satisfaction Analyses: Census Occupation Categories

In the next three analyses, the multiple correlations between ASVAB scores and the four job satisfaction measures were examined for those Census occupation codes meeting the criterion for inclusion in the analyses (i.e., having at least 60 incumbents). The number of individuals in each of the Census occupation categories is presented in Table 10.

Table 10. Number of Individuals Included in Each of the Ten Census Occupation Categories that were Included in the Analyses of Job Satisfaction

Census occupation category	Number of Cases			Occupations in category
	Total	Males	Females	
280	144	83	61	Salespersons and sales clerks, not elsewhere classified
310	88	20	68	Cashiers
372	143	2	141	Secretaries, not elsewhere classified
381	77	53	24	Stock clerks and storekeepers
394	80	11	69	Miscellaneous clerical workers
690	80	65	15	Machine operatives, not elsewhere classified
705	71	71	0	Deliverypersons and routepersons
903	67	62	5	Janitors and sextons
912	90	64	26	Cooks, except private household
925	80	13	67	Nursing aides, orderlies, and attendants
Total	920	444	476	

For each of the three analyses (within each of the 10 occupation categories), the multiple correlation was calculated between the 10 ASVAB Form 14 subtest standard scores and each of the 4 job satisfaction measures. For each analysis, an attempt was made to calculate a total of 40 multiple correlations (some could not be calculated because the number of independent variables was greater than the number of cases).

Analysis 17. For the analysis of males and females combined, only 2 of the 40 multiple correlation coefficients that could be calculated were significant at the .05 probability level. This is no more than would be expected by chance alone. After adjusting for expected shrinkage, these had values of only 0.070 and 0.069. Thus, neither of these multiple correlation coefficients accounted for more than 1% of the variance in the job satisfaction measure to which it was related. These values were judged to be too low to be of any practical significance.

Analysis 18. For the analysis of males only, none of the 28 multiple correlation coefficients that could be calculated were significant at the .05 probability level.

Analysis 19. For the analysis of females only, only 2 of the 36 multiple correlation coefficients that could be calculated were significant at the .05 probability level. After adjusting for expected shrinkage, these had values of only 0.079 and 0.076. Neither of these multiple correlation coefficients accounted for more than 1% of the variance in the job satisfaction measure to which it was related. Thus, these values were judged to be of no practical significance.

Job Satisfaction Analyses: ASVAB Profile Similarity

The third set of analyses calculated a measure of profile similarity for each individual in an occupation or job group and examined the relationship between profile similarity and job satisfaction. Profile similarity was measured in terms of the Mahalanobis distances between an individual's profile based on the 10 ASVAB subtest scores and the mean profile for the occupation or job group.

Analysis 20. In the first analysis in this set, the relationship between the Mahalanobis distances and each of the four job satisfaction measures was determined across the 23 DPT categories combined. Thus, though the Mahalanobis distance measures were calculated relative to each follow-up respondent's DPT category, the correlations were based on all 4,175 of the respondents. The correlations between the four job satisfaction measures and the Mahalanobis distance measure are presented in Table 11. Of the four coefficients, the correlation for the Composite Job Satisfaction measure (CJSAT) was the only one that was statistically significant at the .05 probability level. However, because a correlation of this magnitude accounts for only one-tenth of 1% of the variance in the job satisfaction measure, it was judged to be of no practical significance.

Table 11. Correlations Between Each of Four Job Satisfaction Measures and Mahalanobis Distances

Global Job Satisfaction	-0.0019
Combined Job Satisfaction	-0.0339
Experimental Job Satisfaction	0.0113
Total Job Satisfaction	-0.0077

Analysis 21. The final analysis was similar to the previous analysis, but the correlation coefficients were calculated separately for each of the 23 DPT categories. Of the 92 correlation coefficients calculated, only 6 were statistically significant at the .05 probability level. Of these 6, 2 were negative and 4 were positive. The largest (in absolute value) of the significant correlations was -0.3001, a value that accounted for only 9% of the variance in the job satisfaction measure. The other five significant correlations ranged from -0.2562 to +0.1875. Given the low values of these correlations and fact that, contrary to expectations, there were more positive than negative values, it was judged that they did not represent a departure from the values that would be expected by chance alone.

IV. DISCUSSION

This study sought to utilize information from an extant longitudinal data set to assess the predictive validity of the ASVAB for civilian occupations. The ASVAB is administered annually to thousands of high school and college students and represents a potentially important source of information for career guidance. The value of the ASVAB as a guidance tool, however, rests on the extent to which ASVAB scores can be shown to be valid predictors of entry and success in civilian, as well as military, occupations. The need for validating the ASVAB for civilian occupations has been widely documented. To the extent that validation studies can be carried out using extant data, considerable savings in both time and effort would be realized.

Data from the National Longitudinal Survey of Youth (NLSY) were used to determine, for a nationally representative sample of young adults, the extent to which ASVAB test scores are predictive of membership in a wide range of occupations and of satisfaction with and performance in those occupations. The NLSY served as the norming sample for ASVAB Form 14; as a result, ASVAB data were available for over 94% of the sample. In addition, data on the jobs held by the sample members are available for the period from 1979 through 1986. Analyses were based primarily on a sample of 4,175 youths who were employed full-time at the time of the 1982 follow-up survey; one set of analyses was based on youths who were employed full-time at the time of the 1986 follow-up survey.

Discriminant analyses were performed to assess the relationship between ASVAB scores and occupational membership. Because relatively few specific occupations had sufficient incumbents to warrant analysis at the occupation level, occupations were grouped together based on their levels of complexity in terms of work with Data, with People, and with Things. Using two different analytic models (one with prior probabilities set to be equal across occupational groups, and one with prior probabilities set to be proportional to the actual frequencies in the occupational groups), discriminant functions were calculated using the 10 ASVAB subtest scores. These discriminant functions were then used to re-classify the sample members, and the numbers of correctly classified cases were determined.

For each model, the number of cases correctly classified using the ASVAB-based discriminant functions was significantly greater than would be expected by chance. Specifically, the expected number of correct classifications was 7%, whereas the obtained numbers of correct classifications were 12% (with prior probabilities equal) and 22% (with prior probabilities proportional). When discriminant functions were based on a set of non-overlapping ASVAB composites, however, 7.4% of the cases were correctly classified -- only slightly more than would have been obtained by chance. This is consistent with the a priori hypothesis that maximum differentiation would be obtained using the 10 subtest scores, rather than composite measures derived from these scores.

The highest proportions of correct classifications occurred for jobs that were High or Low in terms of complexity with Data (33% and 27% respectively). The ASVAB-based discriminant functions were less successful at classifying cases in the Medium Level of complexity with Data. These results are consistent with Hunter's reanalyses of GATB data, in which he found the predictive validity coefficients to vary depending on job complexity (and, in particular, complexity of work with Data).

When analyses were restricted to individuals who were satisfied with their jobs, there was some improvement in the predictive power of the ASVAB subtests. The numbers of cases correctly classified increased to 15% (with prior probabilities equal) and 25% (with prior probabilities proportional). Again, classifications were considerably more accurate for individuals having jobs with High or Low levels of complexity with Data.

Few differences were found when analyses were performed separately for men and women. Overall, the ASVAB tests appeared to be equally effective for both groups; i.e., 25% of the men and 27% of the women were correctly classified (with prior probabilities proportional). However, there was some variation in the proportions of correct classifications of men and women for different job groups. Among men, the ASVAB scores were most effective in classifying those who had jobs involving a Low level of complexity with Data; namely, 38% of these men were correctly classified, as contrasted to 26% of the men whose jobs involved a High level of complexity with Data. Among women, however, the ASVAB scores were more effective in classifying those who had jobs involving a High level of complexity with Data; here 42% were correctly classified, as compared to 24% of the women whose jobs involved a Low level of

complexity with Data. This finding suggests that the predictive validity of the ASVAB test scores may vary by gender, as well as by type of occupation.

For comparison purposes, similar analyses were performed using occupations rather than groups of occupations as the unit of analysis. A total of 10 occupations, each having at least 60 incumbents, were analyzed. Again, the ASVAB-based discriminant functions yielded significantly more correct classifications (35%, with prior probabilities proportional) than would have been expected by chance (11%). This proportion of correct classifications was also considerably higher than was obtained in the analyses using DPT-based occupational groups (22%). This difference is probably partly due to the fact that occupations are more easily differentiated than are DPT-based occupational groups.

In general, the ASVAB scores were considerably more effective in classifying women into occupations than men. Specifically, 43% of the women were correctly classified, as contrasted to 27% of the men. Both of these values are significantly greater than would be expected by chance alone. However, there were some differences between their relative proportions by job. For example, among salespersons and sales clerks, more men (63%) were correctly classified than women (26%). But, among cashiers and stock clerks/storekeepers, respectively, 40% and 37% of the women were correctly classified, while none of the men were correctly classified. It was not possible to determine the factors underlying these differences.

One final analysis was performed based on respondents to the 1986 follow-up survey who held a full-time job. Substantially more of the NLSY youth were employed by 1986 than in 1982, and it was expected that the correspondingly larger sample size would result in a greater number of occupations meeting the criterion for inclusion in the analysis. Indeed, a total of 22 jobs met the criterion for inclusion. However, the number of correctly classified cases (22%) obtained in this expanded analysis --though significantly greater than chance (5%) -- was considerably smaller than the 35% obtained in the previous analysis based on fewer occupations.

In summary, the analyses of the relationship between ASVAB scores and occupational membership suggest that the ASVAB does indeed provide a basis for differentiating individuals in different occupations or occupational groups. As expected, the ASVAB subtest scores have greater predictive power than do composite measures derived from those scores, even when the composites are non-overlapping. The ASVAB appears to more effectively differentiate individuals having jobs with High or Low levels of complexity with Data. This suggests that the factor(s) captured by the ASVAB are more highly related to complexity of work with Data, and less related to complexity of work with People or Things.

The question of the extent to which ASVAB scores can be used to predict satisfaction with an occupation was investigated in two ways. First, multiple correlations between each of the 10 ASVAB scales and the 4 measures of job satisfaction were calculated for groups of occupations (defined by levels of job complexity) and for specific occupations (defined by Census categories). It was expected that there would be a significant multiple correlation between

ASVAB scores and job satisfaction for at least some of the occupations or groups of occupations examined. Second, estimates of the difference between each individual's ASVAB score profile and the typical profile of individuals in that occupational group were calculated; these difference measures were then correlated with individuals' overall job satisfaction. It was expected that greater deviations from the typical ASVAB score profile for an occupation or group of occupations would be associated with lower job satisfaction.

Neither hypothesis was strongly supported by the data. There were few significant relationships between ASVAB scores and job satisfaction among occupations or among occupational groups; in no case was the number of significant coefficients greater than would have been expected by chance. Although there was a statistically significant relationship between deviations from the mean ASVAB score profile for an occupational group and the composite measure of job satisfaction (CJSAT) across all occupations, the relationship accounted for only a small fraction of the variance in job satisfaction. Further, when occupational groups were examined separately, few significant relationships were found, and those coefficients were more likely to be positive than negative. Again, it may be that the sample sizes in specific occupations were too small to detect significant relationships, and that the occupational categories and groups that could be examined were not sufficiently unique for significant relationships to be found. The weak relationship between the ASVAB subtest scores and the job satisfaction measures is not all that surprising. A number of factors other than general or specific cognitive abilities are thought to influence job satisfaction. These factors include interests, working conditions, salary, and coworkers. While general and specific cognitive abilities may provide an individual with the potential to be successful in a job, these other factors would likely have a strong influence on whether the individual would be satisfied doing the job. Range restriction in the job satisfaction scores of the respondents in the NLSY sample is another potential reason for the low observed relationships between job satisfaction and the ASVAB subtest scores. It is highly likely that those individuals who would have been least satisfied in a job would have already left the job or would not have entered the job initially. However, given the very low values for the observed multiple correlations, it is unlikely that coefficients based on unrestricted samples would fall in the range that would be considered practically significant.

The results of these analyses provide some support for the ability of the ASVAB to predict membership in a wide range of civilian occupations. They also provide some indication of the kinds of occupations for which the ASVAB is likely to have greater predictive validity -- specifically, occupations involving High and Low levels of complexity with Data. Other factors not currently measured by the ASVAB, however, would appear to be important for differentiating entrants into occupations distinguished by the extent of complexity of work with People or Things. The ASVAB subtests did not prove to be effective predictors of job satisfaction. This suggests that though aptitudes may be associated with the type of occupation one chooses, other factors, such as interests, may bear a stronger relationship to how satisfied one is with the occupation.

The present analyses support the conclusions of previous researchers that the ASVAB has strong predictive validity for civilian as well as for military occupations. They do not address the question, however, of differential validation -- whether there is a single underlying factor that accounts for the validity or whether different subtests have differential validity for different occupations. Further investigation is needed to address this issue. These analyses also do not address the question of relationships to job performance. Finally, these analyses suggest that, for career guidance purposes, consideration should be given to factors not currently measured by the ASVAB. Results based on the GATB suggest that a measure of psychomotor ability may be a useful addition to the ASVAB battery. Similarly, consideration should be given to interests as well as aptitudes in making career decisions.

A clearcut determination as to the utility of the NLSY data base (and other extant data sets) for performing validity studies cannot be made based on the obtained results. Certainly it is possible to assess predictive validity in terms of occupational membership using this data set, and it is also possible to carry out analyses of the relationships between aptitudes measured by the ASVAB and satisfaction with one's occupation. However, the inability to differentiate jobs from employers in the work history data severely constrains the utility of the data for assessing performance or success on the job. Consideration should be given to obtaining selected measures of performance and success for the current job -- for example, tenure on the job, starting salary on the job -- in future follow-up surveys. Consideration could also be given to including self-assessments of performance on the job.

REFERENCES

Armstrong, T.R., Chalupsky, A.B., McLaughlin, D.H., & Dalldorf, M.R. (1988). Armed Services Vocational Aptitude Battery: Validation for civilian occupations. Palo Alto, CA: American Institutes for Research.

Center for Human Resource Research. (1986). The National Longitudinal Surveys Handbook. Columbus, OH: The Ohio State University.

Cronbach, L.J. (1979). The Armed Services Vocational Aptitude Battery: A test battery in transition. Personnel and Guidance Journal, 57, 232-237.

Darlington, R.N. (1968) Multiple regression in psychological research and practice. Psychological Bulletin, 69, 161-182.

Douglas, W.F. (1986). Relationships among the Armed Services Vocational Aptitude Battery (ASVAB) and the PSAT, SAT, and ACT. Journal of Studies in Technical Careers, VIII(3), Summer, 199-207.

Fine, S.A. (1955). A structure of worker functions. Personnel and Guidance Journal, 34, 66-73.

Hunter, J.E. (1984). The validity of the ASVAB as a predictor of civilian job performance (Technical report). Rockville, MD: Research Applications, Inc.

Hunter, J.E. (1986a). The validity of the Armed Services Vocational Aptitude Battery (ASVAB) for civilian and military job performance (Final report). Rockville, MD: Research Applications, Inc.

Hunter, J.E. (1986b). The differential validity of ASVAB for military job performance (Technical report). Rockville, MD: Research Applications, Inc.

Janzen, A.M. (1985). Test reviews: Armed Services Vocational Aptitude Battery. Measurement and Evaluation in Counseling and Development, 18(April), 19-27.

Mahalanobis, P.C. (1977). Analysis of race-mixture in Bengal. Journal of Asiatic Soc. Bengal, (24), 101-111.

McLaughlin, D.H., Rosenfeld, P.G., Wise, L.L., Brandt, D.A., & Wang, M.M. (1984). Validation of current and alternative Armed Services Vocational Aptitude Battery (ASVAB) area composites (Technical Report No. 651). Alexandria, VA: U. S. Army Research Institute for the Behavioral and Social Sciences.

Miller, A.R., Treiman, D.J., Cain, P.S., and Roos, P.A. (Eds.). (1980). Work, jobs, and occupations: A critical review of the Dictionary of Occupational Titles. Washington, DC: National Academy Press.

Office of the Assistant Secretary for Defense. (1983). Biennial report of the Defense Advisory Committee on Military Personnel Testing. Washington, DC: Department of Defense.

Prediger, D.J. (1987). Validity of the new Armed Services Vocational Aptitude Battery job cluster scores in career planning. The Career Development Quarterly, December, 113-125.

Rao, C.R. (1952) Advanced statistical methods in biometric research. New York: Wiley.

Sellman, W.S. & Laurence, J.H. (1981, October). Aptitude testing in DOD and the Profile of American Youth study. Proceedings of the Annual Conference of the Military Testing Association - 1981, 1627-1635.

U. S. Department of Defense. (1984a). Armed Services Vocational Aptitude Battery (ASVAB) Test Manual. Washington, DC: Office of the Assistant Secretary of Defense (MI&L).

U. S. Department of Defense. (1984b). Military-civilian occupational crosswalk manual. Washington, DC: Office of the Assistant Secretary of Defense.

U. S. Department of Labor, Employment and Training Administration. (1977). Dictionary of occupational titles (4th ed.). Washington, DC.

Weiss, D.J. (1978). Multi-aptitude batteries: ASVAB review [483]. In O.K. Buros (Ed.), The eighth mental measurements yearbook. Highland Park, NJ: The Gryphon Press.

APPENDIX A: ITEMS FROM THE NLSY DATA SET USED IN ASVAB VALIDATION ANALYSES

Except as noted, the following questions were asked in both the 1982 and the 1986 follow-up surveys. Question numbers shown here pertain to the 1982 questionnaire -- specifically to Section 5, which contains items relating to Current Labor Force Status.

Items Relating to Current Employment Status and Occupation

All respondents were asked the following question:

Question 1. What were you doing most of last week -- working, going to school, or something else?

Working	01
With a job but not at work	02
Looking for work	03
Keeping house	04
Going to school	05
Unable to work	06
Other (specify)	07

(Recorded answer was choice nearest to the top of the list.)

If the follow-up survey respondent was working or was with a job but not at work, then the following questions were asked:

Question 30A. How many hours per week do you usually work at this job?
(Interviewer recorded number of hours.)

Questions 27-29. What was your job and what industry was your job in?
(This question was not asked directly in this form. Instead, a standard set of discrete, but related questions was asked of each respondent. From the answers, the NLSY staff determined and coded the Bureau of the Census occupation and industry codes of the job.)

Question 41. Have you been looking for other work in the last 4 weeks?

Yes	1
No	0

If the follow-up survey respondent had been looking for work during the past 4 weeks, the following question was asked:

Question 44. What was the main reason you were looking for a new job during the past 4 weeks?

Little chance for advancement in current job	01
Pay inadequate at current job	02
Working conditions bad at current job	03
Current job is part-time or seasonal, desire full-time work	04
Current job does not make good use of experience or skills	05
Wish to live in a new location	06
Want job in a different field	07
Needed money	08
Laid off, job ended	09
Other (specify)	10

Items Relating to Job Satisfaction

For both the 1982 and 1986 surveys, respondents were asked to describe their overall level of satisfaction with their job:

Question 39A. How do you feel about the job you have now?

Like it very much	1
Like it fairly well	2
Dislike it somewhat	3
Dislike it very much	4

In addition, during the 1982 follow-up survey the respondents were asked several questions that relate to specific aspects or dimensions of their jobs and, indirectly, to their satisfaction with their jobs. Respondents who were working, but who were not self-employed, were asked to indicate how true each of the following 10 statements was of their current job:

Question 33.

A. You are given a chance to do the things you do best.

B. The physical surroundings are pleasant.

C. The skills you are learning would be valuable in getting a better job.

D. The job is dangerous.

E. You are exposed to unhealthy conditions.

F. The pay is good.

G. The job security is good.

H. Your co-workers are friendly.

I. Your supervisor is competent in doing the job.

J. The chances for promotion are good.

The follow-up respondents answered these questions using a four-point scale:

Very true	4
Somewhat true	3
Not too true	2
Not at all true	1

Using the same four-point scale for their answers, the self-employed follow-up respondents were asked to indicate how true seven similar statements were of their current job:

Question 34.

A. You have the chance to do the things you do best.

B. The physical surroundings are pleasant.

C. The experiences you are gaining would also be valuable in getting another job or business.

D. The job is dangerous.

E. The business is stable.

F. You are exposed to unhealthy conditions.

G. The income is good.

Finally, during the 1982 follow-up survey the respondents were asked a question about the job they would have if they had their choice:

Question 35A. I'd like to get some idea of the kind of job you'd <u>most</u> like to have. If you were free to go into any type of job you wanted, what would you do? Would you take another job or keep the same job you have now?

Take another job	1
Keep the same job	2
Would not work at all	3

APPENDIX B: CODING OF BEHAVIORAL JOB SATISFACTION VARIABLE (BJSAT)

The Behavioral Job Satisfaction (BJSAT) variable took values of 1 to 4, with 1 indicating a low degree of job satisfaction and 4 indicating a high degree of job satisfaction, as follows:

4 = The respondent would keep the same job and had not been looking for work during the past 4 weeks. (Question 35A = 2 and Question 41 = 0)

4 = The respondent would keep the same job, but had been looking for work during the past 4 weeks for a reason not related to job satisfaction. (Question 35A = 2 and Question 41 = 1 and Question 44 = 4, 6, 9, or 10)

3 = The respondent would take another job or no job at all, but had not been looking for work during the past 4 weeks. (Question 35A = 1 or 3 and Question 41 = 0)

2 = The respondent would take another job or no job at all and had been looking for work during the past 4 weeks for a reason not related to job satisfaction. (Question 35A = 1 or 3 and Question 41 = 1 and Question 44 = 4, 6, 9, or 10)

2 = The respondent would keep the same job, but had been looking for work during the past 4 weeks for a reason related to job satisfaction. (Question 35A = 2 and Question 41 = 1 and Question 44 = 1, 2, 3, 5, 7, or 8)

1 = The respondent would take another job or no job at all and had been looking for work during the past 4 weeks for a reason related to job satisfaction. (Question 35A = 1 or 3 and Question 41 = 1 and Question 44 = 1, 2, 3, 5, 7, or 8)

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