NLSY

ATTACHMENT 106: PROFILES

Profiles of American Youth

General & Technical Information on the 1980 Administration of the Armed Services Vocational Aptitude Battery (ASVAB) to Respondents of the National Longitudinal Survey of Youth
ATTACHMENT 106: PROFILES
Background and General Information

Profiles is the term used to describe the study called the Profile of American Youth that was conducted with the NLS youth sample during July through October of 1980. In that study, the Armed Services Vocational Aptitude Battery (ASVAB) was administered to a total of 11,914 NLS respondents, representing a completion rate of approximately 94%. The study was sponsored by the Department of Defense and the Military Services in cooperation with the Department of Labor.

The purpose of the Profile of American Youth was to obtain data on the vocational aptitudes of current youth and to establish current national norms for the ASVAB. Previously, military recruits had been compared statistically to adult males who were extensively tested during World War II. The Department of Defense and the Congress, after questioning the appropriateness of using the World War II reference population as the primary basis for interpreting the enlistment test scores of contemporary recruits, decided in 1979 to conduct this new study.

The NLS respondents were selected because they comprised an already existing nationally representative sample of young people ages 16 to 23. The test was administered by NORC representatives according to strict guidelines conforming to standard ASVAB procedures. Groups of 5 to 10 persons were tested at more than 400 test sites that included hotels, community centers, and libraries throughout the United States and abroad.

For their participation, NLS respondents were paid an honorarium of $50 for completing the test to compensate them for their time and travel expenses. Additionally, the respondents were sent their test results along with information on how to interpret the results and how to use the ASVAB scores in helping to make career choices.

The ASVAB consists of a battery of 10 tests that measure knowledge and skill in the following areas: (1) general science, (2) arithmetic reasoning,
Attachment 106: Profiles continued

(3) word knowledge, (4) paragraph comprehension, (5) numerical operations, (6) coding speed, (7) auto and shop information, (8) mathematics knowledge, (9) mechanical comprehension, and (10) electronics information. The NLS tapes contain 33 Profiles variables, R(6147.) through R(6179.), which include individual number correct scores, scale scores, and standard errors for each of the 10 sections along with sampling weight, test disposition, and high school graduate status at Profiles testing. (Please note that the scale scores include both positive and negative values and that non-interviews have a value (-5) within the range of valid scores.)

Military Services uses ASVAB scores to determine eligibility and assignment qualifications for specific military jobs for new enlistees. Also, Military Services sums the scores of four of the ASVAB subtest scores—word knowledge, arithmetic reasoning, paragraph comprehension and 1/2 of the numeric operations—to create the Armed Forces Qualification Test (AFQT). The AFQT is a general measure of trainability and a primary criteria of enlistment eligibility for the Armed Forces.

Included in this attachment are the following:

(1) Technical notes on the ASVAB scale scores

(2) An annotated bibliography of Department of Defense publications related to the Profile of American youth

(3) The brochure that NORC sent to NLS respondents providing information about the Profiles study and their participation in it

(4) An example of the test score report and related brochures that the participating respondents received after the tests were graded
THE PROFILE OF AMERICAN YOUTH

ASVAB SCALE SCORES

TECHNICAL NOTE

The public release tape of data from the National Longitudinal Survey of Labor Force Behavior, Youth Survey, includes information from the 1980 administration of the Armed Services Vocational Aptitude Battery (ASVAB) to the NLS sample. The scale scores and associated standard errors of measurement are the by-product of psychometric analyses of these data, obtained through the item response methods described in Data Quality Analysis of the Armed Services Vocational Aptitude Battery (R. Darrell Bock and Robert J. Mislevy, Chicago: National Opinion Research Center, 1981). Relevant excerpts of that report are attached.

Inasmuch as neither item content nor item-response data has been released at this time, final estimates have been re-standardized within each ASVAB subtest to weighted population means of zero and standard deviations of one. No scale scores are reported for the 36 subjects who were administered the ASVAB under non-standard conditions.

PART I

DATA QUALITY ANALYSIS WITH ITEM RESPONSE CURVE MODELS

In order to discover and describe the manner in which each of the ten ASVAB subtests operates to measure subject abilities, each subtest has been fit separately to an item response curve (IRC) psychometric model. This part of our report briefly describes the IRC models that are used: a 3-parameter logistic model for the power (unspeeded) tests and a Poisson model for the speeded subtests.

ITEM RESPONSE CURVE MODELS AND DATA ANALYSIS

The use of item response curve (IRC) psychometric models has long been supported and developed by the armed services, beginning in the 1960's with the work of Allan Birnbaum and continuing in the present with the work of Fumiko Samejima, James McBride, and others. The principal advantages of these models in selection and classification stem from the fact that subject abilities are estimated conditionally on the items the subject has been presented. Tailored testing and linking of test forms, difficult problems for the methods of classical test theory, become quite tractible.
Our choice of IRC models for the analysis of the ASVAB has been motivated from a different point of view. In parameterizing the expected patterns of subject/item interactions, IRC models are excellent vehicles for data analysis of mental test data. To the extent that an IRC explains the data, it expresses the operations of the test and of the items as measuring devices. The amount of information provided about subjects at various levels of ability, by individual items and by the test as a whole, are easily obtained. Departures from the model highlight disturbances and anomalies in the data, such as ambiguities in test items or random guessing behavior of subjects.

Eight of the ten ASVAB subtests are power tests, in which performance depends mainly on subjects' knowledge or reasoning abilities rather than time limitations. To these tests, a Birnbaum 3-parameter logistic IRC (Birnbaum, 1968) was fit with the BLOG computer program (Bock & Mislevy, 1980), using the fixed-effects algorithm outlined in Appendix A.

The remaining two subtests are speeded tests, in which performance depends mainly on subjects' speed and accuracy at simple tasks in a limited amount of time. To both of these tests, a Poisson IRC for speeded tests (Rasch, 1960) was fit.

The following sections review these models in turn.
A 3-PARAMETER LOGISTIC MODEL FOR POWER SUBTESTS

An unspeeded (power) mental test demands knowledge or reasoning ability from a subject. Although time limits are set and observed, it is assumed that subjects would answer few additional items correctly under more generous time limits. Eight of the ten ASVAB subtests are unspeeded tests: (1) General Science, (2) Arithmetic Reasoning, (3) Word Knowledge, (4) Paragraph Comprehension, (5) Auto & Shop Information, (6) Mathematics Knowledge, (7) Mechanical Comprehension, and (8) Electronics Information.

The model used to analyze the eight power subtests of the ASVAB is based on Birnbaum's 3-parameter logistic item response curve (IRC) model. The IRC provides a statistical model for the probability of a given subject responding correctly to a given test item. Included in this model is the subject's scale score and parameters that characterize the difficulty and reliability of the item. When the model is fitted to the data, it is capable of accounting for the facts that--

(1) Some subjects perform better than others on the items in the subtest.

(2) Some items in the subtest are easier than others.

(3) Some items measure the underlying ability more precisely than others.

(4) Because the test items are multiple choice, subjects can
occasionally answer any item correctly by guessing.

The scale of ability along which persons are measured is defined explicitly by the locations of the items:

The ability, or scale score, of Subject i ($\theta_i$) is his location along the scale.

The location of Item j on the scale is called its threshold ($b_j$). Items' thresholds indicate their relative probabilities of being answered correctly by a person drawn at random from the target population. A subject located at the threshold of Item j would have a 50-50 chance of answering Item j correctly.

The dispersion parameter of Item j ($s_j$) is inversely related to the reliability with which item j measures ability.

Finally, the lower asymptote of Item j ($c_j$) is the probability of a correct response from even the subjects of lowest ability. Lower asymptotes may be useful during the estimation of item parameters, freeing threshold and dispersion estimates from the effects of random guessing. Because guessing behavior differs from one subject to another, however, final estimates of subject ability are instead based on a robust procedure that does not use the lower asymptotes (see Appendix B).

The exact value of the probability of a correct response to Item j from Subject i is given by the following function of $\theta_i$, $b_j$, $s_j$, and $c_j$:

$$ P_{ij} = c_j + (1-c_j) \exp(Z_{ij}) / [1.0 + \exp(Z_{ij})], $$

where
\[ Z_{ij} = (\theta_i - b_j)/s_j \]

and \( \exp(x) \) denotes the raising of the base of the natural logarithms to the \( x \)th power.

The origin and scale of the ability variable may be chosen arbitrarily. In our analyses, the scale has been set so that the mean of subject abilities in the youth population is zero and the variance is one, after correction for measurement error variation.

The amount of information that Item \( j \) provides about subjects at various levels of ability is given by its information curve, which for the logistic item response model is the derivative of the IRC (i.e., the slope of the curve at each point on the scale). The information provided by Item \( j \) for ability level \( \theta \) is given by

\[ I_j(\theta) = \left\{ \frac{1 - \exp(Z_{\theta j})}{(s_j)^2} \right\} \left\{ \frac{1}{1 - \exp(Z_{\theta j} - \ln(c_j))} \right\} \]

where

\[ Z_{\theta j} = (\theta - b_j)/s_j. \]

It may be inferred that an item provides most information about subjects whose abilities lie in the neighborhood of its threshold. It may also be inferred that, at their most informative points, items with large dispersions provide less information than items with small dispersions.

The total amount of information provided by a collection of items is given by the sum of their individual item information curves, i.e., the test information curve. When the method of maximum likelihood is used to estimate subjects' abilities from their responses to items with known parameters, the standard error
of estimation will be the square root of the reciprocal of the total test information at the estimated ability. An examination of a test's information curve, then, may be used to examine the levels of measurement precision that are attained at various points along the ability scale. Such analyses will be performed for the power tests of the ASVAB.

We note in passing that simpler item-response models with constant item dispersions and/or lower asymptotes of zero have also been proposed (see Lord & Novick, 1968, and Andersen, 1980). These models offer considerable conceptual and technical advantages in applied settings, and are worthwhile goals during test construction. Preliminary analyses of the data from the ASVAB subtests indicated that these simpler models fit the data poorly, however. The 3-parameter model has been adopted as better suited to the task at hand, namely, data analysis of responses to existing tests.

**A POISSON MODEL FOR SPEEDED SUBTESTS**

The items of the speeded subtests of the ASVAB, Numerical Operations and Coding Speed, require little knowledge or reasoning ability. If time were not restricted so severely, almost every subject would answer almost every item correctly. Performance in these subtests, then, places a premium on subjects' speed and accuracy.
The model used to analyze these subtests is based on Rasch’s (1960) model for speeded tests. Two assumptions are necessary. First, item content within a test is considered to be homogeneous—an assumption fairly well satisfied for Numerical Operations and almost perfectly satisfied for Coding Speed. Second, a subtest is treated as if it were infinitely long—an assumption also well-satisfied in both tests, as time restrictions are sufficiently strict to prevent all but a few subjects from reaching the end of either subtest.

Briefly, the justification of the model is as follows: It is supposed that (1) the probability of Subject $i$ responding correctly to an item during any small time interval $\Delta t$ depends only on the length of the interval, and that (2) as $\Delta t$ approaches zero the possible outcomes are essentially either one correct response, with probability $P_i$, or zero correct responses, with probability $(1-P_i)$. Then the probability that Subject $i$ will correctly answer $R_i$ items over the course of $N_i$ time intervals is approximated by the following Poisson model:

$$\text{Prob}(R_i|N_i) = \frac{(N_i P_i)^{R_i}}{R_i!} \exp(-N_i P_i),$$

where $(N_i P_i)$ may be interpreted as the expected number of correct responses.

Rasch’s original model expressed $P_i$ as the product of a term for subject ability and a term for test difficulty, which is essential for the comparison or linking of multiple tests.
Because our attention is focused on only one subtest at a time, this separation is not necessary. Furthermore, because every subject is allotted the same amount of time, \( N_i \) may be absorbed with \( P_i \) into a single parameter \( \theta_i \), the ability of Subject \( i \) with respect to the given subtest and standard time limitations.

Under the assumptions outlined above, the maximum likelihood estimate of \( \theta_i \) is simply \( R_i \) and its standard error of estimation is the square root of \( R_i \). It is customary to analyze the logs of number-correct scores of speeded tests, and for this reason we have approximated \( \theta_i \) by \( (R_i + 0.5) \). Subsequent analyses of score distributions revealed that the number-correct scores have approximately normal distributions in the youth population, as do the ability estimates from the power tests, while the logs of the number-right scores do not. The number-right metric has been retained, then, so that score units may be more comparable for the power subtests and the speeded subtests. Like the power tests, the speeded tests have been standardized so that the mean of the population is zero and the variance is one, after correction for measurement error variance.

A facsimile of a test information curve is obtained by plotting the squared reciprocals of standard errors against ability estimates. While the form of the model dictates decreasing information with increasing ability, it is useful to examine the test information curve in relation to the population distribution of ability. Moreover, it will be possible to derive statements about local and overall test reliabilities.
APPENDIX A

CALIBRATION OF POWER SUBTESTS

The items in each ASVAB power subtest were calibrated with the BILOG computer program (Bock & Mislevy, 1981) using an adaptation of the fixed-effects solution introduced in Bock (1976). Item parameter estimates were based on the responses of a 10-percent random sample (1200 subjects) of the NLS data, excluding those subjects not tested under standard administration procedures. This appendix outlines the calibration algorithm.

According to the assumptions of item response curve theory, item parameters are invariant across subjects and could be estimated from any sample, regardless of its ability or demographic features. This assumption is never satisfied perfectly in practice, however, so precautions were taken to guard against biases in item parameter estimates caused by the oversampling of disadvantaged subjects. Rather than weight each subject in the calibration sample equally, we have weighted them in proportion to their NLS sampling weights. The weights have been rescaled to make the sum of subject weights add to 1200, the actual number of subjects. The data from a given subject will be weighted inversely to his probability of being selected. In the following discussion, we use the following terms for a subject's item attempts and correct responses:

A-1
\[ N_{ij} = \text{the weighted number of attempts by Subject } i \text{ to Item } j \]
\[ = W_{ij}, \text{ and} \]
\[ R_{ij} = \text{the weighted number of correct responses by Subject } i \]
\[ \text{to Item } j \]
\[ = W_{ij} \text{ if the response is correct and 0 otherwise.} \]

As a consequence of this weighting, the item-fit and test-fit Chi-square statistics will not be strictly correct. It may be appropriate to adjust them in accordance with a design effect, probably a value around two like the design effects for many other variables in the NLS survey. The resulting item parameter estimates will, however, correspond more closely to those that would be obtained from the responses of a true, simple random sample of the youth population.

**CALIBRATION ALGORITHM**

**Step 1**

An initial estimate of the ability of each subject in the calibration sample is obtained as the logit of correct response:

\[ \hat{\theta}_i = \ln(\sum R_{ij}/(\sum N_{ij}-\sum R_{ij})). \]

If all the responses of Subject \( i \) are correct or all are incorrect, \( W_{ij} \) is added to the number of attempts and \( W_{ij}/2 \) to the number correct.

**Step 2**

Based on the provisional ability estimates, the calibration sample is partitioned into ten intervals as follows: The lowest and highest scoring five-percent of subjects are assigned to the
lowest and highest intervals, then the attainment scale between these extremes is divided into ten intervals of equal length.

It is assumed that the abilities of subjects in each interval are sufficiently similar to be approximated by a single interval ability. Numbers-tryed and numbers-correct of Interval $2$ are defined by

\[ N_{2j} = \text{the weighted number of attempts to Item } j \text{ by subjects in Interval } 2, \text{ and} \]

\[ R_{2j} = \text{the weighted number of correct responses to Item } j \text{ by subjects in Interval } 2. \]

**Step 3**

The probability of a correct response to Item $j$ from a subject in Interval $2$ is assumed to be given by the logistic ogive:

\[ P_{2j} = .10 + .90 \psi(Z_{2j}) \]
\[ = .10 + .90 \exp(Z_{2j})/(1 + \exp(Z_{2j})), \]

where

\[ Z_{2j} = (\theta_2 - b_j)/s_j \]
\[ = (1.0/s_j) \theta_2 - (b_j/s_j) \]
\[ = a_j \theta_2 - c_j. \]

The item parameters $b_j$ and $s_j$ are the item threshold and dispersion discussed above. The re-expression in terms of the item parameters $a_j$ and $c_j$, the item slope and intercept, simplifies computation.

Assuming the local independence of responses to test items, the probability of observing $R_{2j}$ correct responses to Item $j$ from the subjects in Interval $2$ is given by

\[ P_{2j} = \Pr(R_{2j} \mid N_{2j}, \theta_2) \]

A-3
\[
\frac{N_{2j}!}{R_{2j}!(1-R_{2j})!} = \frac{P_{2j}^{R_{2j}}(1-P_{2j})^{N_{2j}-R_{2j}}}{R_{2j}!(N_{2j}-R_{2j})!}
\]

and the probability of the entire calibration data matrix becomes

\[
P = \prod_{l=1}^{10} \prod_{j=1}^{n} P_{2j}
\]

Estimates of the \(a_j\)'s, \(c_j\)'s, and \(\theta_2\)'s are chosen to maximize this probability. The log likelihood function is

\[
L = \prod_{l=1}^{10} \prod_{j=1}^{n} C + \sum_{l}^{R_{2j}} \ln(P_{2j}) + (N_{2j}-R_{2j}) \ln(P_{2j}),
\]

where \(C\) does not depend on the parameters. The likelihood equations for \(l = 1, 2, \ldots, 10\) and \(j = 1, 2, \ldots, n\) are

\[
c_j: \sum_{l}^{R_{2j}} (R_{2j} - N_{2j} P_{2j}) = 0
\]

\[
a_j: \sum_{l}^{R_{2j}} (R_{2j} - N_{2j} P_{2j}) \Theta_2 = 0
\]

\[
\Theta_2: \sum_{j}^{R_{2j}} (R_{2j} - N_{2j} P_{2j}) a_j = 0
\]

In order to fix the size and origin of the provisional scale units, the highest and lowest intervals are assigned scores of plus one and minus one respectively. BILCG solves the reduced equations by means of Newton-Raphson iteration.

**Step 4**

From the provisional item parameters estimated in the preceding step, each subject's scale score is estimated. The appropriate likelihood equation, under the assumption of local independence, is given by

\[
\Theta_i: \sum_{j} (R_{ij} - N_{ij} P_{ij}) a_j = 0,
\]

where
\[ P_{ij} = .10 + .90 \exp(Z_{ij}) / (1 + \exp(Z_{ij})) \]

with

\[ Z_{ij} = a_j \theta_i - c_j. \]

This equation has no solution if all of the responses of Subject i are correct or all are incorrect. In the former case, \( W_{ij} \) is added to the number of attempts to the item with the highest threshold and \( W_{ij}/2 \) is added to his number correct; in the latter case, the same procedure is applied to the item with the lowest threshold.

**Step 5**

Step 2 is repeated with the improved subject score estimates.

**Step 6**

Step 3 is repeated with the improved interval boundaries.

**Step 7**

Standard errors of estimation for the item parameters are obtained in the final Newton iteration of Step 6, as the square roots of the negative reciprocals of the second derivatives of the log likelihood at the final solution.

Item fit is indicated by a Pearsonian chi-square over intervals:

\[ X_j^2 = \sum (R_{lj} - N_{lj} P_{lj})^2 / [N_{lj} P_{lj} (1-P_{lj})]. \]

If the expected number of either correct or incorrect responses to Item j in Interval \( l \) is less than 5, the Interval \( l \) is collapsed into an adjacent interval for the purpose of the item-fit index. The number of degrees of freedom associated with the value is two less than the number of intervals after collapsing.

Overall test fit is indicated by the sum of the item-fit
chi-squares, with degrees of freedom similarly summed but reduced by 6 to account for the estimation of interval scores.

As noted above, it may be appropriate to divide the resulting item and test fit Chi-squares by two to account for the stratified sampling design.
BIWEIGHT ESTIMATES OF LATENT ABILITY

Maximum likelihood estimates of subjects' abilities in item
response curve models are overly senstive to disturbances that are
common in educational measurement, such as guessing and careless-
ness. The biweight solution described in this appendix, intro-
duced and illustrated in Mislevy and Bock (1980), is highly resis-
tent to these disturbances. It effectively discounts suspicious
responses, and agrees with the maximum likelihood estimator when
none are present.

We first review the form of maximum likelihood estimation of
latent ability. Our final estimates of subject abilities in the
power subtests of the ASVAB employ two variations on this basic
theme, namely, the use of a prior distribution and biweighting.

MAXIMUM LIKELIHOOD ESTIMATES OF LATENT ABILITY

Suppose that the item parameter of n test items are known.
Let \( b_j \) be the threshold of Item \( j \) and \( s_j \) be the dispersion. We
observe the responses of Subject \( i \) to these items. Let \( X_{ij} \) be one
if the response to Item \( j \) is correct and zero if it is not.

Under the assumptions of the 2-parameter logistic item re-
sponse curve model, the probability that Subject \( i \) will respond
correctly to Item \( j \) is given by

3-1
\[ P_{ij} = \exp(Z_{ij}) / (1 + \exp(Z_{ij})), \]  

(3.1)

where

\[ Z_{ij} = (\theta_i - b_j)/s_j \]

and \( \theta_i \) denotes the ability of Subject i. Assuming the responses of Subject i are independent, given \( \theta_i \), the probability of his vector of responses is given by the product of expressions like (B.1) over all the items:

\[ P_i = \prod_{j=1}^{n} P_{ij} \left(1 - P_{ij}\right)^{1 - X_{ij}}. \]  

(3.2)

If the item parameters are known but the ability is not, then (3.2) is the likelihood function of \( \theta_i \) given the vector of responses. The maximum likelihood estimate of the ability, \( \hat{\theta}_i \), is the value which maximizes (B.2) with respect to the observed responses.

In practice the log of the likelihood is maximized. The log likelihood is given by

\[ \ln L = \sum_{j=1}^{n} \left[ C + X_{ij} \ln(P_{ij}) + (1 - X_{ij}) \ln(1 - P_{ij}) \right]. \]

where \( C \) does not depend on the parameters. The first derivative of the log likelihood function is given by

\[ \frac{d\ln L}{d\theta_i} = \sum_{j=1}^{n} \frac{(X_{ij} - P_{ij})}{s_j}. \]  

(3.3)

and its second derivative, by

\[ \frac{d^2\ln L}{d\theta_i^2} = -\sum_{j=1}^{n} \frac{P_{ij}(1 - P_{ij})}{s_j^2}. \]

As long as not all of the responses are correct and not all are incorrect, there is a unique and finite value for which the
first derivative is zero. Since the second derivative is always negative, the zero is a maximum of the log likelihood. A large-sample standard error for the estimate may be obtained as the negative reciprocal of the square root of the second derivative of $\ln L$, evaluated at the maximum.

**BAYES MODAL ESTIMATES**

As noted in Part I of this report, the scale of the item parameters was fixed by requiring the mean of the youth population to be zero and the true-score variation to be one. Under the assumption that the underlying distribution is normal, it is possible to use Bayes Theorem to obtain estimates of subject abilities with lower mean-squared errors than maximum likelihood estimates.

Under this scheme, the prior density of $\theta_i$ is Normal $(0,1)$. The posterior density, $F$, is proportional to the prior density times the likelihood (3.2):

$$F = \prod_{j=1}^{n} P_{ij}^{X_{ij}} (1-P_{ij})^{1-X_{ij}} \cdot \frac{1}{2\pi} \exp\left(-\frac{(\Theta_i - \mu)^2}{2}\right)$$

where $P_{ij}$ is as defined in (B.1). The value of $\hat{\Theta}_i$ that minimizes this expression is the Bayes modal estimate of $\hat{\Theta}_i$, the highest value with the highest posterior density. The log of $F$ and its first and second derivatives are nearly the same as those for $L$, except for additional terms:

$$\ln F = \sum_{j=1}^{n} K + X_{ij} \ln(P_{ij}) + (1-X_{ij}) \ln(1-P_{ij}) - \frac{\Theta_i^2}{2}.$$
\[
\frac{d\ln\theta_i}{de} = \Theta_i + \sum_{j=1}^{n} \frac{(X_{ij} - P_{ij})}{s_j}.
\]

\[
\frac{d^2\ln\theta_i}{de^2} = -1 - \sum_{j=1}^{n} \frac{P_{ij} (1 - P_{ij})}{s_j^2}.
\]

It is typical to take as an indication of the precision of estimation the negative reciprocal of the square root of the second derivative at the maximum; i.e., the curvature of the posterior distribution at its highest point.

**BIWEIGHT ESTIMATES**

In theory, a subject's responses to items with thresholds far above or far below his level of ability provide little information about his ability. In practice, they may provide misinformation. An incorrect response to an easy item from a subject who otherwise appears quite able is probably a careless error; a correct response to a hard item from a subject who otherwise appears unable is probably a lucky guess. Inasmuch as a subject's responses to items far from his apparent ability contain least information and most potential for misinformation, it would be desirable to weight a subject's responses accordingly. The biweight estimator described in this section does just that.

Based on the principle of Tukey's biweight estimate of location, the biweight estimate of ability responds sensitively to information from items in the neighborhood of the subject's apparent ability, while effectively discounting responses to items far above or below this level. The response of Subject i to Item j is
assigned the weight $W_{ij}$ in accordance with the distance of the subject from the item, in units of the item's dispersion:

$$W_{ij} = \begin{cases} (1 - U_{ij})^2 & \text{if } |U_{ij}| < 1 \\ 0 & \text{otherwise} \end{cases}$$

with

$$U_{ij} = \frac{b_i - \hat{\theta}_i}{\bar{3}s_j}.$$ 

In this last expression, \(\hat{\theta}_i\) represents the biweight estimate of the ability of Subject \(i\). (The biweight estimate depends on the weights and the weights depend on the estimate; together they must be computed iteratively.)

The fitting function used in the computation of the biweight estimate is a modification of (B.3), the likelihood equation:

$$G' = \sum_{j=1}^{n} W_{ij} \frac{(X_{ij} - P_{ij})}{s_j}.$$ 

As an indication of the precision of estimation, one may use the negative reciprocal of the square root of a facsimile of a second derivative:

$$G'' = -\sum_{j=1}^{n} W_{ij} P_{ij} \frac{(1 - P_{ij})^2}{s_j}.$$ 

This quantity would be the second derivative of a log likelihood if the weights $W_{ij}$ had been specified in advance rather than in response to the data.
BIWEIGHTED BAYES ESTIMATES

Final estimates of subject abilities in the ASVAB power tests use both the standard normal prior, to provide lower mean-squared errors, and biweighting, to trim potentially misleading responses to extreme items. The fitting function incorporates aspects of the Bayes and the biweight estimates:

\[ H' = \theta_i + \sum_{j=1}^{n} W_{ij} (X_{ij} - P_{ij})/s_j, \]

where \( W_{ij} \) is the biweight. As a standard error of estimation, we use the negative reciprocal of the square root of a facsimile of a second derivative:

\[ H'' = -1 - \sum_{j=1}^{n} W_{ij} P_{ij} (1 - P_{ij})^2 / s_j. \]
THE PROFILE OF AMERICAN YOUTH:
Annotated Bibliography of DoD Related Publications

Compiled by
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Technical Memorandum 82-1
Directorate for Accession Policy
Office of the Secretary of Defense
The Profile of American Youth
Annotated Bibliography of DoD Related Publications

Department of Defense Publications


In 1980, the Department of Defense (DoD) and the Military Services, in cooperation with the Department of Labor, sponsored a large-scale research project to assess the vocational aptitudes of American youth. A national probability sample of approximately 12,000 young men and women, consisting of participants in the National Longitudinal Survey (NLS) of Youth Labor Force Behavior, were administered the Armed Services Vocational Aptitude Battery (ASVAB).

The young people tested were representative of all youth in the United States, ages 16 through 23 years old. The analyses conducted in the profile study focused upon young people who were 18 through 23 at the time of ASVAB testing. The ASVAB is used by the Military Services to determine enlistment eligibility and assignment qualifications to specific military jobs. Four ASVAB subtests are combined to form the Armed Forces Qualification Test (AFQT), a general measure of trainability and a primary criterion of enlistment eligibility. AFQT scores, reading grade level, and vocational aptitude composite scores were used as indices for comparing the performance of civilian and military groups. The analyses included comparisons of the 1980 youth population with the World War II reference population and with military recruits, as well as comparisons of subgroups within the youth population on the basis of age, sex, race/ethnicity, level of education, socioeconomic status, and geographic region.

The report contains five sections and three appendices, as well as a comprehensive bibliography of relevant literature. Section 1 presents a brief introduction. The study design, sampling procedures, and data analysis are described in Section 2. Section 3 presents a comparison of characteristics of the 1980 youth population with military personnel. In Section 4, the mean scores of the 1980 youth population subgroups are compared. Section 5 summarizes the results documented in the report. The appendices contain detailed statistical data. An executive summary is included at the front of the report.

This paper presents a review of subpopulation differences in performance on tests of mental ability. Six categories of subpopulation differences are examined: sex, age, race, ethnicity, social class, and other (including education, geographical location, and physical characteristics). Selected references (40) are briefly described in an annotated bibliography in order to: (a) acquaint the reader with the so-called "classic" works and a representative sample of studies in the field; (b) characterize the literature dealing with controversial aspects of group differences and intelligence testing; and (c) provide a general "road map" for those who wish to further pursue the subject.

It should be noted that no attempt is made to present, explain, or analyze the possible causes of the observed differences. However, the interested reader can find references to several recent books on causative factors in the annotated bibliography and supplementary notes.


The Profile of American Youth is a large-scale research project sponsored by the Department of Defense with the cooperation of the Department of Labor. It was designed to assess the vocational aptitudes of contemporary American young people and, at the same time, to establish current national norms for the Armed Services Vocational Aptitude Battery (ASVAB). To achieve these goals, the National Opinion Research Center (NORC) of the University of Chicago administered the ASVAB during the summer and fall of 1980 to a national probability sample of nearly 12,000 men and women ages 16 to 23. Because of the importance of this study, both to the Department of Defense and to the social science community, it was imperative that an independent audit of the test scores, the demographic variables, and the procedures used to assemble the data base be conducted.

A Department of Defense (DoD) team of computer programmers, testing and survey experts performed a data audit to ensure the accuracy of the information contained on the data tape to be provided by NORC to DoD. This report documents the procedures used in the audit and presents its results. The report addresses several issues: (a) it summarizes the research questions that motivated the aptitude profile study, (b) it describes the sample to which the ASVAB was administered, (c) it explains
the various sources of data assembled in the analytic data base, and (d) it reports on the activities performed by the DoD audit team to verify and audit the data base.


This paper brings together the large body of literature on indicators of changes in U.S. scholastic aptitude and achievement levels within the 1952-1980 period. The target population is youth from pre-school age to post-college graduate age. The study begins with a discussion of the trends which have emerged over time, supported by credible data. The discussion reviews aptitude test score patterns from 1952 through 1980 on eight scholastic achievement tests. An annotated bibliography of 49 sources was reviewed by the author. A bibliography of literature related to the decline of tests scores is included. This reference list includes over 250 sources.

The aptitude testing data covering the entire period from the early 1950s to 1980 show remarkable consistency. With the exception of slight increases on the LSAT, the other measures of scholastic aptitude of youth reviewed have consistently decreased at a rate of about 1 to 3 percent of a standard deviation per year. Although there is some evidence that the rate of decline has lessened somewhat in the past three years, the trend continues through 1980.

In general, the author also found consistent evidence of achievement test score declines, for the 1950s through 1970s in all areas tested above grade 4. The author concluded that these trends are real, national in scope, and continuing, though at a decreasing rate of decline since about 1977.

National Opinion Research Center Publications


The Profile of American Youth is a large-scale research project sponsored by the Department of Defense with cooperation of the Department of Labor. It assessed the vocational aptitudes of contemporary American young people and, at the same time, established current national norms for the Armed
Services Vocational Aptitude Battery (ASVAB). To achieve these goals, the National Opinion Research Center (NORC) administered ASVAB Form 8A during the summer and fall of 1980 to a national probability sample of nearly 12,000 men and women, ages 16 to 23.

Because of the importance of this study, not only to its sponsors but to the social science research community and the general public, care was taken to examine and document the quality of the data collected. This review included the ASVAB's suitability for assessing the aptitudes of the 1980 youth population. Whether the data collected are appropriate for this purpose depends on (a) the adequacy of the sampling plan and its implementation; (b) the quality of the fieldwork and test administration procedures; and (c) the psychometric quality of the test data collected. This report examines the test data.

Using item response theory (IRT) methods, the authors investigated (a) item response profiles of individual subjects for evidence of unusual patterns of right and wrong answers which could indicate carelessness, malingering, or guessing; (b) the possibility of test item bias that could favor one or another subcultural group; (c) the reliability of the ASVAB subtests and the amount of information they provide about subjects across the entire range of ability; (d) the consistency of test administration at the several hundred testing centers established across the country.

The authors concluded that the ASVAB is useful for measuring vocational aptitudes of civilian youth. They found the ASVAB free from major defects such as high levels of guessing or carelessness, inappropriate levels of difficulty, cultural test-question bias, and inconsistencies in test administration procedures.


In the summer and fall of 1980, the National Opinion Research Center of the University of Chicago administered the Department of Defense enlistment test, the Armed Services Vocational Aptitude Battery (ASVAB), to a national probability sample of approximately 12,000 young men and women between the ages of 16 and 23. The ASVAB is currently used, in conjunction with other entry standards, to select personnel for the Army, Navy, Marine Corps, and Air Force, and to assign them to appropriate military jobs. The battery consists of ten tests, which measure knowledge and skill in these areas: General Science, Arithmetic Reasoning, Word Knowledge, Paragraph Comprehension, Numerical Operations, Coding Speed, Auto and Shop Information, Mathematics Knowledge, Mechanical Comprehension, and Electronics Information.
The ASVAB was administered to this sample to obtain current national percentile norms for the tests and to assess the vocational potential of the contemporary youth population. Because the subjects used in this study had previously been interviewed in connection with the Department of Labor's National Longitudinal Survey of Youth Labor Force Behavior, considerable demographic background information was available on each subject in addition to the aptitude test score information. This combination of test score and background data provide a virtually unique opportunity to describe in detail the vocational aptitude test performance of a truly representative sample of American young people.

Of the various background factors covered in the interview, the following show notable effects on average test score profiles: (a) sex, (b) highest grade completed, (c) sociocultural group, (d) economic status, (e) region of residence at age 14, and (f) mother's highest grade completed. Effects of these factors on the ten ASVAB subtests were studied by multivariate analysis of variance. The background variables used in the analysis were defined as follows: sex--male, female; highest grade completed--0-8, 9-11, 12, 13; sociocultural group--white, black, Hispanic; economic status--non-poor, poor (below poverty level); region of residence at age 14--Northeast, Southeast, Midwest, West; mother's highest grade completed--0-8, 9-11, 12, some college, college graduate.

The analysis showed statistically significant effects or interactions of these background factors on one or more of the ASVAB subtests. Three-factor interactions were observed for: sex by sociocultural group by economic status; highest grade completed by sociocultural group by economic status; and sociocultural group by region of residence at age 14 by economic status. A significant two-factor interaction not represented in the triple interactions was sex by highest grade completed. A main effect not represented in any interaction was mother's highest grade completed.


The Profile of American Youth is a large-scale research project sponsored by the Department of Defense (DoD) with the cooperation of the Department of Labor. Its purposes were to assess the vocational aptitudes of contemporary American young people and, at the same time, establish current national norms for the Armed Services Vocational Aptitude Battery (ASVAB). To achieve these goals, the National Opinion Research Center administered the ASVAB during the summer and fall of 1980 to a national probability
sample of nearly 12,000 young men and women. Because of the importance of the sampling components of the Profile study to the overall reliability of the ability estimates produced, a peer review committee of experts in the field of survey sampling was recruited to provide an independent review of the sample design and estimation procedures used in the study.

The overall study design for the Profile of American Youth required that the ASVAB be administered under standard conditions to a nationally representative sample of young people. Rather than selecting an entirely new national probability sample, a lengthy and expensive task, NORC and the sponsors of the study jointly decided to utilize the already existing sample of youth initially selected for the five-year National Longitudinal Survey (NLS) of Labor Force Behavior. This sample, selected in 1978 and interviewed in 1979 and 1980, was a nationally representative sample of American youth ages 16 to 23 (born 1957 to 1964) and, therefore, met the requirements for the Profile of American Youth. Moreover, both the Department of Defense, as a cosponsor of the NLS (with the Department of Labor) and NORC, as the NLS subcontractor for data collection, were already familiar with the sample.

It is important to emphasize that the profile sample is built on the NLS sample. The profile study began with the list of respondents who had completed the baseyear (1979) interview for the NLS. This was the "target group" to which the ASVAB was administered.

This report provides a detailed, technical discussion of the design of the sample, selection and implementation of the sample, sample weighting, the reliability of the results, and an evaluation of the potential impact of nonresponse on study results. A non-technical version of this report (McWilliams & Frankel, 1981) is also available for the less technically-oriented reader (see below).


The Profile of American Youth is a large-scale research project sponsored by the Department of Defense with the cooperation of the Department of Labor. It was designed to assess the vocational aptitudes of contemporary American young people and, at the same time, establish current national norms for the Armed Services Vocational Aptitude Battery (ASVAB). To achieve these goals, the National Opinion Research Center administered the ASVAB during the summer and fall of 1980 to a national probability sample of nearly 12,000 men and women ages 16 to 23. This field report addresses several issues: it discusses the research questions that motivated the study; it illustrates the planning and strategic
considerations that went into the design of the project; it describes the sample to which the test was administered; it explains the organization and management of the data collection effort, including (a) the field reporting structure, (b) the training provided to the field staff, (c) the recruitment of respondents, (d) the test administration procedures, and (e) the processing of the data collected. It concludes by presenting the results of the data collection effort in terms of the participation rate and by discussing the respondents' reactions to their participation in the study. Throughout the report an attempt is made to explain not just what was done, but why it was done as well.


The Profile of American Youth is a large-scale research project sponsored by the Department of Defense (DoD) with the cooperation of the Department of Labor. Its purposes were to assess the vocational aptitudes of contemporary American young people and, at the same time, establish current national norms for the Armed Services Vocational Aptitude Battery (ASVAB). To achieve these goals, the National Opinion Research Center administered the ASVAB during the summer and fall of 1980 to a national probability sample of nearly 12,000 young men and women.

This report is a non-technically-oriented version of the technical sampling report (Frankel & McWilliams, 1981) cited above. The report describes the design, selection, implementation, and limited statistical description of the study sample. This report is designed for the reader interested in knowing what was done and how, rather than the detailed statistical presentations contained in its companion report. It is written in language understood by the non-statistician.


The Profile of American Youth is a large-scale research project sponsored by the Department of Defense (DoD) with the cooperation of the Department of Labor. It was designed to assess the vocational aptitudes of contemporary American young people and, at the same time, establish current national norms for the Armed Services Vocational Aptitude Battery (ASVAB).
To achieve these goals, the National Opinion Research Center (NORC) administered the ASVAB during the summer and fall of 1980 to a national probability sample of nearly 12,000 men and women aged 16 to 23.

The study had its genesis in the National Longitudinal Study (NLS) of Youth Labor Force Behavior, which is funded by the Department of Labor under authority of the Comprehensive Employment and Training Act. Supplementary funding for NLS has been provided by the Office of the Assistant Secretary of Defense (Manpower, Reserve Affairs, and Logistics) and the Military Services.

The purpose of the NLS is to study a large and representative cross-section of American youth through annual personal interviews over a five-year period. Young people are at a crucial point in their lives, a time when they make decisions about education, career, and family formation. While a central concern of the study is problems relating to employment and unemployment, the interviews gather a great deal of supplemental information about the characteristics, experiences, plans, and attitudes of the youth.

Although NORC already had access to the NLS panel of young people, there still remained the formidable problems of persuading them to take ASVAB, selecting and preparing suitable test locations, and training NORC interviewers to administer the test under a wide variety of circumstances. For these reasons, NORC formally proposed to DoD that a pretest of the profile study be conducted in the spring of 1980. This pretest provided a tryout of the proposed materials and procedures in a small number of places to test their reliability, feasibility, and cost implications before proceeding with the full study.

The pretest was extremely useful in providing an empirical test of NORC's methodology, and the lessons learned were adapted to the full-scale testing during July through October 1980. The present report provides a detailed account of pretest activities.
Dear Respondent,

As we promised, here are your results on the Profile of American Youth test. On the enclosed form you will find your scores for each of the ten subtests. We have also included two brochures—one explaining your scores in more detail, the other providing information about jobs, schools, and vocational testing.

In the first brochure, "About Your Test Scores," there is a section on understanding your test scores. When looking at your Profile scores, keep in mind other things that you know about yourself—for example, what you enjoy doing, your scores on other tests, your grades in school, and the things that you feel you do well. Remember that if you were ill or tired or had some personal problem bothering you on the day of the test, you may not have done as well as you could have. Also, keep in mind that your background, both your education and experience, plays a part in how you scored on the test.

In the second brochure information is provided on testing, education, career choices, and resources. These are the areas that you, as a group, identified as being important when you completed the Profile test.

We want to remind you that your test results, like all information you provide NORC, will remain completely confidential. You are the only person who will receive your test results. You may want to share them with someone—your parents, a guidance counselor, or an employment counselor—but NORC will not.

Again, thank you for your time and effort in taking the Profile test. We hope the test scores are useful, and that you find both of the brochures helpful. We look forward to your participation in the next NLS interview.

Sincerely,

Mary C. Burich

Mary Cyn Burich
Senior Survey Director
About The Profile Of American Youth

This study is part of a larger research effort in which you have already participated — the National Longitudinal Study of Youth Labor Force Behavior, or NLS. Your participation in the NLS has been a real contribution. You have added greatly to our nation’s understanding of the young men and women of today. Now, we ask for your cooperation again, to enlarge and improve that understanding.

The new study, called the Profile of American Youth (or the Profile Study, for short), is designed to do just what its name suggests — to draw a profile of contemporary American youth, in the important area of vocational aptitudes. This profile will show the abilities developed by today’s young people in the course of their lives, abilities that they will use as they continue their educations and careers.

The nearly 13,000 young men and women who are participating in the NLS are a carefully selected cross section of American youth. When all of their answers are combined, the results will provide an accurate picture of the entire population of that age. So, as one member of that unique group, your opinions and your experiences and your abilities really count.

To draw this profile we are planning to administer a test to every member of our large study group, and naturally you will be included. We will use a research version of a vocational assessment test developed by the government and based on over 30 years of research and experience. The Profile test will be given to small groups of young people at several hundred locations all over the United States. And in return for your time and effort we will give you that $50, plus information that you can use in making your education and career plans.

About The Sponsorship And Uses Of The Study

The Department of Labor (DoL) originated sponsorship of the NLS. The Department of Defense (DoD) joined in the sponsorship of the NLS, so the study would include youth in the military, and is also sponsoring the Profile component.

The results of the study will have many important uses. DoL researchers will have new and valuable information about you, the NLS participants, as well as the millions of young people you represent. This information, added to that from the NLS interviews, will help them to create a truly comprehensive profile of American youth today. DoD researchers will be able to use this information to improve the way young men and women who enter the Armed Services are assigned to training and duty. In addition, the Profile data will be made available for use by university scholars and others who are concerned with the abilities of young Americans in the 1980s.

But all of these efforts will be based on the results of the whole group of young people who take the test. Your individual test results will be kept completely confidential. No one — not your parents, not your school, not the government — will know your scores. They will be used only as a part of this group portrait.

The profile of American Youth will be important in understanding the young men and women of today and in making plans for education and career programs to benefit them. The study will be conducted entirely in the year 1980, and the results from it will be valuable throughout the decade ahead.

About Your Contribution

You are the very heart of the Profile Study’s success. Your effort on the Profile test will represent that of many other young people like you. Without you we cannot obtain an accurate picture of contemporary American youth. And an accurate picture is essential if government planners, educators, and employers are to help the youth of today make the best use of its talents.

Your contribution to this research effort will be to take a test. You will find it very similar to tests you have taken before. It requires no preparation on your part and is easy to take — you will not be asked to write any long responses, only to fill in spaces on an answer sheet.

Because the test normally takes about three hours, we ask that you set aside a morning, afternoon, or evening, go to a testing session in your area, and give the test your best effort. In return, you will have the satisfaction of knowing that you have contributed to an important research effort that will benefit you and other young people, and you will receive the very direct benefits to you that are described below.

About The Benefits To You

$50. We recognize that your time is valuable, and we want you to give the test your best effort. So, after you’ve finished the test, we will give you $50. What could be simpler? Or better?

Feedback. The results of this test will provide a national profile of the abilities of today’s young people. The results of your test will be used to give you information about your own abilities. We will send you this information in a form that will be useful in making plans for your future.

Again, the information about your own test results will be kept completely confidential. It will be sent only to you, in an envelope marked personal and confidential. You may choose to share this information with persons who can help you to make the best use of it — career counselors, for example — but that will be entirely your choice.

We hope that these direct benefits, coupled with the knowledge that you can contribute to an important national study, will make you a participant in the Profile of American Youth.
This score sheet contains your results from the Profile of American Youth test. The enclosed booklet, "About Your Test Scores," describes the scores and the subtests in greater detail.

For each subtest you have two scores—the NUMBER RIGHT score and the PERCENTILE RANGE score.

The NUMBER RIGHT score shows the number of questions you answered correctly in that subtest. The NUMBER POSSIBLE column shows how many questions appeared in that subtest. In the subtest on ARITHMETIC REASONING you got 12 right out of 30 possible.

Your PERCENTILE RANGE scores, in the chart to the right of the NUMBER POSSIBLE column, show how you did in comparison to the nationwide group of all persons born between 1957 and 1964. A percentile score indicates the percentage of people who scored below you on a certain test. The percentile scores on the Profile test are presented as PERCENTILE RANGE scores and shown as bands of Xs because they are only approximate. For example, your PERCENTILE RANGE score in ARITHMETIC REASONING is 20 to 35. This means that your percentile score in ARITHMETIC REASONING is probably greater than 20 but less than 35.

<table>
<thead>
<tr>
<th>SUBTESTS</th>
<th>NUMBER RIGHT</th>
<th>NUMBER POSSIBLE</th>
<th>PERCENTILE RANGE</th>
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<tr>
<td>Paragraph Comprehension</td>
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<td>15</td>
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<tr>
<td>Word Knowledge</td>
<td>33</td>
<td>35</td>
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<tr>
<td>General Science</td>
<td>18</td>
<td>25</td>
<td>Xxxxxxxxxx</td>
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<tr>
<td>Mathematics Knowledge</td>
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<tr>
<td>Arithmetic Reasoning</td>
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<tr>
<td>Numerical Operations</td>
<td>32</td>
<td>50</td>
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<tr>
<td>Coding Speed</td>
<td>15</td>
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<tr>
<td>Mechanical Comprehension</td>
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<td>25</td>
<td>Xxxxxxxxxx</td>
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<td>Auto &amp; Shop Information</td>
<td>17</td>
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<tr>
<td>Electronics Information</td>
<td>11</td>
<td>20</td>
<td>Xxxxxxxxxx</td>
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</tbody>
</table>
ABOUT YOUR TEST SCORES

The Profile of American Youth
Interpreting Your Profile Test Results

As a member of the sample for the National Longitudinal Survey, you have taken the ten subtests that make up the Profile of American Youth test. Your test results are enclosed on a separate sheet. This guide explains the scores more fully and describes the skills the Profile test is designed to measure.

How to Read Your Scores

The Profile test consists of ten separate subtests, each focusing on a different skill area. You have received two kinds of scores for each test.

The number right score is simply the number of questions you answered correctly. The total number of questions in the test is also shown; it represents the highest possible score on the subtest. Very few persons receive this maximum score.

Number right scores, in and of themselves, are not very useful without some standard of comparison. For this reason your score is also reported as a percentile range, which allows you to compare your performance with the national group of persons born from 1957 to 1964. A percentile score indicates the proportion of persons in the national group who would score lower than you. A range, rather than a single number, is presented for each test, because percentile scores, like any other test scores, are only approximate. You can be about 70% confident that your percentile ranges include your true percentile scores.

Your percentile range scores are illustrated on the score sheet as bars of X’s. This chart will help you compare your scores in the various skill areas. It may help you identify areas of relative strength or weakness. If the percentile range bars from two tests overlap, then you have performed at roughly the same level on both.
tests. If one bar is in a higher range than another, you have performed better in that area; that is an area in which you are stronger.

Factors Affecting Profile Test Results

A set of scores on tests like the Profile of American Youth does not present a complete picture of a person’s aptitudes and abilities. It cannot be emphasized too strongly that your Profile test results, like any other test results, can only be interpreted in light of your interests, your past performances, and your history of training and education.

What the Profile test does try to measure is a group of skills that are useful in various training programs and occupations. Your performance reflects in part the knowledge and the skills you have acquired in these areas. Such scores may suggest promising directions for further training.

What the Profile test does not try to measure is the wide variety of personal qualities that are a part of success in any occupation or training program—motivation, interest, and creativity, to name a few. Strengths in these areas can overcome deficiencies in specific skills.

Your Profile test scores also reflect factors other than your levels of skill. Low scores, for example, can often be traced to illness, misunderstanding of directions, or improper marking of answer sheets.

Many of the Profile subtests cover skills commonly taught in school, and nearly all of the subtests require the use of the English language. For these reasons, Profile scores may not be accurate indications of the abilities of persons whose schooling is limited, or whose native language is not English.

What the Subtests Measure

The Profile test is a research form of a vocational aptitude test developed by the Government. For over thirty years, forms of this test have been used for occupational counseling in high schools and in the military. The enclosed booklet on tests, careers, schools, and jobs contains more information about the use of scores from vocational aptitude tests like the Profile test. You may consider your Profile test results as one of the many factors to be used in considering your career options. The following sections briefly describe the Profile subtests.

Paragraph Comprehension is a test designed to measure how well you can acquire information from written passages. You were asked to read short paragraphs and then to answer questions about them. Most occupations require this skill to some degree. Some occupations place heavy demands on paragraph comprehension—law, journalism, and management, for example. Most college courses also require this skill. Low scores in paragraph comprehension may be improved through practice in reading—either by increasing the variety and amount of one’s reading, or perhaps by entering a program specifically designed to increase reading speed and comprehension.

Word Knowledge is essentially a vocabulary test. Given a word, you were asked to choose one of four other words that most nearly had the same meaning. This test reflects a person’s reading range and educational experiences. It is often used as a predictor of success in further training in academic areas. As with paragraph comprehension, low scores in word knowledge may be improved by increasing the variety and amount of one’s reading, and by studying vocabulary-building books and guides.

General Science items are drawn from a variety of fields: biology, medicine, chemistry, and physics. This test measures basic factual
knowledge taught in secondary school general science courses. Low scores might be improved by taking courses in science, or through reading general scientific publications.

Mathematics Knowledge scores depend largely on a person's formal training in mathematics. Most of the questions concern subjects that are typically introduced in high school courses, such as geometry, algebra, and trigonometry. Scores on this type of test are often used to predict success in occupations or training programs that require advanced mathematics.

Arithmetic Reasoning items are often called "word problems." You were asked to use arithmetic skills to solve problems described in short passages. These questions do not require advanced mathematics, but rather the ability to translate real-life problems into mathematical terms. These skills are required in varying degrees by scientists, engineers, carpenters, tool-and-die makers, clerks, and accountants.

Numerical Operations items covered basic arithmetic questions, which you were to answer as quickly as possible. Your score on this test depends mainly on your speed and accuracy with simple arithmetic. Clerks and bookkeepers, among others, use these skills in their work.

Coding Speed, like numerical operations, tests speed and accuracy in completing tasks. Given the code numbers for certain words at the top of the page in your test booklet, you were asked to mark the spaces on your answer sheet corresponding to the code numbers of these words. These skills are required by clerks, coders, warehouse workers, file clerks, bookkeepers, and others.

Mechanical Comprehension showed pictures built around basic machines such as pulleys, levers, gears, and wedges. The questions asked you to visualize how the objects would work together. Relatively high scores in this test suggest that a person might do well in an area where the emphasis is on mechanics—for example, designing, manufacturing, or repairing machinery. Low scores in this area could probably be improved by working with mechanical devices, such as in shop classes or auto repair.

Auto and Shop Information tests your specific knowledge of the tools and the terms used in the repair and maintenance of vehicles. This type of test is used to predict performance in training for occupations dealing with the repair, maintenance, or operation of mechanical equipment.

Electronics Information is another rather specific test. It measures your knowledge of electrical terms, your familiarity with electrical equipment, and your ability to solve electrical problems. Knowledge and abilities of these kinds are needed by electricians, engineers, electronics technicians, and electrical equipment services.

How To Use Your Scores

From these descriptions of the Profile subtests, you can see that your results may be useful in selecting an area of work for which the skills you now have might be helpful. In addition, your results may suggest skill areas that you would like to improve. You should be aware that these scores are only part of the total picture. You'll probably want to consider them together with other information that is available before making any decisions. To help you further in thinking about your future, we have included a booklet with questions and answers on careers, schools, and other tests that you might want to take. Please refer to this booklet for additional information.
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Introduction

When you participated in the Profile of American Youth Study, you answered some questions to let us know what information you would like to receive along with your test results. We learned that most of you are interested in getting information about colleges and vocational schools. You would also like to know what various people and places can tell you about schools, colleges, and jobs. In this booklet, we have put together some information that we hope will be helpful to you.
TESTING

Many tests are available to help you discover more about your abilities and interests.

Now that you have had some firsthand experience with the Profile of American Youth test, you might be interested in knowing about other tests that have been developed to provide people with information about themselves. Most people take tests for one of two reasons. Some want to apply to schools or for jobs that require applicants to take tests. Others want to learn more about themselves—for example, the kinds of jobs they might do well in, or the subjects they might enjoy in school. We will take a look at several types of tests and the kinds of things they measure.

What do vocational aptitude tests measure?

Vocational aptitude tests measure how well you can be expected to do in some area related to a job. Some of these tests measure your ability in a number of areas and relate to a broad range of careers. There are also vocational aptitude tests that relate only to specific occupations, such as engineering, music, or accounting.

Two vocational aptitude tests that measure ability in several areas are the Differential Aptitude Tests and the General Aptitude Test Battery. The Differential Aptitude Tests (DAT) are eight paper-and-pencil tests taken as a group: Verbal Reasoning, Numerical Ability, Abstract Reasoning, Space Reasoning, Mechanical Reasoning, Clerical, Spelling, and Sentences. The General Aptitude Test Battery (GATB) is made up of twelve tests, eight paper-and-pencil and four dexterity tests. The paper-and-pencil tests measure aptitude in eight areas: general reasoning, verbal, numerical, mechanical, spatial, form matching, clerical, and motor coordination. The dexterity tests measure manual ability.

You can find out more about these tests from your high school or college guidance counselor or an employment counselor.
What is an interest test?

An interest test is designed to measure what you like to do and what you don’t like to do. It does not ask questions to find out how much you know, as an aptitude test does, and there are no right or wrong answers on tests of this kind. Instead, interest tests ask questions like, “If you had your choice of listening to music for an hour, swimming for an hour, or working on your car for an hour, what would you prefer to do?”

Based on your answers to many questions like this, your score on an interest test would summarize your major interest and other strong areas of interest. You might be told, for example, that you are most interested in machine work, but also have a strong interest in music.

The names of two interest tests are the Kuder Preference Record and the Strong Vocational Interest Blank. One form of the Kuder Preference Record estimates occupational interests. It provides scores in ten areas: outdoor, mechanical, computational, scientific, persuasive, artistic, literary, musical, social service, and clerical. The Strong Vocational Interest Blank (SVIB) can be scored for any number of vocational interests. Some of the general areas that can be included are: creative, scientific, technical, musical, business, and verbal. If you would like more information on interest tests, a guidance or employment counselor will be able to help you.

If you are thinking of taking vocational aptitude and interest tests to explore career possibilities, keep in mind that your scores may not match on the two kinds of tests because your abilities and your interests may lie in different vocational areas. For example, you may do very well in mathematics on a vocational aptitude test, while your interest test shows no interest in any career that uses mathematics. Whatever the different kinds of tests show, you may want to use them by looking at the areas where your interests and abilities overlap.

Another thing to keep in mind when using aptitude or interest tests is that testing is only one measure of your abilities and interests. Other things that you know about yourself—what you like to do, what you do well in, your school grades, and other measures—are also indications of your abilities and interests. But interest and aptitude tests may be useful tools, when combined with other information, to help you decide what area or areas to concentrate on for further study, for training, or for job possibilities.

What are academic aptitude tests?

Academic aptitude tests are used to predict how well you can be expected to do in college. Two such tests are the Scholastic Aptitude Test (SAT) and the American College Testing (ACT) Assessment. You may have heard of these tests before, since many colleges require that you take one of them before you are considered for admission. If you are interested in graduate study, then you may have to take the Graduate Record Examination (GRE), which is another academic aptitude test. Because these three tests are so often required for college
admission, we will look at each one separately.

The Scholastic Aptitude Test (SAT) measures ability in both verbal and mathematical areas. Verbal ability is measured by vocabulary skills, reading comprehension, and analogies. Mathematical ability is measured by arithmetic skills, algebra, and geometry. The cost for taking the test is $9.25, but those who cannot afford the fee are sometimes allowed to take the test at no charge. The SAT is given several times a year at most high schools. If you would like more information, talk to a guidance counselor or write to:

College Board American Testing Program
Box 592
Princeton, New Jersey 08541

The American College Testing (ACT) Assessment includes tests in English, mathematics, social sciences, and natural sciences. It also includes a section on your interests. The cost for taking the test is $8.50, but if you cannot afford the test fee you may be able to get a fee waiver and take the test at no charge. The ACT is given at various high schools and colleges. To find out more about the ACT, see a guidance counselor or write to:

American College Testing
P.O. Box 414
Iowa City, Iowa 52243

The Graduate Record Examination (GRE) is required by many universities and professional schools for students who want to take graduate courses beyond the bachelor’s degree. The GRE Aptitude Test covers verbal, quantitative, and analytic skills.

There is another GRE—the Advanced Test—which is given in twenty different areas, including biology, French, engineering, music, and literature. In this GRE you are tested only in your area of study. Not all schools require that you take an Advanced Test, so check with the schools you are applying to for their requirements.

The GRE Aptitude and Advanced Tests are given a number of times during the year at different locations in the United States and in foreign countries. The fee for each test is $20. If you cannot afford to pay for the tests, you may be able to get a fee waiver. If you would like more information on the GRE, ask a college guidance counselor or write to:

Graduate Record Examinations
Educational Testing Service
Box 955-R
Princeton, New Jersey 08541

Guidance and career counselors may know what tests are required for specific schools. If not, you can contact the schools that you are interested in to find out their requirements.

For most academic aptitude tests, there are practice tests available—either from the organizations that design the test or at major bookstores. A guidance counselor may have some practice questions, or you can write to the organization for a practice version of the test. Bookstores often carry manuals or practice tests that you can purchase on academic aptitude tests, such as the SAT, ACT, or GRE. You may also want to look into courses designed to help you do better on these academic aptitude tests, though these courses are not required before you take the tests.
There are many reasons for continuing your education and many ways to do it. Some people go directly from high school to college, junior college, or vocational school. Others, who didn’t finish high school, study to take the General Educational Development test. Some people whose native language is not English take a course in English as a Second Language (ESL). Many people take courses such as ceramics, music, or swimming just because they enjoy them. Still others take courses in order to get better jobs than the ones they have.

This section describes a wide range of educational opportunities, including vocational schools, colleges and universities, non-credit courses, and other educational programs.

What are vocational schools?

Vocational schools offer training in particular skills. They may also be called trade or technical schools. At vocational schools, courses are taken mainly in your area of specialization. Completing a vocational school program may take from three weeks to three years, depending on the particular program and the school. In some cases, courses that are taken at vocational schools can count toward a degree from a four-year college. Some vocational schools offer these types of programs:

- Acting
- Appliance Repair
- Baking
- Building Maintenance
- Carpentry
- Construction Technology
- Data Processing
- Drafting
- Electronics
- Fashion Design
- Haircutting/Styling
- Heavy Equipment Operation
- Industrial Management
- Legal Secretarial
- Medical/Dental Assisting
Medical Lab Technician
Office Machine Repair
Plumbing
Printing
Real Estate Brokerage

Where can I get more information on vocational schools?

You can ask your librarian or a guidance or career counselor for more information. You can look in the Yellow Pages of the telephone book under 'Schools,' or you can write for the 'Handbook of Trade and Technical Careers and Training.' It is available at no charge at this address:

National Association of Trade and Technical Schools
2021 K Street, N.W.
Washington, D.C. 20006

What are two-year colleges?

Two-year colleges, often called junior or community colleges, are schools where a student can earn an associate's degree after two years of study. They generally offer a variety of courses, from auto mechanics to literature. In many cases these courses can be transferred if you decide to attend a four-year college. The major advantages of community colleges are their low tuition and the fact that students can generally live at home rather than on campus. Community colleges frequently offer courses during the evening and on weekends for the convenience of those who work.

Where can I get more information on two-year colleges?

You can ask a guidance or career counselor or librarian, or you can consult reference books. Two that may be useful are:


These books are probably available at your high school or public library.

What about four-year colleges and universities?

Four-year colleges differ in many ways. Some are large, some are small; some are located in rural areas, some in metropolitan areas; some are supported by public tax money, some are private; some are very expensive, some are much less expensive. The differences among colleges and universities are so great that making a choice of which to attend is seldom easy. However, there are many ways to gather information that will make your choice easier. This section describes some of the resources you can consult to get information about colleges and universities.
What kinds of programs are offered at four-year colleges and universities?

At college a student works toward a bachelor's degree by taking a number of different courses every term. By the junior or senior year these courses are mostly in a major area of study, such as chemistry, English, nursing, or accounting. The courses and majors that a college or university offers are listed in the college or university catalog. The catalog also describes the admission requirements, the cost of attending the college, and other useful information. The college admissions office will send a copy of the college catalog upon request.

Some of the programs offered at colleges and universities are:

- Accounting
- Advertising
- Anthropology
- Architecture
- Astronomy
- Biology
- Botany
- Business Administration
- Chemistry
- Counseling
- Education
- Engineering
- English
- French
- History
- Journalism
- Mathematics
- Nursing
- Nutrition
- Physics
- Physiology
- Political Science
- Public Administration
- Psychology
- Sociology
- Spanish
- Zoology

Where can I get more information on four-year colleges and universities?

You can get more information from a guidance or career counselor, from a teacher, or from your librarian. You can also write directly to the admissions office of a college in which you are interested. Ask for their college catalog and any other information they have for prospective students. Two books that describe hundreds of colleges and universities are:

- Barron's Profiles of American Colleges, Barron's Educational Series, 113 Crossways Park Drive, Woodbury, New York 11797.

What are the admission requirements for two-year colleges, four-year colleges, and universities?

Admission requirements differ from one college to another. Almost all colleges require that your high school send them a copy of your transcript. Most colleges require that you take either the SAT or ACT exam. If you are interested in graduate study, then either the GRE Aptitude or both the Aptitude and an Advanced test may be required. If you are interested in some professions, such as law
or medicine, then another exam is usually required. Some colleges, universities, and professional schools require letters of recommendation from teachers, counselors, or employers. Most also require that you complete an application, and some have an application fee. These fees are usually $25 or less. Some schools waive fees for those who cannot afford to pay. The best way to find out about requirements is to contact the particular school that you are interested in or ask a guidance counselor.

What kinds of non-credit courses are available?

The possibilities are as broad as people's interests. Universities and colleges frequently offer non-credit courses in writing, films, literature, mathematics, basic accounting principles, music appreciation, physics, and many other areas. Some of these courses are taught by members of the regular faculty, others by people who do not usually teach at the university or college. For example, at one university a non-credit broadcasting course is taught by a local TV announcer.

Non-credit courses are also available at places outside of schools. Your local YMCA or community center may offer courses in swimming, typing, dancing, auto mechanics, and a variety of other subjects. Some stores offer courses in connection with the products they sell. A kitchen utensil shop, for example, might offer cooking courses. Hospitals may offer courses in nutrition, churches in theology, women's groups in self-defense. Some non-credit courses are free, others have a fee, though these are usually not very high.

How can I find out more about non-credit courses?

Non-credit courses are often advertised in local newspapers. You can also call community centers or youth centers to find out what courses they offer. You can ask about adult courses, extension courses, or non-credit courses at colleges and universities. If you are employed you can ask your supervisor or someone in the Personnel Department about any educational opportunities available with your company.

What kinds of courses might be available with my company?

Job-related courses and job-training programs are offered by some companies. Job-related courses or seminars may help you improve your skills in the job you hold or get a better job. Job-training programs are specifically designed to teach employees new jobs, either when they are first hired or at the time of a promotion. Some companies also offer General Educational Development courses for their employees who did not finish high school. These opportunities may be offered by the company itself or by others. Courses offered by companies for their employees are usually free of charge. Courses offered by others are often paid for by the company when approved.
What is a General Educational Development course?

A General Education Development (GED) course prepares people to take the GED exam. The main reason for the GED exam is to give people who did not finish high school a chance to show that they can do work comparable to that of high school graduates. Many things about the GED test, including minimum score requirements and costs for taking the test, differ by state.

Although it is not necessary to take a GED course before taking the GED exam, many people prepare themselves in this way. Local community colleges, community centers such as the YMCA, and high schools are some of the places that may offer a GED course.

Before you take the GED exam, you may want to take the GED Official Practice Test, which is half as long as the regular GED test. Both the regular test and the practice version cover the subjects of writing skills, social studies, science, reading skills, and mathematics. The questions on the practice version are not the same as those on the regular GED test, but they are similar enough that you will know what to expect when you take the real test. There are two forms of the practice test. Sometimes people take one form before taking the GED course and then take the other form afterward to see if they are ready to take the regular test. You can write to the address below to order either Form A or Form B, or both. The cost for each copy is $1.75. With the practice test, you also receive a summary sheet with the correct answers, the minimum score requirements for each state, and other information. The address to write to is:

GED Testing Service
American Council on Education
1 Dupont Circle
Washington, D.C. 20036

You can also write or call your State Department of Education for more details about the GED test and GED courses. They may know where courses are offered in your area, the cost to take the test, and other information.

What is the English as a Second Language (ESL) course?

English as a Second Language (ESL) is a course open to anyone whose native language is not English and who would like to know the language better. These courses are usually free of charge. For further information about ESL courses check with your local high school, community center, community college, church, or place of employment.

How can I get help in paying for my education?

There are a number of programs that may help you pay for your education. Some of these programs are:

Grants and Scholarships. These are awards based on academic or athletic ability or financial need. Grants and scholarships are like gifts and do not have to be paid back. Grants and scholarships may be given by a school or college, or by the federal, state, or local government. They may also be
given by some public or private foundation, by a corporation, by a civic organization, or by other interested persons or groups.

Two grants administered by the federal government are the Basic Educational Opportunity Grant program (BEOG) and the Supplemental Educational Opportunity Grant (SEOG). Both of these grants are based on the student’s financial need. They range from $150 to $1800 a year.

Loans. Loans are different from grants because loans have to be repaid within a certain time period, and interest payments must be added to the amount of money borrowed. The amount of the loan that can be taken and the amount of interest that must be paid differ depending on the particular loan.

One loan program, administered by the federal government, is the National Direct Student Loan Program (NDSL). The interest on this type of loan is very low, 3%, and payments and interest charges start only after the student leaves school.

Another program is the Guaranteed Student Loan Program (GSL), which is offered by banks, savings and loan associations, and credit unions. The interest on this loan is 7%. The federal government pays the interest while the student is in school.

With both the NDSL and the GSL, the student is required to start paying back the loan and take over paying the interest as soon as he or she is no longer going to school.

There are other loan programs administered by schools, by state and local governments, and by other agencies.

Work-Study Programs. Work-study programs are administered by individual schools and sponsored by the federal government. The schools try to find students jobs that they can do while in school, and, whenever possible, they place students in jobs related to their academic interests. The students’ salaries are paid in part by their employers and in part by the federal government.

Employers. Some companies have scholarship programs for their employees or their employees’ children. You can inquire about these programs at the Personnel Department where you work or where your parents work.

Many employers also have tuition-reimbursement programs for their employees. Through these programs, companies pay for all or some of the costs of taking courses at colleges, universities, vocational schools, and other places where courses are offered. Some companies reimburse employees only for educational costs that are directly related to the jobs they hold, others pay for courses in any area. These programs are generally administered by Personnel Departments.
How do I apply for these programs? Where can I get more information?

Different programs are administered in different ways. A career or guidance counselor may be able to tell you about the many financial aid programs that are available and to discuss which program would be best for you. A counselor may also know of financial aid opportunities available for your particular career interest. You can also approach individual schools and companies about the financial aid programs they administer. For almost all of these programs you will have to fill out some kind of application which asks about the financial background of you and your family.

If you would like more information on financial aid programs, contact the financial aid department of the school of your choice or your State Department of Education. You may also write to the following address:

Bureau of Student Financial Assistance
P.O. Box 84
Washington, D.C. 20044
CAREERS

Career possibilities are everywhere, many people aren’t aware of the variety.

There are thousands of career possibilities, and each career offers a whole range of opportunities.

For example, let’s look at the field of law. Many people think only of lawyers when they think of careers in law, but in fact there are many more possibilities. There are legal secretaries, court reporters, legal assistants, and judges, all working in the field of law. There are also many careers in one aspect of law—law enforcement: police officers, parole officers, and private detectives, to name a few. Within each of these career possibilities there are many variations. A lawyer for example, might either set up his or her own office or go to work for an already-established law firm. A law officer might choose to work in an urban area or to run for office as sheriff.

Another approach is to look at the jobs involved in the work of a particular organization. For example, the National Opinion Research Center, NORC, brings together people in many careers to do the work of social science research. There are those who design the studies, deciding which issues should be examined. There are people who write the questionnaires used to interview NORC’s respondents. Interviewers talk to respondents to get the important information required by each study. And that is only the beginning. There are also secretaries, accounting clerks, personnel specialists, printers, word processors, librarians, receptionists, business managers, keypunch operators, computer programmers, maintenance personnel, and more.

As you can see, there are many more possibilities out there than some people consider when they think about making their own choices.
What are some career opportunities?

- Account adjuster
- Aircraft mechanic
- Architect
- Bailiff
- Baker
- Bank cashier
- Biologist
- Bricklayer
- Bus driver
- Cabinetmaker
- Camera operator
- Cardiologist
- Cartographer
- Chemist
- Child care aide
- Computer programmer
- Customs agent
- Dental hygienist
- Drafting clerk
- Editor
- Employment counselor
- Farmer
- Film technician
- Government clerk
- Graphics designer
- Health technician
- Home economist
- Inspector
- Judge
- Keypunch operator
- Laboratory supervisor
- Legal clerk
- Lithographer
- Machinist
- Mail carrier
- Management analyst
- Nurse's aide
- Nutritionist
- Occupational therapist
- Orthodontist
- Painter
- Patrol officer
- Quality control clerk
- Radiologist
- Realtor
- Secretary
- Soil chemist
- Steel handler
- Surveyor
- Tailor
- Therapist
- Tool and die maker
- Vocational counselor
- Warehouse clerk
- Woodworker
- X-Ray developer
- Youth program director
- Zookeeper

Where can I get more information on careers?

You can talk to a career or guidance counselor at your high school or college, a state employment counselor, or a private employment counselor. Your librarian may be able to direct you to books or reference materials on careers. One very useful book is the Occupational Outlook Handbook. This handbook, published by the federal government, includes information on many jobs. For each type of job there is information on the kind of work involved, employment opportunities, educational requirements, salary, opportunity for advancement, working conditions, future demand, and places to write to get more information.
RESOURCES

People and places can help you learn more about testing, education, careers, and job hunting.

Making career choices and finding a job can be very challenging. Your interests, abilities, education, and the kinds of jobs that are available all play a part. Some of you may be looking for a part-time job while you are in school, others may be looking for your first job in your chosen career, and still others may already be working but interested in a new job or career.

Whatever your goal, there are many people and places along the way that can help you in your career search. Some of these resources are:

Guidance and Career Counselors. These specialists can help you in many ways. They can tell you more about aptitude and interest tests. They can give you information about school choices and financial aid. They may know what the future demand will be for persons in various jobs. A guidance or career counselor might also be able to direct you to career and job opportunities in your area.

Friends and Relatives. The people you know may be great resources in the same ways that guidance and career counselors are. They may know of schools or financial aid opportunities. They may also know about job openings, either where they work or with people they know or work with. If you think about the people you know, you may find that they represent many jobs and careers. You can ask them about their own work, or if they know any places to go or people to talk to about careers and jobs.

Professional Organizations. A professional organization is just what the name implies—a group of individuals in the same occupational area. Professional organizations are probably in the best position to know what is going on in their fields. They know about schools that offer courses in their fields and they sometimes offer courses themselves. They often know about future needs in their fields and about immediate job openings.
One such organization is the American Institute of Architects. They can tell you which schools provide programs in architecture and the future need for architects. They also have information on organizations that give financial aid to people who want to study architecture.

Another professional organization is the American Nurses' Association. The services they provide are similar to those of other professional organizations. They have information on careers in nursing, loans, scholarships, job opportunities, and other items of interest for those who are thinking of going into nursing.

If you want to know if there is a professional organization for the field that you are interested in, one way of finding out is by looking at the Occupational Outlook Handbook. At the end of each career section, there are places listed where you can write for more information, often including professional organizations. The Occupational Outlook Handbook should be available from your librarian.

Unions. Workers in particular kinds of jobs are often organized into unions. These organizations are often good sources of information about jobs in their fields. For many jobs, they also provide training through apprenticeship programs.

To find the names of unions representing workers in fields you are interested in, you can look in the Directory of National Unions and Employee Associations. This is a government publication and should be available from your librarian.

Government Job Opportunities. Federal, state, and local governments have many job opportunities in almost every field. They also have information on careers, including the skills involved, the future need for employees, and salary ranges. If you would like information on a specific career, you can write to:

Superintendent of Documents
U.S. Government Printing Office
Washington, D.C. 20402

For information on federal jobs, you can call the Federal Job Information Center in your area. The Federal Job Information Center is listed in the white pages of the telephone book under "United States Government." If you contact the federal government about jobs, you can ask about openings in your particular field of interest. You can also ask about the requirements for various jobs, which may include taking a test. If a test is required, the Job Information Center can give you dates, times, and places where the test is offered. These kinds of tests measure how much you know about a particular field. They are like attitude tests, because they attempt to measure how well you can be expected to do in a particular job. Like the tests we talked about in the section on testing, there are practice tests and manuals available at most bookstores to help prepare you for these tests.

If you would like more information about jobs with the federal government, you can write to this address:

Office of Personnel Management
1900 E Street, N.W.
Washington, D.C. 20415
If you would like more information on state and local government jobs, you can look in the white pages of the telephone book under the state, county, or city name, then call either the Employment or Personnel Department. Sometimes when you call these departments, including the Federal Job Information Center, you will hear a tape-recorded message on the jobs that are available. They will usually tell you what to do if you are interested in any of these jobs.

Another opportunity for employment with the federal government is the Armed Services. There are a variety of enlistment options including active duty and the Reserves.

The active duty requirements vary from branch to branch. For example, the minimum Army enlistment is for two years active duty.

The Reserve program is an enlistment option provided by some branches of the Armed Services. The distinctive feature of the Reserves is that an enlistee continues to live at home and receives pay for attending weeknight meetings, weekend activities, and summer vacation training camps. Reserves are called to active duty only in the event of a national emergency.

The Reserve Officer Training Corps (ROTC) is another program in the Reserves. Participants attend a regular four-year college program and, in addition, take certain military-related courses. While in college, people in the ROTC program receive financial assistance. The amount of this assistance varies among the branches of the Armed Services. In exchange for this financial support, one makes a commitment to serve for a certain period of time as an officer in the chosen branch of service.

Further information about enlistment options can be obtained from recruiters for the branches of the Services.

Among other benefits, there are two general types of educational opportunities through the Armed Services: those available while on active duty and those available after the completion of active duty.

While on active duty, members of the Armed Services may take part in programs offered on the military bases where they are stationed. These include courses for the GED test or for a high school diploma, college and graduate-level courses, and vocational training. Members may also use their off-duty time in courses offered at non-military schools in the areas where they are stationed. The Armed Services will pay a percentage of such tuition costs. This percentage varies among the branches of the Services.
For those who complete their active duty requirement, the U.S. government also provides a matching funds educational program. For every dollar you set aside for education during your period of enlistment, the government will provide two additional dollars toward the cost of that education.

The Armed Services, in addition to these educational programs, provide on-the-job training to all enlistees in connection with their regular job assignments in the Services. Job assignments are determined by tests taken at the time of entering the service, the individual's interests, and the needs of the particular branch of the service. A wide variety of assignments means that intensive job training is provided in areas as diverse as computers and cooking.

If you would like more information about any aspect of the Armed Services, career counselors or military recruiters will be able to help you. You can find the telephone numbers of the Service branches in the white pages of the telephone book under "U.S. Government—Armed Services." The minimum age requirement for all branches of the Services is 17.

State Employment Agencies. State employment agencies provide services both for the person who is looking for a job and for the employer who wants to hire someone. These agencies have listings of jobs that are available in your state. Some agencies also provide counseling to those who aren't sure of their abilities and interests, and some administer vocational aptitude and interest tests. All of the services provided are free of charge.

Private Employment Agencies. Private employment agencies have listings of available jobs. They are different from state employment agencies because they do not usually provide job counseling and they sometimes charge a fee. However, private agencies usually do try to match up abilities with job openings. Some agencies work with all fields, but some only work in one field, for example, engineering, accounting, or secretarial. There are also some agencies that work only with people who want a job for a short time, or people who want to work part-time.

Private employment agencies charge a fee for their services. Sometimes this fee is paid by the employer and sometimes it is paid by the employee. Generally, if the employee is required to pay the fee, a contract is signed by the employee agreeing to this. If you're thinking of using this method to try to find a job, it's a good idea to be careful about signing anything that could commit you to paying a fee.

If you would like to know more about private employment agencies, you can find a listing of names and numbers in the Yellow Pages of the telephone book under "Employment Agencies." You can also write for a list of accredited agencies from the National Employment Association. "Accredited" means that an agency has met certain standards set by their national association. The address is:

National Employment Association
2000 K Street, N.W., Suite 353
Washington, D.C. 20006
Yellow Pages of the Telephone Book. In addition to the ways already discussed, the Yellow Pages can be used to call employers directly. To do this, look up the field that interests you and call the employers listed. When you call, you might ask to speak to the head of the department where you would like to work. You can use this approach either to find out more about a particular field or to try to get a job.

As an example, to learn more about repairing typewriters, you might look under "Typewriters" in the Yellow Pages. Then you could call the places listed and ask to talk to the manager. You could tell him or her that you would like to come in to learn more about typewriter repair. You could say that you are thinking of going into this field. Then you could make an appointment. By going in to talk to the manager or someone else in the shop, you would get a direct look at the work one does in typewriter repair. Many people get jobs by going in and talking to an employer and showing interest in that field.

Newspaper Want-Ads. Newspapers can be helpful in a number of ways. They may have a section on career advice, as well as listings of job openings in the want-ads section, often called "The Classifieds." Job openings are usually listed alphabetically by job title. Newspaper ads generally explain how to apply for the jobs listed. The ad will ask you either to telephone or write to the company.

If you telephone, you will probably be asked some questions about your education and work experience. If the company thinks that you may fill its needs, you may be asked to come in for an interview.

If the ad says that you should respond in writing, send the employer a letter that explains clearly how you fit the job description. For example, if the ad says that you need certain qualifications for the position, include a description of the related skills that you have. If the employer feels that you will be a suitable candidate for the job, you may be asked to come in for an interview.

Libraries. Libraries can provide a wealth of information on careers, schools, and jobs. Most libraries have many types of reference materials on each of these areas. Libraries usually have course catalogs and bulletins for vocational schools and colleges. They also have directories for jobs in different areas of the country. These directories include the company name and address, the type and size of the company, and the names and titles of key executives in the company. There are national, state, and regional directories, and directories for particular fields, such as chemistry, rubber, appliances, retail sales, and banking.
In this booklet, we have included some general information on careers, schools, and jobs. We hope it will be useful to you, and we wish you success in your education and career.
ATTACHMENT 106 ADDENDUM

There were 13 new variables added to the NLSY record type PROFILES for the 1979-1990 release. These include: (1) ten subtest standard scores, R(6180.10) to R(6180.19), one for each of the 10 subtests raw scores; (2) a standard score for a composite variable called Verbal, R(6181.1); (3) and two Armed Forces Qualification Test (AFQT) percentile scores, R(6182.) and R(6183.). PROFILES variables available prior to the 1979-1990 release include subtest raw scores (i.e. the number of correct answers), scale scores, and standard errors.

All 12,686 NLSY respondents were eligible to participate in the PROFILES study; 11,914 respondents completed the tests. The standard scores and percentile scores are computed for all valid raw subtest scores, except for thirty-six respondents who were deemed to have taken the test under altered test conditions (code 67 on R(6148.)). Those respondents with altered test procedures have been assigned a 3 value on the standard scores and percentile scores. It should be noted that the standard scores and percentile scores are based on those respondents born prior to 1963 on R(5.) and who do not have altered test procedures.

Note: Tables A through E referenced within the text of this addendum appear at the end of this attachment.

PROFILES Subtest Standard Scores

10 Subtest Standard Scores - R(6180.10) to R(6180.19)

Each of the ten PROFILES subtest raw scores were converted (recoded) to subtest standard scores by using the figures in Tables C and D.

Verbal (VE) Composite Standard Score - R(6181.1)

The Verbal (VE) composite was computed by first summing the raw scores for Word Knowledge and Paragraph Comprehension (WK + PC = VE) and then converting to a standard score by using the figures in Table D.

The administration of the PROFILES tests involved the use of answer sheets that differed from the answer sheets used by the Department of Defense (DoD) in the administration of the Armed Services Vocational Aptitude Battery (ASVAB). The inconsistency has resulted in the need to make small adjustments to the PROFILES speeded subtests of Numerical Operations (NO) and Coding Speed (CS). The corrections estimate the raw score a respondent would have obtained if the military answer sheet had been used.

The figures in Table A provide the crosswalk used to make the needed adjustments to the PROFILES Numerical Operations and Coding Speed raw scores. The PROFILES raw scores (unadjusted) for Numerical Operations and Coding Speed, R(6154.) and R(6155.) respectively, were adjusted using the figures in Table A. These adjusted
raw scores were then used in the conversion to standard scores for Numerical Operations and Coding Speed, R(6180.14) and R(6180.15) respectively. The other tests were not affected by the answer sheet differences.

The standard scores are linear transformations of raw scores and, when weighted by R(6147.) for those respondents born prior to 1963 with unaltered test procedures, exhibit a mean of 50 and a standard deviation of 10, approximately.

**PROFILES Armed Forces Qualification Test (AFQT)**

**AFQT Definition Through 1988 - R(6182.)**

Two Armed Forces Qualification Test (AFQT) percentile scores were added to the Main NLSY data file for the 1979-1990 release. The formula to compute R(6182.) was used by the DoD through 1988 (some NLSY documents will refer to this variable as AFQT80). It was computed as follows:

1. Adjust the Numerical Operations (NO) raw score for the answer sheet differences using the figures in Table A.

2. Compute an AFQT80 "raw" score as the sum of Word Knowledge (WK), Paragraph Comprehension (PC), Arithmetic Reasoning (AR), and one-half of the Numerical Operations (NO) raw scores.

\[ WK + PC + AR + (0.5(NO)) = AFQT80 \text{ raw score} \]

3. Convert the AFQT80 raw score to a percentile score using the figures in Table B.

**AFQT Definition Since January, 1989 - R(6183.)**

The formula to compute R(6183.) has been used operationally since January, 1989 (some NLSY documents will refer to this variable as AFQT89). It was computed as follows:

1. Convert the raw scores for Arithmetic Reasoning (AR), Math Knowledge (MK), and Verbal (VE) composite to standard scores using the figures in Tables C and D.

2. Compute a sum of standard scores by adding the standard scores for AR and MK and two times the VE.
3. Convert the AFQT89 standard score to a percentile score using the figures in Table E.

The AFQT80 and AFQT89 percentile scores, when weighted by R(6147) for those respondents born prior to 1963 with unaltered test procedures, exhibit a mean of 50 and a standard deviation of 29, approximately.
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**NOTE:** NOT APPLICABLE FOR ASVAB FORMS 15/16/17 (EXCEPT FORM 15c)

**SOURCE:** Department of Defense (Oct. 90).

*Conversion Tables: Armed Services Vocational Aptitude Battery (ASVAB)*

*Forms 8-19. (D.D. 1304.12W)*
# TABLE C

CONVERSION OF RAW TEST SCORES TO 1980 STANDARD SCORE EQUIVALENTS

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*Conversion Tables: Armed Services
Vocational Aptitude Battery (ASVAB)
Forms 8-19 (D D 1304.12W1)*
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**SOURCE:** Department of Defense (Oct. 90).

*Conversion Tables: Armed Services Vocational Aptitude Battery (ASVAB)*

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Conversion Tables: Armed Services  
Vocational Aptitude Battery (ASVAB)  
References


