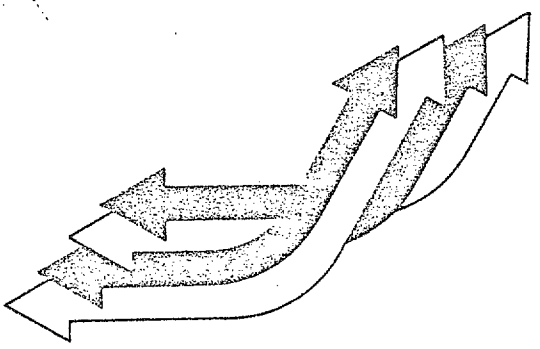
Contractor Report

High School Vocational Training



Center for Education Statistics

OERI

Office of Educational
Research and Improvement
U.S. Department of Education

High-School Vocational Training

The National Center for Research in Vocational Education
The Ohio State University Research Foundation
Columbus, Ohio

Paul B. Campbell

Andrew Kolstad
Project Officer
Center for Education Statistics

Prepared for the Center for Education Statistics under contract OE-300-84-0196 with the U.S. Department of Education. Contractors undertaking such projects are encouraged to express freely their professional judgment. This report, therefore, does not necessarily represent positions or policies of the Government, and no official endorsement should be inferred. This report is released as received from the contractor.

February 1987

CS 87-322c

PREFACE

This report, High School Vocational Training, was a joint effort of the National Center for Research in Vocational Education of Ohio State University and the Center for Education Statistics of the U.S. Department of Education. As is the case with many ambitious projects, the resources were depleted before all of the tasks were completed. Hence, this report and the analyses contained in it, are not as extensive as many would like.

The High School and Beyond data, on which this report is based, are publicly available. The Center for Education Statistics hopes additional analyses will expand the beginning this report represents.

David A. Sweet
Director
Education Outcomes Division

C. Dennis Carroll
Chief
Longitudinal Studies Branch

TABLE OF CONTENTS

NOTE ON SIGNIFICANCE TESTING

High School and Beyond samples, while representative and statistically accurate, are not simple random samples. Students were selected within schools grouped within strata. Sampling rates for schools within different strata varied, resulting in better data for policy purposes, but at a cost of statistical efficiency. Hence, simple random sample techniques for estimation of standard errors and significance test parameters are frequently underestimates. To overcome this problem, the standard errors for estimates in this report used a conservative and simple approach.

For percentages, the standard errors were first calculated by simple random sample techniques,

$$S.E. = SQRT\left(\frac{p*(100-p)}{n}\right).$$

For other, or continuous, variables' standard errors,

$$S.E. = SQRT\left(\frac{STD**2}{n}\right).$$

Second, the simple random sample estimates of standard errors were adjusted by multiplying by a design effect. The design effect multipliers have been previously estimated to be between 1.6 and 2.0 for High School and Beyond data.

Simple significance testing was conducted using Student's t. These t's were estimated for a difference, x-y, to be

$$\frac{x-y}{SQRT(S.E.(x)**2 + S.E.(y)**2)}.$$

To determine the confidence in the t estimate, the values were compared with 1.65, 1.96, and 2.58 for confidence levels of 90 percent, 95 percent, and 99 percent, respectively.

In a few cases, significance testing was conducted by comparison of confidence intervals about the estimates.

For further information, consult the subsection of Chapter 1, entitled "Method of comparing percentages" and the subsection of Chapter 2, entitled "Wages, hours worked, and weekly earnings."

TABLES

CHAPTER 1

IMPACTS OF VOCATIONAL EDUCATION

The Research Design

The Problem

The economic outcomes of vocational education have been a subject of considerable study in the recent past. Although the association seems obvious, there are many problems that interfere with a straightforward analysis of the relationships. The stated overall objective of this study is to assess the short-term economic advantages that accrue to young people as a result of their vocational training. The fact that such an analysis is desirable, even though many studies have been completed, serves to demonstrate the problems and difficulties that have been encountered in these studies of economic effects.

There are four sources of difficulty that complicate our understanding of the expected and intended relationships that are the subject of this study. First among them are the complex influences that may operate upon the expected economic outcomes to shroud, counteract, or possibly augment them. Second is the difficulty of securing adequate measures of these forces or influences. Third, there is the problem of selecting appropriate analytic techniques that are sensitive enough to pick up the possible effects and sophisticated enough to avoid the many pitfalls that may lead to erroneous conclusions. Finally, there is as yet insufficient data about what actually goes on in vocational education to permit an adequate comparison between a vocationally educated and a vocationally uneducated young person.

The first source of difficulty in understanding the economic consequences, that of the complexity of influences, is also the most likely arena for policy alternatives. One representation of the network of potential influences on short-term economic out-comes is shown in Figure 1. Many, but not all, of the variables that represent the sources of influence suggested by this figure are available in the High School and Beyond (HS&B) database.

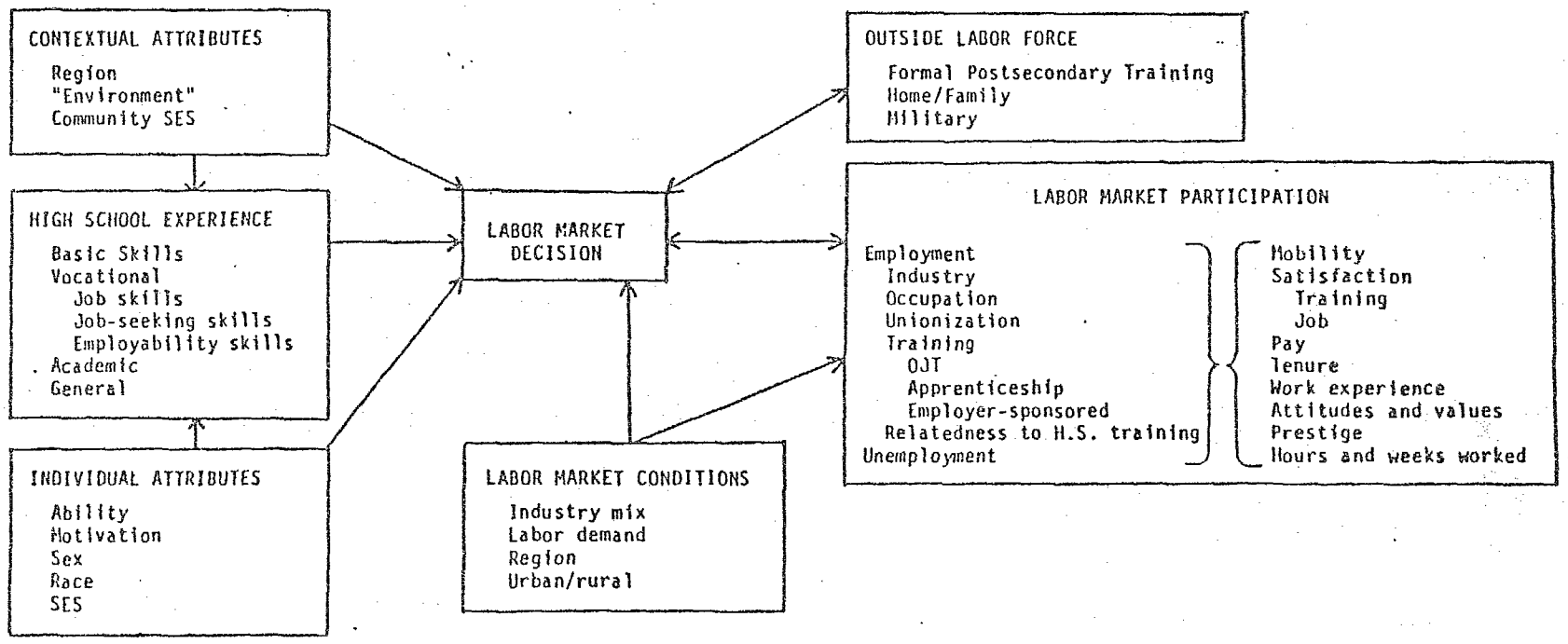
Recent efforts to measure these effects by applying rigorous statistical analysis to national survey data have found at least three results that seem to be consistent across the studies and to be puzzling to researchers and policy makers.

- First, the evidence is mixed as to whether male vocationally educated high school graduates (especially white males) earn significantly more per hour or per week than otherwise similar nonvocational graduates.

- Second, the effect of secondary vocational education on the hourly or weekly earnings of women in commercial or office specialties is more consistently and significantly positive than for men.

FIGURE 1

VARIABLES INFLUENCING LABOR MARKET BEHAVIOR



SOURCE: Campbell, et al. Employment Experiences of Students with Varying Participation in Secondary Vocational Education. Columbus: The National Center for Research in Vocational Education, The Ohio State University, 1981.

- Third, as the period to which the earnings measure applies becomes longer (hours, weeks, or years), any apparent advantages associated with secondary vocational training become greater for men and women.

Three categories of elements are presented in the diagram (Figure 1). They are influences, experiences, and decision points. Although there is not an inviolate temporal or causal ordering in the process, a reasonable place to begin consideration of the network is at the point of high school experience. It is at this point that two sets of influences come to focus that may alter the vocational education experience sufficiently to be transmitted to the labor market decision point, and thence directly or through further training, to the labor market.

The high school experience itself includes both training and informal learning in academic skills, basic skills, and vocational skills. The nature of the high school experience is influenced by two primary sources: the attributes that the individual brings to the experience and the contextual attributes of the school itself. These two sources of influence also impinge directly and independently upon the labor market decision point, thereby contributing to decision variability regardless of the quality of the high school experience.

Among the individual attributes that are expected to influence the high school and labor market experiences are ability, motivation, gender, race, and individual and family socioeconomic status (SES). Some of these attributes are judged to be potentially modifiable by experience, others are not. The contextual variables include region of the country, community socioeconomic status, and other local environmental conditions. Because only the local environmental conditions may be amenable to alteration, they become of primary interest. Geographic region and community SES may help explain high school and labor market experience but cannot be reasonably or practically manipulated to change either. Identification and measurement of the local conditions, such as community attitude toward the work ethic and individual responsibility are, however, extremely difficult and complex. Consequently, in most analyses a substantial proportion of these attributes remain unexplained in the residuals.

The central axis in the vocational education/career network is the labor market decision point. In addition to being influenced by individual attributes and other contextual attributes, the characteristics of the labor market itself may also exert a major influence upon the decision. Likewise the requirements or availability of postsecondary education, home and family activities, military training, and other nonlabor market activities will influence the decision. When the decision to enter the labor market is made, the two possible results are employment and unemployment. Which of these two alternatives occurs is also heavily influenced by the high school experience, the effects of individual and contextual attributes through this experience, and the effects of these latter two attributes directly.

The labor market conditions that influence the decision also influence directly the employment/unemployment results of the decision. If the result is continued unemployment, initial decisions are likely to be periodically reevaluated, with possible nonlabor market outcomes. If, on the other hand, employment results, there are characteristics of employment

that may be influenced by the high school vocational education experience--characteristics that must be accounted for before there can be an adequate explanation of the relationships. These characteristics themselves tend to be interdependent and overlapping. Assessing them is therefore difficult. Nevertheless they cannot be ignored. They include the nature of the industry, the nature of the occupation, the presence of unionization, the availability of training, and the relatedness of the employment to the high school training experience. Finally, there are a series of attributes of the job or career that may be influenced by secondary vocational education, but may only be evaluated through employment. These include mobility, satisfaction with training and job, pay, tenure, work experience, attitudes and values, prestige, and time worked.

Evidence from Previous Studies

The three findings cited earlier regarding the labor market effects of vocational education explain the continuing concern about the indirect routes of effects.

First, the evidence is mixed as to whether male vocationally educated high school graduates (especially white males) earn significantly more per hour or per week than otherwise similar non-vocational graduates.<1> Grasso and Shea (1979) report this result in an analysis of data from the National Longitudinal Survey of Labor Market Experience (NLS-LME) data. Black male vocational graduates even appear likely in those data to earn less than other black males, though the difference is not statistically significant. Similar results using the same data were reported by Gustman and Steinmeier (1981) and Mertens and Gardner (1981). Meyer's (1981) analysis of data from the National Longitudinal Study of the High School Class of 1972 (NLS-72) survey found only small earnings effects for vocational education for men. They are statistically significant only for specialists in the trade and industry area, and for them, only in one year (1973) during the period of estimation (1973 - 1979). Gustman and Steinmeier and Mertens and Gardner found similar effects in their analyses of those same data. For hourly earnings Mertens and Gardner reported disadvantages for male business specialists, advantages for marketing (distributive education) specialists, and mixed results for trade and industry specialists. Reanalyses of NLS-72 data by Woods and Haney usually showed white male vocational graduates earning less than comparable general curriculum graduates, though the estimates were seldom significant. They did report a more consistently significant positive pattern of effects for black men who specialize in trade and industry. In a study using an especially designed survey of younger adult workers, Mertens and Gardner found earnings advantages that were statistically significant only for a small group of specialists in marketing (distributive education).

In studies of another major database, the National Longitudinal Survey of Labor Market Experience--New Youth (NLS Youth) neither Rumberger and Daymont (1982) nor Campbell et al. (1981) could find convincing evidence of consistent and significant positive earnings effects among men with twelve or fewer years of education. Rumberger and Daymont found that additional vocational credits were associated with higher hourly earnings if the credit was earned in a program that had provided skills that were being used on the respondent's job. Additional credits in vocational courses

that were not related to the job reduced hourly earnings. However, whether the vocational coursework was expressed as total credits or as a proportion of total courses taken, the estimated effects of job-related courses were not significantly different from zero. Campbell et al. found that a pattern of greater concentration in vocational education was associated with slightly (not statistically significant) lower earnings per week for men.

Second, the effect of secondary vocational education on the hourly or weekly earnings of women in commercial or office specialties is more consistently and significantly positive than for men. Grasso and Shea found statistically significant, positive earnings effects for women who had training in commercial or business/office courses. In the NLS-72 and NLS-LME data sets, Meyer, Gustman and Steinmeier, and Mertens and Gardner similarly found significantly higher earnings (hourly and weekly) for women who took vocational courses in the business/office area. Reanalyses by Woods and Haney of NLS-72 data show strongly positive effects for white women, somewhat less significant (but always positive) for black women. Campbell et al. found strongly significant earnings advantages for women (especially minority women), and Rumberger and Daymont reported similar findings for the NLS Youth. The only apparent sources of disadvantage in earnings for women were so unimportant as to barely merit mentioning: specialization in home economics<2> (found in Meyer's study) or vocational courses not used on the current job (in Rumberger and Daymont).

Third, the longer the period to which the earnings measure applies, the greater are any apparent advantages associated with secondary vocational training either for men or women. Although advantages in weekly or hourly earnings for male vocational graduates are very difficult to detect, both Conroy (1979) and Li (1981) reported advantages in annual labor income for men. Gustman and Steinmeier also found a statistically significant advantage in male annual labor income, but only for specialists in the trade and industry area. Meyer found that any advantages for women in hourly earnings were magnified in weekly earnings and annual labor income by the longer hours per week and the more weeks per year that women vocational graduates worked. Rumberger and Daymont did not estimate equations for weekly or annual earnings. Their findings, however, of significantly longer hours worked (for both men and women) and (usually)<3> fewer weeks per year unemployed suggest that they would have found results for weekly and annual earnings in the same direction as those of Meyer and Gustman and Steinmeier.

The model presented earlier suggests that the failure to find consistent effects for men on short-term measures of earnings, the differences in apparent effects for men and women, and the sensitivity of estimated effects to the time unit of measurement may all be explained in large part by an improved understanding of the factors that mediate the effect of vocational education on labor market outcomes.

Economic theory suggests that employees' earnings should be closely related to their individual net (marginal) productivities. Vocational education may increase net productivity if it aids students in acquiring occupation-specific (but usually not firm-specific) skills; in acquiring basic, communication, and leadership skills and good work habits; in improving learning capacity, and in reducing subsequent training costs. If vocational education imparts these skills better than a general curriculum, and if employers perceive that difference, employment prospects and initial pay levels should be better for vocationally educated youth than for youth

who are otherwise alike but who followed a general curriculum. To the extent that learning capacity is fostered or training costs are reduced, earnings growth on the job should also be higher.

Educational courses can perform a credentialing or signaling function that enables employers either to pay different earnings for entry-level jobs or to identify better risks among job applicants. The signaling function may reduce the employer's risk and cost in obtaining this information and allow the firm to hire more readily, or to pay higher wages to, new vocationally-trained employees who are better risks. The validation of the employer's expectations occurs as the employee acquires tenure with the firm and as the employer evaluates the worker's current and potential productivity. Hence, earnings can rise with tenure either because productivity grows as new skills (firm specific and/or job specific) are acquired or because the employer's perceived risk regarding the employee's productivity is reduced.<4>

The shape of the entire life cycle earnings profile depends on the intermediating influences that one expects to operate here, and those influences are conditioned by the way in which vocational education affects productivity. Any earnings differential between students from different curricula that exists at some point in the life cycle can change over time as high school training becomes more distant and direct job experience becomes more important in determining current productivity. As Gustman and Steinmeier (1981) pointed out, if vocational education directly replaces early on-the-job training and if (as in most career progressions) there are limits to the proficiency that can be attained, one would expect former vocational students to have an early earnings advantage over former general curriculum students in the same occupation, an advantage that narrows with time and eventually disappears.

Meyer (1981) pointed out that a different pattern of life cycle variation would accompany a different mechanism for transmitting the effects of vocational education. Vocational and general students might systematically find employment in different types of jobs with different earnings profiles. In this scenario vocational students tend to work in jobs that have both high initial earnings and flat earnings profiles, whereas general students tend to find jobs with steeper earnings profiles but lower initial earnings. In this case the former vocational graduates would start out with an earnings advantage over general students that would eventually disappear. This case differs from Gustman and Steinmeier because the initial advantage may eventually be reversed.

Meyer's scenario implies that general students obtain jobs that provide more on-the-job training than do the jobs that vocational graduates obtain. Normal career progression involves acquiring new skills, improving old ones, and demonstrating competence, all of which improve the individual's earning capacity within a firm. This permits the firm to increase pay with tenure. Second, if the improved capacity is not reflected in advancement within a firm, employees are likely to find another firm that will compensate them more appropriately. The improved earning capacity need not always be reflected in higher earnings, for the employee may use it instead to "buy" improvements in hours, prestige, working conditions, and/or job duties. However, it will be reflected in a more satisfactory overall employment situation, and it should be reflected in greater job satisfaction<5> for the employee.

Vocational education may further affect earnings and employment by influencing the efficiency of a person's job search and application process. It can help students to assess their own abilities and interests better, thereby narrowing the focus of the job search. Students may also learn where and how to find job openings, or they may even be directed by teachers or counselors toward specific job vacancies. These factors can contribute to a more efficient job search, thereby reducing the expected duration of a spell of unemployment and helping students find better-paying jobs.

Workers are concerned about job characteristics and outcomes such as pay, prestige, security, hours, working conditions, regularity of employment, advancement opportunities, and the appeal of the work, to list only a few. In two ways vocational education may guide the student toward jobs that have particular sets of characteristics.

First, vocational education tends to confer skills that are appropriate to particular occupations. Second, participation in vocational education is likely to reflect the interests of a student in particular kinds of work, either because the student takes courses that develop preexisting interests or because the courses create new interests. Rumberger and Daymont (1982) provide some evidence suggesting that this may be the case. Since job characteristics vary systematically across occupations, one would expect the distribution of the characteristics of jobs held by vocational and general students to vary systematically if vocational education influences the types of jobs that people have.

Institutional constraints and the structure of labor market scan limit the applicability of the traditional assumption that individual employees are paid according to their own productivity as determined in competitive markets. As those constraints limit the usefulness of earnings as a criterion of training effectiveness, however, they create possibilities for trade-offs among various criteria. Existence of internal labor markets and of limited ports of entry or exit, long-term contracts, the idiosyncrasies of firms, the bureaucratization of the hiring and wage-setting processes, and the role of production teams in modern enterprises combine to limit the range of competition for wages.<6> Minimum wage laws also may inhibit payment of wages that correspond to individual productivity. In both of these cases, however, employers will adjust other aspects of the employment situation. If vocationally educated youth are more productive than non-vocationally educated youth, differences will emerge in these other aspects of labor market outcomes. If vocational graduates are known to be more productive in certain classes of jobs, for example, they will be hired more quickly than will general curriculum students in situations where either type of student would receive the same wage when hired. Thus, the institutional structure of the labor market should not negate any positive effect of vocational education on productivity, but it may shift the manifestation of that effect from earnings to other outcomes.

Summary. This discussion can be summarized in terms of the outcomes (criteria) that are of interest to this project and the intermediating factors that help to explain the effect of vocational education on those outcomes. The focus in the discussion has been on hourly earnings, annual income, and weeks in the labor force and weeks unemployed as outcomes. Vocational education is expected to affect those outcomes through its impact on a respondent's approach to job search, educational attainment, labor market experience, job tenure, occupational choice, industry of

employment, unionization, fringe benefits, job safety, and frequency of various types of job separations. Some of these intervening relationships have been examined before by the author of this design, but not with the HS&B database in a unified treatment that has linked vocational education to them and then linked them to outcomes. This study provides a preliminary look, with the new data, at both labor market and also several forms of postsecondary outcomes. It does not explore these data from a causal modeling point of view, and therefore does not control for the complexities that influence their outcomes.

Policy Issues

The policy issues that arise in the light of the findings can best be considered as they relate to the perceived purposes of vocational education. At the federal level, these purposes include the availability of quality vocational programs to persons of all ages and in all parts of the country. The programs are to be realistic in terms of employment and suited to the interests of those pursuing them. Special attention is given to the handicapped, to gender equity, and to minorities. The societal need for the development of human resources is also included specifically among the purposes. These objectives of policy are reflected in the Statement of Purpose of the current Federal law covering vocational education, the Carl D. Perkins Vocational Education Act. Vocational education is not limited however, to Federal purposes. More than 90 percent of its support comes from state and local sources. These agencies frequently expect additional purposes to be fulfilled. In this context the focus of this study must be seen as a subset of the overall purposes of vocational education, but one that is commonly shared across the agencies with responsibility for vocational education. As the NIE Vocational Education Study (The Final Report, 1981, p. xxiv) points out, policy questions primarily concern access to and quality of programs. The maturity of the HS&B database also limits policy considerations to the high school and early post high school years at the present. Eventually, as new waves of data are collected, a rich study of the broader issues represented in the purposes will be possible.

Policy must deal with the question of both access and quality in an interrelated way, because the ultimate goal to be striven toward is unhindered access to high quality programs. It will not do to have either open admissions to inconsequential programs or high quality programs for a highly restricted clientele.

Keeping in mind the interrelatedness of these two issues, the policy questions may be clustered into two groups for simplicity. The issue of quality is most commonly described in economic terms. The questions on this first issue may be stated as follows:

- Does high school vocational education result in a labor market payoff for those who participate in it with sufficient intensity?

- Does participation with sufficient intensity pay off for each of the several service areas in high school vocational education (e.g., trade and industry, business and office)?

Whether the answers to these questions are positive or negative, it is still necessary to ascertain whether or not there are differential effects upon groups of persons described by such characteristics as gender and racial/ethnic group membership. This is the issue of access. Questions that address this issue are as follows:

- Are there differential economic consequences for persons of differing gender and racial/ethnic group membership?
- Are the outcomes for differing specialties uniformly distributed across these groups?
- Is there a preponderance of certain gender or racial/ethnic subgroups in certain specialties? If so, are they the more beneficial service areas in terms of economic payoffs or the lesser ones?

The answers to these questions have been suggested in part by the previous research that has been reviewed in this design statement. However the availability of the HS&B database, with its substantial sample size, transcript data, and labor market data permits a more precise look at the issues than that which has been previously possible. Also the possibility of trends that may be a consequence of policies now in effect can be considered. The completed analyses make it possible to suggest areas in which alternative policy might be considered and existing policy might be continued and strengthened.

The Approach

We turn now to the general plan for approaching the present study. One of the critical problems recognized in the task specifications of this project is the inappropriateness of using a simple designation of curriculum as vocational, academic, or general. Although Woods and Haney (1981) found that self-designation sometimes produced more definitive results than designations based upon credits, our experience suggests strongly that ambiguity of results can be sharply reduced by using a set of indicators that take into account the timing, intensity and continuity of the vocational experience (see, for example, Gardner 1984).

The first step, then, in the general approach was to set up the classification of high school students in terms of this system. Once the high school curricular experience was classified, the next step was to specify the dependent variables of interest in operational terms and select the explanatory variables that best addressed the policy questions that seem amenable to consideration with the time and resource constraints of this project.

The simplicity of cross tabulations has been used primarily for these analyses. The explanatory variables deemed important, and necessary to provide responses for the questions, have been represented in row or column headings that define the many tables produced. Although it is recognized

that multivariate approaches would lead to more complete understanding of the complexities of the relationships studied, they were beyond the scope of this study.

Specific Research Questions

The objective of this research is the evaluation of the short term economic effects<7> of vocational education. It can best be approached by a series of research questions. These are presented in two sets, in an order that moves from preliminary questions to the final outcome questions. They are as follows:

1. How can the variability of patterns of participation in vocational education be represented for analytic purposes?

2. What are the prerequisites of vocational education participation by level of participation, race, ethnic status, gender, SES and specialization?

3. What are the frequencies of kinds of training that occur after high school (e.g., on-the-job, vocational, two-year colleges) by length, by timing (immediate or delayed) by secondary level of participation, by specialization, by race/ethnic status and gender?

4. What credentialling occurs (certificates or licenses) by source, by race/ethnic status, by gender, and by secondary specialization?

With the exception of question 1, these questions lead to analyses of the crosstabulation form. These questions and the results of the analyses concerning them form the content of chapter 2 covering the preliminary exploration of potential relationships among the descriptive variables. At this point we shift to a description of the data available in the HS&B database and to a description of the typology that responds to the concern of question 1.

Data and Method

Data source. The Center for Education Statistics (CES) of the U.S. Department of Education conducts the National Education Longitudinal Studies (NELS) program, a continuing long-term project designed to provide time-series data on a nationally representative sample of high school students. The general aim of the NELS program is to study longitudinally the educational, vocational, and personal development of high school students and the personal, familial, social, institutional, and cultural factors that may affect that development. The NELS program consists of two

major studies: The National Longitudinal Study of the High School Class of 1972 (NLS-72) and High School and Beyond (HS&B). The present study uses HS&B sophomore cohort data.

The HS&B study began in 1980 with the collection of base year data on high school seniors and sophomores. The sample for the HS&B study was designed in two stages. The first stage consisted of a stratified national probability sample of secondary schools drawn from a list of all schools, public and private, in the 50 states and the District of Columbia, that contained tenth and twelfth graders during the 1979-80 school year. With the exception of certain special strata, schools were selected with probability proportional to estimated enrollment in their 10th and 12th grades. From a frame of 24,725 schools with grades 10 or 12, the total number of schools selected for the sample was 1,122. Some schools refused to participate, resulting in a total of 1,015 high schools that participated in the base year survey.

One of the special criteria for inclusion in the sample with probabilities higher than occurrence in the population was the number of Hispanics enrolled in the school. This procedure ensured that sufficient numbers of Cuban, Puerto Rican and Mexican students would be sampled to support separate analyses of these groups.

In the second stage of the HS&B study design, 36 sophomores were randomly selected within each school from school enrollment lists. In those schools with fewer than 36 sophomores, all eligible students were selected. Other students were not substituted for students who refused, for students whose parents refused for them, or for students who were absent on the survey day and make-up days. Of the 35,723 sophomores selected to participate in the base year survey, 30,030 students (84 percent) completed a base year questionnaire. Further details on the base-year sample design are available in Frankel, Kohnke, Buonanno, and Tourangeau (1981).

The base year student questionnaire focused on individual and family background, high school experiences, work experiences, and plans for the future. Cognitive tests given to sophomores measured both verbal and quantitative abilities, as well as measuring achievement in science, writing, and civics (for an assessment of the cognitive tests, see Heyns and Hilton, 1982). The survey and tests were administered to the HS&B sophomores in groups in school classrooms.

The HS&B study of the sophomore cohort continued in the spring of 1982 with the collection of follow-up data at a time when most sophomores had become seniors. The follow-up sample retained the multi-stage, stratified, and clustered design of the base year sample. All students selected in the base year (including base year nonrespondents) survey had a probability of inclusion in the first follow-up survey. Most 1980 sophomores were sampled with certainty, although some 1980 sophomores, generally those no longer enrolled in their original schools, were subsampled. Of the 29,737 sophomores selected to participate in the first follow-up survey, 28,119 students (95 percent) completed a first follow-up questionnaire. Further details on the first follow-up sample design are available in Tourangeau, McWilliams, Jones, Frankel, and O'Brien (1983).

The sophomore cohort first follow-up questionnaire replicated nearly all the items used in the base year questionnaire; the cognitive tests were identical to those used in the base year. Two versions of the sophomore questionnaire were used. One was designed for students still in school (including transfer students and early graduates); the other for school

leavers (dropouts). In addition, early graduates and transfer students were asked to fill out special supplements that elicited additional information relevant to their early graduation or transfer. The survey and tests were group administered to the 1980 sophomores, generally in school classrooms, but sometimes in off-campus locations.

In 1980 and again in 1982, the HS&B schools in the sample were asked to complete a school questionnaire that provided information about enrollment, staff, educational programs, facilities and services, time scheduling, grading systems, dropout rates, and special programs for disadvantaged students.

In the fall of 1982, the schools were asked to provide high school transcripts for selected members of the HS&B sophomore sample. A total of 12,309 cases belonging to policy-relevant subgroups were sampled with certainty, while a uniform 0.35 probability sample was selected from the remaining 17,703 sophomores in the first follow-up sample. The sample design further increased the overrepresentation of racial and ethnic minorities (especially those with above average HS&B achievement test scores), students who attended private high schools, school dropouts, transfers and early graduates, and students whose parents participated in the base year Parents' Survey on financing postsecondary education. Of the 18,427 transcripts requested, information was returned for 15,941 cases (87 percent). Further details on the transcript survey sample design are available in Jones, Knight, Butz, Crawford, and Stephenson (1983).

In the spring of 1984, when the HS&B sophomore cohort had left high school, the sophomores were again asked to complete a follow-up survey. The second follow-up sample was based on the transcript study design, but, using similar policy-relevant criteria, the sample size was further reduced to 14,825. Of this number, 13,682 (92 percent) completed the second follow-up survey, and of these, 12,142 cases also had transcript data available. Further details on the second follow-up survey design are available in Jones, Sebring, Crawford, Spencer, Spencer, and Butz (1986).

The second follow-up survey asked the former 1980 sophomores about their activities, educational attainments, school experiences, training, work experiences, goals and attitudes, marital and family status, and military experiences. The 1984 survey was conducted using a combination of mailed questionnaires and telephone interviews of former sophomores who did not initially respond to the mailed questionnaire. A third follow-up survey is scheduled for spring of 1986.

Method of comparing percentages. Because the HS&B study design did not simply select sample cases at random, but used a multi-staged, clustered, and stratified design, and because survey nonresponse was not random, weights were developed to compensate for the unequal probabilities of being in the sample. The weights are based on the inverse of the probabilities of selection through all stages of the sample selection process and on nonresponse adjustment factors computed within weighting cells. Because the resampling rates for policy relevant subgroups in each survey remained disproportionately higher and the resampling rates for the remaining sample members remained correspondingly lower, the weights vary considerably from one sample case to the next. The use of simple random sample assumptions in computing population means and proportions, and their associated sampling errors, will lead to inaccuracies. In order to generalize from this sample to the U.S. population of 1980 high school sophomores, the

present study used weights (those associated with responding to the second follow-up and having transcript data available) to obtain population estimates in the text and in each table reported below.

In order to obtain measures of the precision of the reported population estimates, two adjustments to the conventional statistical procedures for assessing the significance of differences (those assuming a simple random sample) are necessary. The first adjustment is the incorporation of a design effect into the statistical confidence calculations. The design effect represents a correction factor that measures the ratio of the variance of a statistic to the variance that would be obtained if the sample were treated as a simple random sample. Thus, if the standard error (S.E.) of a statistic, say average number of weeks worked, were 2, the conventional confidence band for a simple random sample would be 1.96 S.E.'s on either side of the average. If, however, there was a design effect of 2 because of stratification, clustering, or other sampling artifacts, the confidence band would be 3.92 S.E.'s on either side of the average (1.96 S.E.'s x design effect of 2).

The second adjustment is to be conservative in establishing the level of confidence, since the sample will inevitably be attenuated by missing data on some of the variables of interest. To respond to both of these concerns, a correction factor of 2.0 was employed in estimating the confidence intervals referred to from time to time in the text. This factor was based on the recommendation of Goldberger and Cain (1982) in a discussion of some findings concerning public and private schools from HS&B. The standard errors of differences in proportions were computed by the standard formula (see any basic statistical text) and then weighted to the four-sigma level.

Defining vocational participation and specialization. The present study uses a measure of participation in vocational education in high school that, while modified, is based on a schema developed by Evaluation Technologies Incorporated (1982). This schema originally included four categories, labeled for this study vocational specialist, vocational generalist, sampler, and nonparticipant. This process required judgements to be made in categorizing course titles, supplied on the transcripts, into vocational specialties. The process has been demonstrated to be more accurate than self report or administrator classification, but still is subject to error. As originally defined, these categories did not lend themselves well to the analytical objectives of this study. In particular, including a classification for academic and general students as comparison groups for vocational students resulted in a confusing overlap among categories. Therefore, the categories were redefined as follows:

- Vocational Specialist--a student with two or more Carnegie credits in one of six vocational program areas.

- Vocational Generalist--A student who earned at least 2.5 Carnegie credits in the six vocational education program areas combined, but less than two in a single vocational program area.

- Academic--A student who earned at least 12 credits in the "New Basics." These include English, Mathematics, Physical and Natural Science, Foreign Language, Social Science, and Computer Science.

- General--those not otherwise classified.

Note that the samplers and nonparticipants were not included as separate categories. They were reclassified as academic or general, as appropriate. In some cases samplers met the new criteria for vocational generalists and were classified in that category.<8> This classification procedure highlights the openness of the curriculum in the high school. Although students are assigned to one and only one category for the purpose of tabulation, there is considerable overlap because the academic curriculum, in particular, is not very restrictive. Approximately 3 percent of the vocational generalists also meet the academic requirements, and 35 percent of the vocational specialists meet them as well. Within the vocational specialist category, this study identified six vocational areas of specialization: agriculture, business and office, distributive occupations, health occupations, occupational home economics, and trade and industrial/technical occupations. If students met the minimum course-taking criterion in more than one area, the students were assigned the area in which they had earned the maximum number of Carnegie units.<9> Because there is some evidence that fewer than four credits (Campbell and Basinger, 1985) show a significant labor market association, the minimum criterion for classification into one of the six vocational specialist categories was set at two Carnegie units rather than four Carnegie units (the criterion adopted by Evaluation Technologies, Inc.). The vocational specialist category includes students who may have met the minimum criterion of two credits for more than one of the six programs, who may have had additional credits in other vocational program areas, or who may have met the requirement for classification as an academic student (that is, earned 12 or more credits in the New Basics). The students classified in the academic category did not meet the requirements to be counted as either Vocational Specialists or Vocational Generalists.

The categories produced by the foregoing conventions were used to classify and cross tabulate the data available in HS&B for the sophomore cohort for whom transcripts were available.

Descriptive Analysis

Several variables required for this phase of the research were created by combining multiple data elements. For example, "Carnegie credits in each subject matter area came from student transcripts. Race/ethnicity and gender were composite variables created by the National Opinion Research Center by cross-checking responses from several survey waves to fill in missing information and reconcile inconsistent responses. Socioeconomic status was created by NORC from measures of father's education, mother's education, father's occupation, family income, and an index of material possessions in the home (see chapter 6 in the Second Follow-up Data File User's Manual, Jones, et al. 1986)." They are described in some detail in the next chapter when the tables involving them are discussed. These

tables included vocational participation, subsequent education or training, military training, certificates and licenses, and wages and hours worked. The next chapter presents the descriptions provided by the tables.

Footnotes

<1> The findings of previous research are summarized here somewhat differently than they are by Woods and Haney (1981). Their review suggests, although they do not explicitly acknowledge this in their discussion, that regression analyses show significant advantages for male vocational graduates less frequently, and significant earnings advantages for women more frequently, than do simple descriptive comparisons of average earnings. Since regression analyses, if properly done, should provide better estimates of any effects of vocational education, the current authors are inclined to attach more weight to those results and less to the descriptive studies than do Woods and Haney. This difference in emphasis explains the conclusions here that the differences between men and women in estimated effects of vocational education are somewhat sharper than are portrayed by Woods and Haney.

Moreover, Woods and Haney point out that stronger evidence of positive earnings effects is found for men when participation in vocational education is identified by self-report than when it is identified by coursework. Their own reanalyses of the NLS-72 data support that difference. It is argued elsewhere by the present authors that accurate specification of coursework from transcript data more appropriately identifies curriculum (Campbell, Orth, and Seitz 1981). Attaching greater weight to regression analyses based on coursework again leads to a sharper contrast between estimated effects for men and women than Woods and Haney offer.

<2> Includes both occupational and nonoccupational home economics courses.

<3> They found that more vocational credits reduce unemployment. But a higher proportion of vocational credits reduce unemployment for women by only a small amount and actually increase it for men.

<4> If vocational education performs this credentialing function, the supply of vocationally educated labor may increase relative to generally educated labor in ways that reduce any favorable earnings differentials, lengthen search duration, and raise unemployment rates for individual vocational students. This point was argued persuasively by Gustman and Steinmeier (1980). They also noted that the extent of supply-side effects depends on the availability of facilities and instructors and the ease of entry into vocational programs. Neither the data available to Gustman and Steinmeier (NLS-LME and NLS-72) nor the NLS Youth data permitted accurate estimates of these supply-side adjustments. This is clearly a subject that deserves closer examination. The emphasis here is on the intermediate effects of vocational education that link the proximate effects to labor market outcomes. It is the outcomes rather than the intermediate effects that are masked by the supply-side adjustments that Gustman and Steinmeier discussed.

Footnotes (continued)

<5> Job satisfaction is the subject of another study conducted by one of the authors at the National Center for Research in Vocational Education (Campbell et al. 1982).

<6> See for example, Doeringer and Piore (1971), Williamson, Wachter and Harris (1975), Thurow (1975), and Okun (1981).

<7> Although we are interested in estimating the "effects" of vocational education, we agree with Woods and Haney (1981) that the term "outcomes" is more appropriate to the results of the analyses that are feasible with longitudinal survey data.

<8> Seven subject matter areas were identified on students' transcripts as "vocational." These categories were agriculture, marketing and distributive education, health occupations, home economics, office occupations, technical education, and trade and industrial occupations. Technical education was combined with trade and industrial courses, and the two are identified here as a single specialty area. A concerted effort was made to exclude from the vocational classifications such course areas as industrial arts, personal typing, and nonoccupational home economics.

<9> Sometimes a student's transcript showed more than one specialty area with equal numbers of credits. In those cases the student's self-designation was used to break the tie.

CHAPTER 2

VOCATIONAL TRAINING: NATURE AND IMPACT

The study questions. This chapter provides a description of the nature of vocational education and training at two levels--during high school and after high school. It emphasizes in particular the level of intensity of participation in vocational education, the areas in which training is taken, and the distribution of education and training among groups of special interest. This chapter then explores the relationship between vocational training in high school and wage rates two years later. This chapter addresses four questions of particular interest to policy makers:

1. Are there differences in levels of participation and specialization in vocational education and training in high school that are associated with race or ethnic group membership, with gender, or with socioeconomic status?

2. How much and what kinds of training occur in the first two years after high school in various contexts: on-the-job, in vocational schools, in the military, and in 2-year college vocational programs? Are there differences in such postsecondary training associated with race or ethnic group membership, with gender, or with high school curriculum?

3. What credentialing occurs in the first two years after high school (certificates and licenses)? Are there differences associated with race or ethnic group membership, with gender, or with high school curriculum?

4. Two years after high school, what wage differences are associated with vocational training? Within the different labor markets faced by those who continued their schooling and those who left school, are there differences associated with race or ethnic group membership, with gender, or with high school curriculum?

The answers to these questions were considered through examination of the associations among these variables shown in cross-tabulations. The results section, addressing the four questions, takes up the rest of this chapter.

Descriptive Results

Vocational specialty. The policy implications of the question concerning differences in levels of participation and specialization can be quite significant. If, for example, there are substantive differences in the specialties followed by the different gender, ethnic, and socioeconomic groups, then that is evidence of the operation of a sorting mechanism that can have an effect on the economic status of the groups. One would expect that if vocational specialties are equally available to all and that if there are no societal restraints upon the choice of specialty, members of the groups of interest would be distributed across the vocational specialties in proportion to their distribution in the general population. One would also expect the same situation in terms of the level of intensity of participation in a vocational education program.

Tables 1, 2, and 3 compare the percentage of high school participation in vocational specialties among groups defined by race/ethnicity and gender, based on the HS&B sophomore data. A recent study (Oakes 1983) suggested that the kinds of programs available to Hispanics, for example, were different from those available to the majority population. Oakes's sample was quite limited, however, and a comparison of her results with a nationally representative sample is therefore important. When one considers the proportions within specialties shown in Table 1, the national data show little substantive support for Oakes' locally-based conclusion.

Blacks and Hispanics tend to be underrepresented in the academic curriculum. They do not crowd into the vocational curriculum, however, but rather are found in the general curriculum.

Table 3 presents participation percentages for men and women within each racial/ethnic category. As earlier studies have shown, the business specialty is dominated by women and the trade and industry specialty by men. The HS&B sophomore data show that the percentage of women in the business specialty is 29 percentage points greater than that of men, while the percentage of men in the trade and industry specialty is 15 percentage points greater than that of women.

The evidence concerning the interaction of race/ethnicity and gender with vocational specialization can be summarized as follows: Gender continues to be a major factor in the selection of specialty. The HS&B sophomore data shows that the long standing selection of business by women and trade and industry by men continues. On the other hand, there is little evidence supporting a large scale differential selection into vocational specialties on the basis of racial/ethnic groupings. The percentages selecting each specialty in each racial/ethnic group are fairly close to the proportions of that group in the total vocational curriculum.

Level of participation. Tables 4, 5, and 6 present levels of participation in the high school curriculum by racial/ethnic groups, gender, and socioeconomic groups. In addition, they show the percentages of each group who drop out before completing enough credits to be classified in any of the other four categories. The dropouts shown in these tables reflect status as of the 1984 second follow-up survey, when a substantial proportion of those earlier identified as dropouts had returned to obtain a high school diploma or equivalency certificate.

The results of the racial/ethnic comparisons are shown in Table 4. Both blacks and Hispanics have significantly higher proportions of dropouts than majority whites.

Table 5 shows the total gender differences and introduces divisions by gender into the distribution of racial/ethnic groups across curricula. As noted in Table 3, the gender differences in high school curriculum are significant, though the differences in the cumulative dropout rates as of 1984 are not.

It has been widely observed that participation in the high school curricula differs with socioeconomic status. Table 6 shows the distribution for the HS&B sophomores, which are consistent with the results of other surveys and observations. Vocational specialists are significantly underrepresented in the highest socioeconomic status quartile. Those following the academic curriculum are underrepresented in the lowest quartile. Both general curriculum students and those who dropped out (before obtaining enough credits to be classified in a curriculum category, and who did not return within two years) also tend to be clustered in the lowest or second lowest socioeconomic status category. These findings point to the necessity of taking into account socioeconomic status when considering the consequences of vocational education.

Postsecondary vocational training. The next series of tables presents the distribution of young people across the different types of postsecondary training. Table 7 shows the distribution of subsequent training by types of high school curriculum. The most striking findings are that nearly three-fourths of the young people in this cohort reported receiving no formal training on the job, and that a like proportion of them also reported receiving no informal training on the job during the first two years after leaving high school.

Informal training was defined as being assigned to watch or work with someone on the job; formal training included other employer provided training, either on or off the premises, but during working hours. It also included tuition aid or financial assistance for attending school after working hours. Both the number of hours per week and number of weeks of training were reported. Periods of training of less than eight hours duration were not counted. Those who reported the least training are the graduates of the academic curriculum; general graduates more frequently reported informal training of a duration greater than four days.

Less than one percent of the former sophomores reported participating in a formal apprenticeship program during the first two years after high school, and the proportions across high school curriculum types do not differ appreciably. About 3 percent of the former sophomores later reported some form of government training.

What is surprising is the low frequency of reports of using such training on the job. Among those who either received government training or participated in a formal apprenticeship program and who held a full-time job, only 6 percent of the former sophomores reported that they had "received formal training to do your current (or most recent) job" from such a program. A somewhat higher proportion (14 percent) of sophomores who had taken an academic curriculum in high school reported the government training or the apprenticeship as the source of their formal job training. The term, "formal training," may have been misinterpreted by the respondents, especially since the question instructed them not to include on-the-job or employer training, but this cannot be readily determined from the

data. No validation of responses to questionnaire items was included in HS&B.

Table 8 presents figures on attendance, completion, and use of training associated with vocational-technical schools and vocational programs<10> in 2-year colleges, by high school curriculum and graduation status in 1984, both overall and for males and females separately. Overall, about 11 percent of the former sophomores attended vocational, technical, trade, or business schools, and about 12 percent attended vocational programs in 2-year colleges.

By high school curriculum, the results show that about 14 percent of the former vocational specialists who graduated from high school reported attending vocational or technical schools and 12 percent attended vocational programs in 2-year colleges. Among high school dropouts from the general curriculum who did not return to high school, about 8 percent reported attending vocational or technical schools, and only 2 percent reported attending vocational programs in 2-year colleges.

Among those who attended, the proportions completing either vocational/technical school requirements or the requirements of vocational programs in 2-year colleges are relatively low, especially in the 2-year colleges. Since the follow-up survey was conducted in February 1984 and the former sophomores had graduated from high school in June of 1982, most students would not have had time to complete the requirements of a 2-year program. These proportions can be expected to increase considerably when the data from the 1986 follow-up survey become available.

As with apprenticeships and government training, the proportion reporting that their vocational-technical or 2-year college training was the source of their formal training to do their jobs was fairly low, though there were marked differences between the two types of schools in the proportions reporting such schools as the source of their formal training. Overall, 23 percent of those who attended vocational/technical schools reported that a vocational/technical school was the source of their formal job training, while 8 percent of those who attended vocational programs in 2-year colleges reported that a 2-year college was the source of their formal job training.

Comparing the further training followed by students from the different high school curricula, there were some differences in the proportions reporting 2-year colleges as the source of their formal training. Among vocational specialists 10 percent reported 2-year colleges as their source of formal job training, compared to 2 percent of vocational generalists, 7 percent of academic graduates, and 6 percent of general graduates. Respondents from all of the curriculum patterns were more likely to report training completed in a vocational school as the source of their formal job training than training completed in a vocational program in a 2-year college.

Comparable percentages for men and women are also presented in Table 8. In general, the same trends can be observed. There is a tendency, however, for a greater proportion of women to attend and complete vocational technical courses, and also to report vocational technical schools as the source of their formal training to do their job. These gender differences are present, but not as strongly so, in the 2-year college sector, either for attendance in a vocational program, or for completion of such a program, or for reporting a 2-year college as the source of their formal training to do their job.

Certificates and licenses. Human capital theory explains the effects of education on labor market outcomes in terms of the skills acquired through education. Competing theories attribute the effects of education to credentials that are obtained at the completion of schooling. These credentials signal the employer that the prospective employee has accumulated the kinds of characteristics that should pay off in productivity and encourage the employer to offer higher compensation to secure the services of the credentialed employee. Regardless of which theoretical approach is taken, positive labor market effects for degree awards and other education credentials have been found. It is useful therefore to examine the antecedents of credentialling in terms of high school curriculum, race/ethnicity and gender. This information should provide policymakers with a potential alternative to consider in dealing with the problems of inequity in the labor market.

Tables 9 and 10 present the distribution of certificates and licenses earned by the 1980 sophomore cohort during the first two years after high school graduation. Both tables present the occupational distribution of awards in terms of the major groups used in the 1980 standard occupational classification (U.S. Department of Commerce, 1980).<11> Some of the certificates and licenses were not occupationally related; such awards were excluded from Tables 9 and 10. Because a person might earn more than one certificate, the sum of the percentages across occupational fields will sometimes exceed 100 percent.

Table 9 presents the occupational distribution of awards earned by the former sophomores, crossed with high school curriculum and graduation status. Two observations should be noted concerning Table 9. First, only slightly less than eleven percent of the 1980 sophomores earned certificates and licenses in the two years following high school. Evidence from the NLS-72 study shows that the earlier 1972 cohort continued to obtain certificates and licenses at significant levels for at least seven years after high school, eventually resulting in over a quarter of the high school class of 1972 obtaining a certificate or license (Kolstad, 1981). At the time of the 1984 second follow-up of the HS&B sophomores, slightly less than two years had elapsed during which this cohort could have earned a certificate or license.<12>

Second, it is hard to assess accurately the occupational fields pursued by the former sophomores, because only about half of these certificates or licenses can be classified in a major group of the standard occupational classification; many of the responses were so vague or idiosyncratic as to be unclassifiable. If a certificate or license was clearly personal or recreational, the award was not counted. An unknown proportion of the vague and unclassifiable responses are probably non-occupational and should not have been counted, but this could not be corrected in the absence of any evidence. The most frequently chosen occupational field, not counting the residual groups in the "other and not specified" category, is the service occupations group, including such jobs as beautician and health assistants. The administrative support occupations (such as computer operator, typist, and keypunch operator) and mechanics and repairers (such as radio and TV repair) are the next most frequently pursued fields.

Table 9 also shows some curriculum and graduation status differences in the choice of occupational qualifications acquired by the former sophomores. Graduates of vocational specialties were more likely than graduates

of general or academic curricula to earn certificates or licenses in service occupations and in administrative support occupations. Dropouts were more likely to give vague or unclassifiable responses about their certificates and licenses, so the apparent result that they seem to have earned fewer awards in the service occupations and in the mechanics and repairers group than those who graduated should not be taken too seriously. Nevertheless, almost none of the dropouts earned any qualifications in the administrative support field, in which the skills of a high school graduate are apparently needed.

Table 10 presents the occupational distribution of awards earned by the former sophomores, crossed with gender and race/ethnicity. Women, especially black women, are somewhat more likely than men to earn an occupational certificate or license. Although many previous studies have documented the extent of occupational segregation by gender, the gender differences in choice of occupational field shown in Table 10 are quite striking. For women, service occupations were most frequently chosen, while for men, this group never accounts for as much as four percent. Similarly, women are well represented in the administrative support occupations, whereas men are rarely classified there. The reverse picture is true for several more frequently male groups: mechanics and repairers; and transportation and material moving occupations.

Some racial/ethnic differences within gender groups may be observed. Black men are much less likely to be certified mechanics and repairers than white or Hispanic men. White women are somewhat less likely to be certified in administrative support occupations than Hispanic women, and black women are somewhat less likely to be certified in the service occupations than white women.

Military vocational training. Another way for young people to acquire postsecondary vocational training is through military service. Many of the training activities that are provided to meet military objectives are also generalizable to civilian job requirements. Table 11 presents the incidence and occupational distribution <13> of military training completed during the first two years after high school graduation by the young men in the 1980 sophomore cohort who entered one of the military services. Because there were too few women to provide a statistical picture with any reasonable reliability, the figures on the incidence and the occupational distribution of military training are presented for men only.

The incidence of entering military service and obtaining vocational training did not differ significantly by high school curriculum. However, among those young men who did receive training, the occupational distribution of the training received did vary by high school curriculum. The vocational specialists were more frequently found in the mechanics and repairers category than were the academic and general high school students. Academic students were more often found in the construction trades and in the combat field than were general students or vocational specialists. Thus it appears likely that the high school curriculum pattern is an antecedent of a certain pattern of training in the military.

More than 90 percent of the military training was job related, among those who had been or were currently working.

Wages, hours worked, and weekly earnings. The next part of this chapter examines the question of how wage rates, hours worked, and weekly earnings are associated with high school vocational training. There are several considerations that lead one to expect an association. Analytical-

ly, one can separate high school education into three components: (1) general learning skills, which enable students later in life to adjust quickly to new situations and to learn new ways to master new problems and situations; (2) specific job skills, which can be put to immediate use on a job; and (3) personal and interpersonal behavior, such as good work habits, self-discipline, and the ability to cooperate with others to get something done. While academic education has many objectives, including the transmission of the content of many different subject matter areas, a major goal of academic training is to improve the students' ability to learn in the future (the first of the three components). Vocational education also has many objectives, but one of its central goals is to provide what academic education does not: specific skills of immediate use on a job (the second of the three components). The goal of achieving personal and inter-personal competence, the third component, is not exclusively the purview of either academic or vocational education. Each of the three components has its value in increasing a person's productivity, according to human capital theorists, such as Becker (1964).

Many different factors can operate to affect the link between personal productivity and wages. For example, "signaling" theory attributes the apparent effects of education on wage rates to signaling preexisting productivity differences rather than to changing a person's productivity (Spence, 1973). Many jobs give specific training to new workers to carry out the duties of the job. To the extent that vocational education can substitute for such training, vocational students should earn more on the job than comparable students without vocational training during the period that the comparable students would be learning their new job duties. Whatever link exists, the association of education with productivity differences and the claims of job benefits made by vocational educators lead one to expect an association between vocational education and wage rates.

Different labor market conditions can mediate the influence of vocational education on wage rates. Two such conditions are important for the process under consideration here. First, the labor market for workers who are enrolled in postsecondary education is different from that for workers who completed their schooling at the high school level. Generally, those workers who are continuing their education are likely to be working to support their schooling and usually do not have a commitment to establish a career in the area of their jobs. Employers may design jobs to fit the needs of such persons; that is, jobs designed for such workers will require little training, will provide for part-time work, will not be disrupted by high turn-over rates, and will provide little opportunity for advancement. On the other hand, those workers who have left school for good are likely to be looking for a career, not just a job, to be interested in learning a variety of related skills, to be willing to take lower wages temporarily while they learn new skills, and to be looking for long-term career advancement. Employers may design jobs that suit this kind of worker as well. This conception of different labor markets is not original; Meyer and Wise, for example, argued that "the labor market aspirations of persons in school, their labor force behavior, their access to the labor market, and thus their realized experiences are likely to differ substantially from persons who are not in school" (1982, p. 278).A worker's schooling is more likely to matter to employers of out-of-school workers than it is to employers of in-school workers; the association of vocational education

with wage rates is likely to be stronger among non-students than among students.

Second, the labor market for men is different from that for women. As a group, women's motivations for work and expected pattern of labor force participation over the life cycle is different from that of men (Oppenheimer, 1970). Women are often segregated, whether by choice or by discrimination, into different occupations than those held by men (Blaxall and Reagan, 1976). A person's aspirations, access to training and to jobs, and experiences in the labor market have considerable influence on jobs and wage rates. Barriers to occupational mobility between men's jobs and women's jobs can interfere with the normal operation of a competitive labor market and can create labor shortages and wage differentials unrelated to worker productivity. For these reasons, education may have a different relationship to wage rates for men than for women. More specifically, the association between high school vocational education and later wage rates can be expected to be different for men and for women.

In order to describe the association between high school vocational training and subsequent labor market outcomes, this chapter presents a set of tables that show the hourly wages, hours worked per week, and weekly earnings of the former HS&B sophomores in February 1984, about twenty months after the standard time for high school graduation. The figures are presented separately for those who are enrolled and those who are not enrolled in some form of postsecondary education, in order to allow for different associations between schooling and labor market outcomes for the in-school and out-of-school workers. In addition, the figures are presented separately for men and for women, again in order to allow for different associations between schooling and labor market outcomes for male and female workers.

The measure of wage rates was obtained in several steps: first, selecting the primary job that the former sophomores held in February 1984; then standardizing reports of hourly, weekly, biweekly, monthly, and annual wages earned on this job into a single hourly measure (by dividing by the appropriate constant and by the number of hours worked per week); next, choosing the maximum of the starting and ending wage for this job; and finally, eliminating outliers among the wage reports (those above $25 per hour or $1 per hour and below). The measure of postsecondary school enrollment for February 1984 was constructed by the data collection contractor and is documented in the data file user's manual (Jones, et al., 1986).

The median was chosen as the summary statistic for reporting wage rates because it is less sensitive to a small number of very large wage rates than is the mean. Wage rates generally have a skewed distribution, with very few people earning the lowest wage rates, most people earning moderate wage rates, and many others spread out over a wide range of higher wage rates. The mean tends to be unduly sensitive to the high wage rates of a few people. The standard deviation provides a measure of the precision with which a mean is estimated. Since it is defined with reference to an underlying normal distribution, it is symmetric about the mean. Unlike the mean, the median is a distribution-free statistic; the precision with which the median is estimated depends on the form of the underlying distribution as well as the size of its base. In order to judge the precision of the wage estimate, confidence bounds were estimated and shown in the tables. The confidence bounds are not symmetric about the median,

since the underlying distribution of wages is skewed. Since the tables on hours worked per week and weekly wages were supplemental to the main findings based on hourly wage rates, medians and their confidence intervals <14> were not generated for these variables; means and standard deviations were chosen for the sake of economy. They likewise permit ready estimates of standard errors, and therefore of the precision of the results.

The associations of hourly wages, weekly earnings, and weekly hours with high school curriculum and specialty shown in the following tables do not fully reflect the impact of the vocational curriculum. It is important to avoid drawing conclusions about this impact because the variability of wages and hours is influenced by many factors unrelated to curriculum (e.g.labor market conditions) and also by factors that relate to both curriculum and wages (e.g. ability, motivation). When these latter factors are not accounted for, the results of the analysis will include biases of unknown direction and magnitude. More complicated statistical modeling than that provided in these tables, incorporating the influences of many factors, is needed to understand fully the impact of high school curriculum and vocational training. However, these tables do provide suggestions of the kind of impact that may be worth examining further by multivariate analysis.

Hourly wage rates. Table 12 presents the median hourly wage rates in February 1984 of the HS&B former sophomores by high school curriculum and graduation status. In this table, as in most of the remaining tables, figures are presented for non-students and for students, and within these groups, for men and women separately, as well as combined. Overall, the hourly wages of the non-students were higher by about 40 cents per hour than those of the students.

Table 12 also presents gender differences in median wage rates. Among students, male median wage rates were 20 cents per hour higher than female rates. Among non-students, male median wage rates were 75 cents per hour higher than the female rates. The relative pattern of earnings by high school curriculum remained much the same among men and among women.

Table 13 presents the median hourly wage rates of the former sophomores by race/ethnicity, for non-students and for students, and for men and women. Table 4 above showed that there is little variation in vocational participation across ethnic groups except for the underrepresentation of Asians in vocational education. This table presents an interesting and unexpected finding. While one might expect the majority white population to be the highest paid, in these data the Hispanics held the highest median wage rates for both the enrolled and the non-enrolled groups.

Table 14 presents the median hourly wage rates of the former sophomores by high school curriculum and vocational specialization, for non-students and students, and for men and women. The interactions of vocational specialty and gender shown in Table 14 suggest an explanation of the relatively low median hourly wage rate of the vocational specialists shown in Table 13. The largest single group of vocational specialists appeared in the business specialty. This specialty had the lowest hourly wage of any in the not-enrolled group, and in the enrolled group it had a lower median wage than any specialty but agriculture. The other fields with sufficient samples (agriculture, and trade and industry) did not show the same wage disadvantage compared to general and academic high school students as did the business specialization.

Table 15 presents the median hourly wage rates of the former sophomores by socioeconomic status, for non-students and students.

Hours worked per week and weekly earnings. The next set of tables presents the distribution of average hours worked per week and average weekly earnings by high school curriculum and graduation status, race/ethnicity, and high school curriculum and vocational specialty. As with median wage rates, figures are presented for non-students and for students, and within these groups, for men and for women separately, as well as for both genders combined. Weekly earnings were measured as the product of each individual's hourly wage and hours worked per week. The totals in Table 16 show that, overall, the non-students worked full-time, about 39 hours per week, while the students worked part-time, about 27 hours per week. This substantial difference in time spent at work, along with the 40 cent larger median hourly wage reported in the preceding section, was reflected in a weekly earnings difference of over $71 per week in favor of the non-students.

Table 16 presents the average hours worked per week in February 1984 by the former sophomores, by high school curriculum and graduation status. For those not in school, the average work week was just over 39 hours, with the exceptions of the dropouts from a vocational specialty program, who averaged 37 hours per week, and the graduates of a general vocational program, who averaged 41 hours per week. For those enrolled in school and working, the academic graduates worked the shortest hours, around 24, while the general curriculum graduates worked the longest hours, over 30.

Table 16 also presents gender differences in average hours worked. Among non-students, men worked about 6 hours per week more than women. Among students, men also worked about 6 hours per week more than women. The association of high school curriculum with hours worked showed the same pattern among men and among women as it did overall.

Table 17 presents the average weekly earnings in February 1984 of the former sophomores, by high school curriculum and graduation status. Weekly earnings, being a function of hours worked and hourly rate of pay, parallel the findings for wage rates and hours worked. The non-student vocational generalists have relatively high rates of pay and relatively long weeks worked. They therefore show the highest weekly earnings in the non-enrolled category. The general curriculum graduates in the enrolled category, however, work enough extra hours to achieve the highest weekly earnings.

Table 17 also presents gender differences in average weekly earnings. Among the male non-students, graduates of a general vocational curriculum earned more than graduates of the vocational specialties, while among female non-students, academic graduates had the highest weekly earnings. It is also interesting to note that, among women, vocational specialists without diplomas exceeded the weekly earnings of those who dropped out of the general curriculum even though the vocational specialists worked fewer hours. Among the male students, graduates of a general curriculum earned more than graduates of a vocational specialty or an academic curriculum, whereas among the female students, a similar, but weaker pattern emerged, with academic graduates earning the lowest weekly sum.

Table 18 presents the average hours worked per week in February 1984 by the former sophomores, by race/ethnicity. As with median wage rates, figures are presented for non-students and students, and within these groups, for men and women separately, as well as combined. Among the non-students, whites worked the longest weeks (about 40 hours), while Hispanics

worked 38 hours, and blacks worked 37 hours. The students worked fewer hours than did the non-students (27 or 28 hours per week), but no real differences appeared between Hispanics, blacks, and whites.

Table 18 also presents gender differences in average hours worked. The association of race/ethnicity with hours worked showed basically the same pattern among men and among women as it did overall. Among the male non-students, whites worked the longest weeks compared to Hispanics and blacks. The students worked fewer hours than did the non-students, but here there was a difference from the overall pattern, in that white women worked about 3 hours per week fewer than Hispanics.

Table 19 presents the average weekly earnings in February 1984 of the former sophomores by race/ethnicity. Weekly earnings are a function of hours worked and hourly rate of pay, so the findings on racial/ethnic differences in weekly earnings are similar to those for wage rates and hours worked. Among the non-students, white workers had the longest work week, nearly 40 hours, and hourly wages that were second only to the Hispanics. This combination produced the highest average weekly earnings for the white group. The white earnings advantage was only about $2 more per week when compared to Hispanics, but was about $20 per week more than the earnings of blacks. Among students, Hispanics show a combination of longer hours and higher rates of pay that result in weekly earnings of nearly $18 per week more than the average.

Table 19 also presents gender differences in average weekly earnings. In general, women work fewer hours than men and, as previously noted, receive lower rates of pay. Among the male non-students, whites earned $33 per week more than blacks, and $17 per week more than Hispanics; while among female non-students, Hispanics had the highest weekly earnings, although white women exceeded the weekly earnings of black women by $9 per week. Among the students, both male and female, a similar pattern emerged of Hispanics showing the highest weekly earnings. White women enrolled in school had lower weekly earnings than any other group.

Table 20 presents the average hours worked per week in February 1984 by the former sophomores by high school curriculum and vocational specialty. As with the preceding tables, the figures are presented for non-students and students, and within these groups, for men and women. Among non-students, the average number of hours per week worked in agriculture was 3 hours higher than for the total, while this average in business and office was 2 hours lower than in the total. Agriculture has been traditionally characterized by long hours. Among students, the average hours per week worked in the business specialty was about average.

Table 20 also presents gender differences in average hours worked. Among the male non-students, those who took an agriculture or a general vocational curriculum worked the longest weeks compared to the other curricula and specialties. The table shows that the advantage for those in the agriculture specialty is primarily a male phenomenon, since there were very few women who followed the agriculture curriculum. Among female students, there was little difference from the overall pattern, in that the average hours per week worked in the business specialty was about the same as the overall average, but was about 2 to 3 hours per week lower than those worked by women in any other vocational specialty or curriculum pattern except the academic students.

Table 21 presents the average weekly earnings in February 1984 of the former sophomores by high school curriculum and vocational specialty. The

content of the various vocational curricula are quite different from one another, so their associations with weekly earnings can be expected to differ. An unexpected finding in this table was the relative advantage of the agriculture curriculum in the high school. Both the enrolled and non-enrolled groups showed the highest weekly earnings among those who specialized in agriculture in high school. Another unusual result was the relatively low weekly earnings for the business specialists; among non-students, nearly $20 per week lower than the total, and among students, $3 dollars per week lower than the total. The largest group was those who took an academic curriculum and continued their schooling; they worked the fewest hours per week, and, though their wages were not the lowest, they earned the least per week. It should be noted, however, that the categories of specialty are broad and that these figures are associated with training received in high school and not necessarily with the actual occupations in which the HS&B respondents are working.

Table 21 also presents gender differences in average weekly earnings, by high school curriculum and vocational specialty. The current interest in nontraditional vocations for women suggests that comparing the weekly earnings of men and women in the business and trade and industry specialties would be of policy interest. Among non-students, men with a business specialty earn more per week than women in the same specialty, though the $30 male-female differential within this specialty is lower than the $54 total male-female difference. Women in trade and industry earn about $72 per week less than men with that specialty. Also, the women from the trade and industry curriculum earn less than women in any other specialty; similarly, the women in the business specialty earn about $6 per week more than the average for women. The men in the business specialty earned less than any other men, except those in distributive education. This examination does not suggest a labor market payoff for pursuing a non-traditional specialty for men or for women. The gender differences among students show similar patterns.

The tables presented and discussed in this chapter have provided descriptive answers to the four questions posed at its beginning. Although the complexity of the issues addressed requires more precise comparison than the tables permit, the trends that the descriptions show are suggestive of the directions that policy should take. A summary of these findings is presented in the next chapter. The implications for policy are expanded there.

Footnotes

<10> If a 2-year college student reported a field of study that could lead to a bachelor's degree (CIP code between 1.00 and 50.00, see Malitz, 1981) or reported studying for a bachelor's or higher award, the student was not counted.

<11> While a subject matter classification of instructional programs (for example, Malitz, 1981) might seem a more appropriate way to present the distribution of awards, such a classification was not feasible. The HS&B data collection contractor, to ensure comparability with the earlier NLS-72 data, used a non-standard category system developed empirically a decade earlier by coding responses to open-ended questions on certificates and licenses earned. Those categories of responses that were occupationally related were reclassified into the standard occupational groupings according to the rules shown in Appendix A.

<12> See Fetters, Brown, and Owings, 1984, for a discussion of the issues involved in comparisons between the HS&B and the NLS-72 studies.

<13> The 1984 follow-up questionnaire asked the former sophomores for the military occupational specialty (MOS) code for the training they received. The responses were coded by the data collection contractor into the detailed occupational classification used by the Defense Department (Defense Manpower Data Center, 1980). In order to provide a more useful summary, the MOS codes were combined into the major occupational categories found in the "Standard Occupational Classification Manual" (U.S. Department of Commerce, 1980). Appendix A also lists the detailed MOS codes that were included in each of the standard occupational groups.

<14> The following procedure was used to estimate the confidence bounds around the median: first, the standard error of the median (the 50th percentile) was determined from the formula, standard error (m) = 1.7 * SQRT (50 * 50 / n), where n is the sample size and 1.7 is a design effect factor used to adjust for the sample design used in the HS&B. Next, the value of 1.96 times the standard error (m) just obtained was added to and subtracted from 50 percent to obtain the upper and lower percentiles that contain the 95 percent confidence interval. Finally, the percentiles were converted to wage rates using the distribution of hourly wage rates in each cell of the table.

CHAPTER 3

SUMMARY AND IMPLICATIONS

This chapter summarizes the findings in a series of state-ments that address the content of each of the four questions that were posed at the beginning of this report. The first question inquired whether three primary variables--race/ethnicity, gender,and socioeconomic status--were related to the level of participation in vocational education or the selection of a vocational education specialty. The second question inquired whether the primary variables, along with two more high school experience variables--the level of vocational participation and the vocational specialty selected--were related to the amount and kind ofpost-high school vocational training on the job, in schools, and in the military. The third question asked about similar relation-ships with post-high school credentialling. The fourth question asked about similar relationships with labor market outcomes--primarily hourly wage rates, but also weekly hours worked and weekly earnings. The findings are summarized below in terms of the five explanatory variables, beginning with race/ethnicity.

- Race/ethnicity did not appear to be a major factor in level of participation or in selection into the vocational specialties. Whites tended to over-participate in the academic curriculum. Blacks, and Hispanics tended to over-participate in the general curriculum.

  Race/ethnicity was associated with the kinds of certificates and licenses earned after high school. Blacks were less likely to be certified as mechanics and repairers than whites or Hispanics. White women were less likely to be certified in administrative support occupations than Hispanic women, but black women were somewhat less likely to be certified in service occupations than white women.

  Race/ethnicity was related to wages in an interesting and unexpected way. Hispanics rather than whites held the highest hourly wage rates. Attending a postsecondary school interacted with race/ethnicity with respect to wages and earnings. Students generally worked much shorter hours per week than non-students. Majority whites who were not students tended to work longer hours per week than the other racial/ethnic groups and therefore have slightly higher weekly earnings.

- Gender was a major factor in the level of participation in vocational education in the high school and in the selection of vocational specialty. Larger proportions of women participated in the vocational specialty curriculum in high school. The well known over-selection of women in business specialties, and

of men in the technical, trade and industry specialties, was again documented in the the HS&B sophomore data. Very few women took vocational training in agricultural specialties.

A greater proportion of women than men attend and complete postsecondary schooling in the form of vocational-technical training. Women were more likely than men to report using this formal training to do their jobs.

Gender was associated with the kinds of certificates and licenses earned. Women were proportionately overrepresented in service occupations and administrative support occupations. Men were proportionately overrepresented in the mechanics and repairers occupations. Gender was associated with military training in that many more men than women obtained such training.

Gender was strongly related to hourly wages, hours worked per week, and weekly earnings. Women worked fewer hours and received lower rates of pay than men. Among non-students, white women worked longer hours but received lower earnings than Hispanic women. Among students, white women were the lowest paid racial/ethnic group.

- Socioeconomic status was associated with participation in vocational education in high school. Students from the lower quartiles of socioeconomic status were more likely to follow a vocational specialist curriculum, while students from the highest quartile were more likely to follow an academic curriculum.

- High school curriculum and graduation status were related to postsecondary vocational training. More vocational specialists than academic students attended postsecondary vocational/technical schools. High school dropouts were much more likely to attend a postsecondary vocational school than a vocational program in a 2-year college.

  The median wage rates for graduates of a vocational specialty were consistently lower than those of academic or general high school graduates.

- High school vocational specialty was associated with labor market outcomes. Among students and non-students, those with training in agriculture showed the highest weekly earnings among vocational specialists.

> Men with a business and office specialty earned more per week than women in the same specialty, though the difference was lower than that found in other fields. Women in trade and industry earned less than men with that specialty, and did not have an advantage over women in any other specialty.

An earlier study by one of the present authors concluded that "The high school vocational education curriculum attracts, in disproportionate numbers, youths from the lower socioeconomic strata, rural youths, youths of lower ability (as measured by conventional intelligience or academic achievement tests), and youths with feelings of personal inadequacy (low self-esteem) (Campbell, et al. 1986, p. 98). The findings of the present study lead one to ask how well does the vocational education enterprise serve the needs of young people like these? If one keeps in mind the limitations of tabular analysis, one can draw three broad implications of the findings summarized above. First, the most severe disadvantage noted is that of gender. Moreover, the most disadvantaged women are frequently white. The kind of vocational training women undertake in high school may be part of the explanation, but not all of it.

Second, most young workers apparently do not perceive that they are receiving the on-the-job training that employers claim they are providing (e.g. "Give us people with the basics and we'll train them ourselves"). Perhaps training on the job is not generally available within the first two years out of high school.

Third, the racial/ethnic minorities did not show as much disadvantage as expected. It takes time for the full advantages of socioeconomic status and quality education to appear in the earnings of workers. Perhaps, as these factors (less available to minorites) generate greater advantages to majority whites in later years, the disadvantages to minorities will increase. On the other hand, the improvements in minority opportunities over the last decades may have produced real improvements in the status of young adults from minority backgrounds. Future follow-up surveys of the HS&B sophomores may shed light on the situation of minorities.

The tables presented by this study did not control for the many factors in addition to curriculum that may influence wage rates, hours worked, and weekly earnings. They did not therefore establish an "effect" of high school curriculum. The results of this study provide some findings that should be considered tentative because tabular descriptions cannot account for the many factors that influence these labor market outcomes. Recently published studies with more adequate statistical modeling of the relationship between vocational training and labor market outcomes have confirmed some of the tabular findings and raised questions about others. Campbell, et al. (1986) confirmed the gender and race/ethnicity trends in both the HS&B data and the National Longitudinal Surveys of Labor Market Experience-New Youth. They also found, however, that when SES, ability, self-esteem, training relatedness, and other similar factors were controlled, the findings for wages and earnings were reversed from those reported here. The results were significant, showing a distinct advantage for those who concentrate in vocational education in the high school. Thus the policy implications are that vocational education is a partial solution to the problems of the lower SES, lower ability youths but it is not sufficient by itself.

TABLES

Table 1--Vocational participation during high school of 1980 sophomores, by race/ethnicity: Fall 1982

Vocational Participation	Total	Race/ethnicity					
		Black	Hispanic	Native American	Asian	White	Other
		Percentage Distribution					
All vocational specialties	48.0	49.1	45.9	50.0	39.0	48.1	41.8
Agriculture	3.3	1.5	2.0	7.7	1.0	3.7	0.0
Business and Office 1/	28.0	24.9	24.9	20.8	20.7	29.0	18.1
Distributive Ed.	2.0	2.7	2.6	2.1	0.4	1.8	0.0
Health Occs	0.7	1.8	1.1	0.2	0.1	0.5	0.0
Home Econ 2/	1.0	1.9	0.8	0.7	0.5	0.8	7.1
Trade and Industry 3/	13.0	16.3	14.5	18.5	12.3	12.3	16.6
Vocational Generalist	2.6	2.6	2.5	3.9	1.1	2.6	1.4
General	23.7	32.8	33.0	33.3	16.2	21.4	30.2
Academic	25.6	15.5	18.6	12.8	47.6	27.8	26.5
		Sample Size					
	11,079	1,565	1,678	248	350	7,215	23

1/ Business and office includes data processing applications.
2/ Home economics includes only occupational courses.
3/ Trade and industry includes technical.
Notes: Vocational participation is based on the number of Carnegie units earned in major curriculum areas. A Carnegie unit is a standard of measurement that represents one credit for the completion of a 1-year course. See text for a description of major curriculum areas. Column percentages may not total 100 due to rounding.
SOURCE: High School and Beyond study, 1982 transcript data, unpublished tabulations.

Table 2--Vocational participation during high school of 1980 sophomores, by Hispanic subgroup: Fall 1982

Vocational Participation	Total Hispanics	Hispanic subgroup: Mexican	Cuban	Puerto Rican	Other Hispanics
		Percentage Distribution			
Vocational Specialty					
Agriculture	2.0	2.0	0.0	0.0	3.1
Business and Office 1/	24.9	26.9	17.3	23.4	23.2
Distributive Ed.	2.6	2.5	3.2	0.8	3.2
Health Occs.	1.1	0.5	0.3	0.1	2.8
Home Econ.2/	0.8	1.3	0.7	0.0	0.4
Trade and Industry 3/	14.5	14.9	11.8	20.5	11.9
Vocational Generalist	2.5	1.6	1.7	2.9	4.2
General	33.0	33.7	40.2	33.3	30.1
Academic	18.6	16.6	24.8	19.0	21.1
		Sample size			
	1,678	883	217	229	349

1/ Business and office includes data processing applications.
2/ Home economics includes only vocational courses.
3/ Trade and industry includes technical occupations.
Notes: Vocational participation is based on the number of Carnegie units earned in major curriculum areas. A Carnegie unit is a standard of measurement that represents one credit for the completion of a 1-year course. See text for a description of major curriculum areas.
SOURCE: High School and Beyond study, 1982 transcript data, unpublished tabulations.

Table 3--Vocational participation in high school of 1980 sophomores, by race/ethnicity and gender: Fall 1982

Vocational Participation	Total		Black		Hispanic		White		Asian		Native American		Other	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
	Race/ethnicity and gender													
Vocational Specialty														
	Percentage Distribution													
Agriculture	6.0	0.8	2.2	0.8	3.4	0.5	6.7	0.9	1.8	0.0	12.9	0.0	--	--
Business and Office 1/	12.9	42.2	10.8	36.8	9.4	40.5	13.6	43.7	10.9	32.0	10.4	36.0	--	--
Distributive Ed.	2.0	2.0	3.1	2.4	2.6	2.6	1.8	1.9	0.0	1.0	2.3	1.8	--	--
Health Occs.	0.2	1.1	0.6	2.7	0.2	2.0	0.2	0.8	0.0	0.2	0.2	0.2	--	--
Home Econ.2/	0.4	1.5	0.2	3.3	0.1	1.6	0.5	1.1	0.0	1.0	0.0	1.8	--	--
Trade & Indust.	20.8	5.8	25.2	8.8	21.2	7.7	19.9	5.1	17.8	6.1	26.1	7.5	--	--
Vocational Generalist	2.7	2.6	2.9	2.3	3.0	1.9	2.6	2.6	2.0	0.2	2.3	6.3	--	--
General	28.3	19.5	38.7	27.9	39.4	26.6	25.7	17.3	19.0	13.1	33.1	33.5	--	--
Academic	26.8	24.5	16.3	14.8	20.7	16.5	28.9	26.7	48.6	46.5	12.7	12.9	--	--
	Sample Size													
	5,346	5,733	737	828	786	892	3,503	3,712	172	178	140	108	8	15

1/ Business and office includes data processing applications.

2/ Home economics includes only vocational courses.

3/ Trade and industry includes technical occupations.

Notes: Vocational participation is based on the number of Carnegie units earned in major curriculum areas. A Carnegie unit is a standard of measurement that represents one credit for the completion of a 1-year course. See text for a description of major curriculum areas.

A dash (--) indicates sample size less than 25.

SOURCE: High School and Beyond study, 1982 transcript data, unpublished tabulations.

Table 4--Vocational participation during high school and graduation status of 1980 sophomores, by race/ethnicity: Spring 1984

Vocational participation and graduation status	Total	Race/ethnicity					
		Black	Hispanic	Native American	Asian	White	Other
				Percentage Distribution			
Vocational Specialist	46.1	46.8	42.5	48.2	33.8	46.5	31.0
Vocational Generalist	2.5	2.5	2.4	2.7	1.1	2.6	1.0
Academic	25.3	15.5	18.0	12.7	47.4	27.5	18.0
General	18.2	23.3	23.4	22.4	13.2	16.9	16.0
Dropout	7.9	11.9	13.8	14.0	4.5	6.6	31.0
				Sample Size			
	11,323	1,603	1,720	251	355	7,365	29

Notes: Vocational participation is based on the number of Carnegie units earned in major curriculum areas. A Carnegie unit is a standard of measurement that represents one credit for the completion of a 1-year course. See text for a description of major curriculum areas. High school dropout status is determined as of February 1984 and excludes late graduates. The column totals may not add to 100 due to rounding.

SOURCE: High School and Beyond study, 1982 transcript data, unpublished tabulations, and 1984 second follow-up data.

Table 5--Vocational participation during high school and graduation status of 1980 sophomores, by race/ethnicity and gender: Spring 1984

Vocational participation and graduation status	Total		Black		Hispanic		White		Asian		Native American		Other	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
	Race/ethnicity and gender													
	Percentage Distribution													
Vocational Specialist	40.5	51.4	39.9	52.7	34.2	50.9	41.2	51.6	30.0	38.0	49.5	46.4	--	--
Vocational Generalist	2.6	2.5	2.8	2.1	2.9	1.8	2.6	2.6	2.0	0.2	2.3	3.4	--	--
Academic	26.5	24.2	16.7	14.5	19.7	16.2	28.6	26.4	48.6	46.0	12.6	12.8	--	--
General	22.0	14.5	27.5	19.8	31.8	14.9	20.5	13.4	13.9	12.5	23.1	21.3	--	--
Dropout	8.4	7.4	13.1	10.8	11.4	16.1	7.1	6.0	5.5	3.3	12.5	16.1	--	--
	Sample Size													
	5,346	5,733	737	828	786	892	3,503	3,712	172	178	140	108	8	15

Notes: Vocational participation is based on the number of Carnegie units earned in major curriculum areas. A Carnegie unit is a standard of measurement that represents one credit for the completion of a 1-year course. See text for a description of major curriculum areas. High school dropout status is determined as of February 1984 and excludes late graduates.
A dash (--) indicates sample size less than 25.

SOURCE: High School and Beyond study, 1982 transcript data, unpublished tabulations, and 1984 second follow-up data.

Table 6--Vocational participation during high school and graduation status of 1980 sophomores, by socioeconomic status: Spring 1984

Vocational participation and graduation status	Socioeconomic status			
	Lowest Quartile	Second Quartile	Third Quartile	Highest Quartile
	Percentage Distribution			
Vocational Specialist	51.8	53.0	48.7	32.2
Vocational Generalist	1.9	2.2	3.2	2.7
Academic	10.5	18.2	26.2	47.5
General	21.9	18.7	17.6	14.7
Dropout 1/	14.0	7.9	4.4	2.9
	Sample Size			
	2,996	2,605	2,718	2,816

1/ Includes only those who did not obtain enough credits to be classified in another category before leaving, and did not return within two years. Some students who dropped out after the data were collected in 1982 are excluded from this category.

Notes: Vocational participation is based on the number of Carnegie units earned in major curriculum areas. A Carnegie unit is a standard of measurement that represents one credit for the completion of a 1-year course. See text for a description of major curriculum areas. High school dropout status is determined as of February 1984 and excludes late graduates.

SOURCE: High School and Beyond study, 1982 transcript data, unpublished tabulations, and 1984 second follow-up data.

Table 7--Participation in postsecondary vocational training after high school and relationship to current job of 1980 sophomores, by high school curriculum and graduation status: Spring 1984

Postsecondary vocational training	Total	High school curriculum and graduation status							
		Vocational specialist		Vocational generalist		Academic		General	
		Grad	Dropout	Grad	Dropout	Grad	Dropout	Grad	Dropout
		Percentage Distribution							
Formal on-the-job training, days 1/									
5 or more	15.9	16.9	15.1	18.1	--	11.5	--	18.3	14.8
1 to 4	9.6	10.5	14.6	9.7	--	9.6	--	8.0	8.0
None	74.5	72.5	70.4	72.2	--	79.0	--	73.7	77.2
Informal on-the-job training, days									
5 or more	15.3	16.1	15.8	13.7	--	12.2	--	17.6	15.1
1 to 4	9.4	8.6	9.1	15.5	--	10.8	--	8.9	6.0
None	75.3	75.3	75.1	70.8	--	77.0	--	73.5	78.9
Formal Apprenticeship	0.7	0.9	0.0	0.7	--	0.3	--	0.6	0.9
Government training 2/	3.2	3.2	0.0	3.9	--	1.4	--	5.0	6.0
Job-Related 3/	6.1	5.2	--	--	--	14.0	--	5.5	0.0
		Sample Size							
1980 Sophomores	11,322	4,749	223	263	12	3,422	13	2,775	815
Formal OJT	10,768	4,298	214	239	9	3,273	13	1,854	763
Informal OJT	10,630	4,248	208	236	8	3,229	13	1,829	754
Apprenticeship or Government Training	11,322	4,525	223	251	12	3,408	13	1,959	815
Job Related 4/	364	151	9	9	0	54	0	93	41

1/ Formal training includes training provided by employers.

2/ Government training includes the WIN, Job Corps, and CETA or JTPA federal as well as state or locally sponsored training programs.

3/ "Job related" means that the respondent reported that formal training was received from an apprenticeship or government training program to do the worker's current or most recent job.

4/ Sample for the job-related distribution includes those who received training through a formal apprenticeship or government training program and who held a job during the first 20 months after high school graduation.

Note: High school curriculum is based on the number of Carnegie units earned in major curriculum areas. A Carnegie unit is a standard of measurement that represents one credits for the completion of a 1-year course. High school dropout status is determined as of February 1984 and excludes late graduates.
A dash (--) indicates sample size less than 25 cases.

SOURCE: High School and Beyond study, 1982 transcript and 1984 second follow-up data, unpublished tabulations.

Table 8--Participation in postsecondary vocational schooling after high school and relationship to current job of 1980 sophomores, by high school curriculum and graduation status: Spring 1984

Postsecondary vocational schooling	Total	Vocational specialist		Vocational generalist		Academic		General	
		Grad	Dropout	Grad	Dropout	Grad	Dropout	Grad	Dropout
		High school curriculum and graduation status							
Percentage Distribution									
Ever attended vocational/ technical schools									
Total	11.2	13.7	4.2	13.7	--	6.6	--	10.9	7.8
Male	9.3	11.2	5.0	9.3	--	5.7	--	9.9	7.1
Female	13.0	15.5	3.5	18.0	--	7.5	--	12.3	8.6
Completed									
Total	36.5	39.5	--	32.8	--	32.6	--	31.9	18.6
Male	29.3	31.1	--	--	--	31.2	--	26.1	18.3
Female	41.2	43.7	--	--	--	33.7	--	38.3	18.8
Job related 2/									
Total	23.4	24.1	--	19.6	--	22.4	--	76.2	51.4
Male	16.6	12.7	--	--	--	19.6	--	68.5	44.5
Female	23.4	19.9	--	--	--	24.7	--	84.7	--
Ever attended vocational program in 2-year college									
Total	11.7	12.1	--	13.2	--	12.4	--	10.2	2.4
Male	10.2	10.1	--	--	--	11.0	--	9.1	2.1
Female	13.2	13.7	--	--	--	13.9	--	11.7	2.8
Completed									
Total	8.9	9.3	--	1.4	--	9.5	--	7.1	--
Male	6.3	8.8	--	--	--	3.6	--	5.2	--
Female	10.9	9.6	--	--	--	14.6	--	9.3	--
Job related 2/									
Total	8.4	10.3	--	1.8	--	7.3	--	6.1	--
Male	8.5	10.3	--	--	--	6.6	--	8.6	--
Female	8.3	10.3	--	--	--	7.8	--	3.1	--
Sample size									
All 1980 sophomores									
Total	11,329	4,743	221	263	12	3,427	13	2,784	816
Male	5,490	1,954	107	130	4	1,766	5	1,576	432
Female	5,839	2,789	114	133	8	1,661	8	1,208	384
Ever attended vocational/ technical schools									
Total	1,155	602	10	32	1	200	0	244	56
Male	447	185	5	13	0	85	0	125	28
Female	708	417	5	19	1	115	0	119	28
Ever worked									
Total	1,038	534	8	30	1	193	0	220	45
Male	418	173	4	14	0	84	0	114	25
Female	620	361	4	16	1	109	0	106	20

Table 8 (continued)

Postsecondary vocational schooling	Total	High school curriculum and graduation status							
		Vocational specialist		Vocational generalist		Academic		General	
		Grad	Dropout	Grad	Dropout	Grad	Dropout	Grad	Dropout
All 1980 sophomores		Sample size							
Ever attended vocational program in 2-year college									
Total	1,292	577	4	36	0	386	0	256	22
Male	568	209	2	18	0	184	0	138	12
Female	724	368	2	18	0	202	0	118	10
Ever worked									
Total	1,178	546	3	33	0	350	0	219	18
Male	514	196	1	16	0	165	0	121	10
Female	664	350	2	17	0	185	0	98	8

1/ Sample for the job-related distribution includes those who received vocational schooling in a vocational or technical school or 2-year college and who held a job during the first 20 months after high school graduation.

2/ "Job related" means that the respondent reported that formal training was received from a vocational school or from a junior or community college to do the worker's current or most recent job.

3/ Sample for the job-related distribution includes those who received training through a formal apprenticeship or government training program and who held a job during the first 20 months after high school graduation.

Note: High school curriculum is based on the number of Carnegie units earned in major curriculum areas. A Carnegie unit is a standard of measurement that represents one credit for the completion of a 1-year course. High school dropout status is determined as of February 1984 and excludes late graduates.

A dash (--) indicates sample size less than 25 cases.

SOURCE: High School and Beyond study, 1982 transcript and 1984 second follow-up data, unpublished tabulations.

Table 9--Certification and licensure after high school of 1980 sophomores, by high school curriculum and graduation status: Spring 1984

Certification and licensure	Total	High school curriculum and graduation status							
		Vocational Specialist		Vocational Generalist		Academic		General	
		Grad	Dropout	Grad	Dropout	Grad	Dropout	Grad	Dropout
		Percentage Distribution							
Any certificate or license	10.7	11.7	5.7	8.3	--	8.1	--	11.8	10.1
Occupational field for which certified or licensed 1/									
Management related occupations	1.7	2.9	--	0.0	--	0.3	--	0.4	0.0
Social, rec. & religious occs.	0.5	0.0	--	0.0	--	1.6	--	0.9	0.0
Teachers	0.3	0.3	--	0.0	--	0.5	--	0.2	0.0
Writers, artists & entertainers	0.3	0.3	--	2.1	--	0.2	--	0.2	0.0
Health technologists & technicians	1.5	0.8	--	7.6	--	1.8	--	2.0	0.0
Engineering & related technologies	0.5	0.4	--	0.0	--	0.0	--	1.2	0.0
Ins, real est & securities sales	1.1	0.7	--	0.3	--	1.0	--	2.0	0.0
Sales & sales related occs	1.3	0.0	--	0.0	--	0.3	--	2.9	0.0
Administrative support occs	10.5	13.8	--	9.4	--	5.0	--	8.3	0.7
Protective service occupations	0.4	0.3	--	0.6	--	0.0	--	0.9	0.0
Service occupations	24.2	28.0	--	32.7	--	23.7	--	16.1	14.2
Mechanics & repairers	9.1	8.3	--	10.7	--	9.9	--	10.0	3.5
Construction trades	1.8	1.7	--	0.0	--	0.2	--	3.3	5.1
Extractive occupations	0.0	0.0	--	0.0	--	0.0	--	0.0	0.0
Precision production occs	0.0	0.0	--	0.0	--	0.0	--	0.1	0.0
Fabricators, assem & handworkers	2.1	2.1	--	0.0	--	1.9	--	1.4	2.6
Trans, & material moving occs	2.2	2.4	--	0.0	--	2.0	--	2.2	1.1
Other & not specified	48.7	43.8	--	52.5	--	55.6	--	53.8	79.8 2/
		Sample Size (all 1980 sophomores)							
	10,868	4,344	208	241	12	3,313	13	1,859	764
		Sample Size (with certificate or license)							
	1,133	531	13	25	2	246	0	318	78

1/ Sample for the occupational-field distribution includes those who received one or more license or certificate in at least one occupational field. Licenses and certificates earned in recreational activities are not included.

2/ This category contains all cases not classifiable into the remaining occupational fields (see text).

Notes: High school curriculum is based on the number of Carnegie units earned in major curriculum areas. A Carnegie unit is a standard of measurement that represents one credit for the completion of a 1-year course. High school dropout status is determined as of February 1984 and excludes late graduates.

A dash (--) indicates sample size less than 25 cases.

SOURCE: High School and Beyond study, 1982 transcript and 1984 second follow-up data, unpublished tabulations.

Table 10--Certification and license after high school of 1980 sophomores, by gender and race/ethnicity: Spring 1984

Certification and license	Gender and race/ethnicity									
	Male					Female				
	Total	Black	Hispanic	White	Asian	Total	Black	Hispanic	White	Asian
	Percentage Distribution									
Any certificate or license	9.9	11.2	10.1	9.6	6.93	11.5	17.5	12.1	10.3	6.6
Occupational field for which certified or licensed 1/										
Management related occupations	1.4	2.7	0.3	1.3	--	1.9	1.6	0.7	2.2	--
Social, rec. & religious occs.	0.8	5.3	0.0	0.2	--	0.3	0.0	0.5	0.4	--
Teachers	0.3	1.3	1.5	0.0	--	0.3	0.0	0.1	0.5	--
Writers, artists & entertainers	0.2	0.0	0.0	0.1	--	0.4	0.0	0.0	0.5	--
Health technologists & technicians	0.0	0.0	0.0	0.0	--	2.7	1.8	2.5	2.3	--
Engineering & related technologies	1.1	2.5	5.5	0.5	--	0.0	0.0	0.0	0.0	--
Ins, real est & securities sales	1.3	0.0	0.0	1.8	--	0.8	0.0	0.0	1.2	--
Sales & sales related occs	0.7	0.0	0.0	1.0	--	1.7	0.5	3.3	1.7	--
Administrative support occs	2.2	1.2	0.3	2.7	--	17.1	23.3	29.7	14.3	--
Protective service occupations	0.7	0.0	5.2	0.5	--	0.1	0.0	0.0	0.1	--
Service occupations	3.6	3.8	3.5	3.7	--	40.8	29.5	36.4	44.5	--
Mechanics & repairers	17.7	4.6	19.6	20.4	--	2.1	0.8	1.1	2.4	--
Construction trades	3.9	11.1	0.0	3.2	--	0.0	0.0	0.0	0.0	--
Extractive occupations	0.0	0.0	0.0	0.0	--	0.0	0.0	0.0	0.0	--
Precision production occs	0.0	0.0	0.5	0.0	--	0.0	0.0	0.0	0.0	--
Fabricators, assem & handworkers	4.3	0.3	10.0	3.9	--	0.4	0.7	0.0	0.4	--
Trans, & material moving occs	4.5	3.9	0.6	4.9	--	0.4	1.2	0.0	0.2	--
Other & not specified	2.6	2.5	4.7	2.4	--	3.1	2.0	0.0	3.9	--
	Sample size									
	5,211	716	754	3,430	169	5,657	827	874	3,661	180
	Sample size (with certificate or license)									
	502	80	82	309	11	631	127	101	376	10

1/ Sample for the occupational-field distribution includes those who received one or more license or certificate in at least one occupational field. Licenses and certificates earned in recreational activities are not included.

Notes: High school curriculum is based on the number of Carnegie units earned in major curriculum areas. A Carnegie unit is a standard of measurement that represents one credit for the completion of a 1-year course. High school dropout status is determined as of February 1984 and excludes late graduates. A dash (--) indicates sample size less than 25 cases.

SOURCE: High School and Beyond study, 1982 transcript and 1984 second follow-up data, unpublished tabulations.

Table 11--Male participation in military vocational training after high school of 1980 sophomores, by high school curriculum: Spring 1984

Military vocational training	Total	High school curriculum: Vocational specialist	Vocational generalist	Academic	General
		Percentage Distribution			
Any military vocational training 1/	5.3	5.8	4.2	4.0	5.8
Occupational field for which certified or licensed 2/					
Management related occupations	3.7	2.1	--	4.1	5.7
Natural scientists and math.	1.7	0.3	--	0.8	4.4
Engineering & related technologies	0.8	0.5	--	0.0	1.9
Science technologies & technicians	4.2	1.8	--	8.8	5.3
Technicians, other	2.9	5.4	--	2.1	0.0
Sales & sales related occs	3.4	4.8	--	0.0	3.9
Administrative support occs	20.9	19.8	--	24.3	19.2
Protective service occupations	8.1	8.8	--	9.2	7.0
Service occupations	3.0	1.7	--	0.0	7.1
Mechanics & repairers	23.3	28.0	--	16.6	21.0
Construction trades	9.9	6.7	--	14.5	9.7
Precision production occs	2.0	1.9	--	0.0	2.9
Trans, & material moving occs	5.4	9.1	--	0.8	3.2
Military combat	10.8	9.2	--	18.7	8.7
Job-Related 3/	92.8	97.1	--	88.5	95.8
		Sample size			
Total	5499	1958	130	1770	1576
Sample size (with military vocational training)	290	116	9	74	83
Sample size (with military vocational training and a related job) 4/	143	54	6	39	43

1/ Military vocational training indicates four weeks or more of specialized schooling while in the armed forces.

2/ Sample for the occupational-field distribution includes those who received military vocational training in at least one occupational field. Field reported for the specialized program in which the trainee spent the longest period of time.

3/ "Job related" means that the respondent reported that formal training was received from military service to do the worker's current or most recent job. Military jobs were included.

4/ Sample for the job-related distribution includes those who received training through a formal apprenticeship or government training program and who held a job during the first 20 months after high school graduation.

Note: High school curriculum is based on the number of Carnegie units earned in major curriculum areas. A Carnegie unit is a standard of measurement that represents one credit for the completion of a 1-year course.

SOURCE: High School and Beyond study, 1982 transcript and 1984 second follow-up data, unpublished tabulations.

Table 12--Hourly wage rates at current job of 1980 sophomores, by high school curriculum and graduation status, gender, and current postsecondary enrollment status: Spring 1984

Current postsecondary enrollment status and gender	Total	Vocational Specialist		Vocational Generalist		Academic		General	
		Grad	Dropout	Grad	Dropout	Grad	Dropout	Grad	Dropout
Not enrolled				Median in Dollars Per Hour					
Total	$4.39	4.33	4.47	5.05	--	4.47	--	4.43	4.43
Male	4.75	4.75	4.87	5.35	--	4.61	--	4.73	4.57
Female	4.00	4.04	3.73	4.27	--	4.20	--	3.98	3.72
Enrolled									
Total	3.99	3.91	--	4.10	--	3.99	--	4.05	--
Male	4.00	3.99	--	4.17	--	3.99	--	4.32	--
Female	3.80	3.74	--	3.96	--	3.82	--	3.90	--
Not enrolled				95 Percent Confidence Bounds, Dollars Per Hour					
Total, lower	$4.25	4.19	3.79	4.13	--	4.20	--	4.23	3.99
Total, upper	4.49	4.49	5.00	6.05	--	4.70	--	4.61	4.92
Male, lower	4.55	4.49	3.92	4.03	--	4.28	--	4.48	4.25
Male, upper	4.99	4.99	6.10	6.96	--	4.98	--	4.99	5.09
Female, lower	3.98	3.97	3.13	3.29	--	3.94	--	3.75	3.34
Female, upper	4.15	4.23	4.84	5.26	--	4.61	--	4.12	4.09
Enrolled									
Total, lower	3.93	3.74	--	3.58	--	3.89	--	3.95	--
Total, upper	4.00	3.99	--	4.98	--	4.00	--	4.44	--
Male, lower	3.99	3.84	--	3.51	--	3.96	--	3.98	--
Male, upper	4.23	4.49	--	5.36	--	4.20	--	4.75	--
Female, lower	3.73	3.57	--	3.48	--	3.66	--	3.59	--
Female, upper	3.99	3.98	--	5.03	--	3.99	--	4.24	--
				Sample Size					
Not enrolled									
Total	3,653	1,763	102	72	5	526	4	779	355
Male	1,983	797	63	41	1	306	0	497	247
Female	1,670	966	39	31	4	220	4	392	108
Enrolled									
Total	2,870	1,072	0	78	0	1,346	0	348	15
Male	1,310	398	0	40	0	657	0	200	10
Female	1,560	674	0	38	0	689	0	148	5

Notes: Postsecondary enrollment status is defined to be attendance in any 4-year college, 2-year college, or business, trade, vocational or technical school as of February 1984. High school curriculum is based on the number of Carnegie units (a unit that represents one credit per 1-year course) earned in major curriculum areas. High school dropout status is determined as of February 1984 and excludes late graduates.

A dash (--) indicates sample size less than 25 cases.

SOURCE: High School and Beyond study, 1982 transcript and 1984 second follow-up data, unpublished tabulations.

Table 13--Hourly wage rates at current job of 1980 sophomores, by race/ethnicity, gender, and current postsecondary enrollment status: Spring 1984

Current postsecondary enrollment status and gender	Race/ethnicity						
	Total	Black	Hispanic	Native American	Asian	White	Other
	Median in Dollars Per Hour						
Not enrolled							
Total	$4.39	4.29	4.50	3.96	3.96	4.39	--
Male	4.75	4.44	4.83	3.78	3.98	4.81	--
Female	4.00	3.91	4.09	4.12	3.53	4.00	--
Enrolled							
Total	3.99	3.96	4.46	4.06	4.39	3.98	--
Male	4.00	4.31	4.69	--	4.13	3.99	--
Female	3.80	3.65	4.14	--	4.55	3.78	--
	95 Percent Confidence Bounds, Dollars Per Hour						
Not enrolled							
Total, lower	$4.25	3.99	4.29	3.47	3.34	4.25	--
Total, upper	4.49	4.61	4.83	4.94	4.59	4.50	--
Male, lower	4.55	4.05	4.49	3.34	3.20	4.52	--
Male, upper	4.99	4.86	5.00	5.52	4.80	5.00	--
Female, lower	3.98	3.51	3.94	3.35	3.10	3.97	--
Female, upper	4.15	4.60	4.50	5.48	5.12	4.20	--
Enrolled							
Total, lower	3.90	3.50	4.00	2.70	3.80	3.80	--
Total, upper	4.00	4.32	4.87	5.70	4.94	3.99	--
Male, lower	3.90	3.50	3.90	--	3.60	3.90	--
Male, upper	4.23	4.85	4.99	--	4.94	4.22	--
Female, lower	3.70	3.40	3.80	--	3.60	3.60	--
Female, upper	3.99	4.20	4.89	--	5.34	3.97	--
	Sample Size						
Not enrolled							
Total	3653	429	616	82	66	2448	12
Male	1983	266	349	56	33	1271	8
Female	1670	163	267	26	33	1177	4
Enrolled							
Total	2870	309	393	21	114	2026	7
Male	1310	133	171	12	43	947	4
Female	1560	176	222	9	71	1079	3

Notes: Postsecondary enrollment status is defined to be attendance in any 4-year college, 2-year college, or business, trade, vocational or technical school as of February 1984.
A dash (--) indicates sample size less than 25 cases.

SOURCE: High School and Beyond study, 1982 transcript and 1984 second follow-up data, unpublished tabulations.

Table 14--Hourly wage rates at current job of 1980 sophomores, by curriculum and vocational specialization, gender, and current postsecondary enrollment status: Spring 1984

Current postsecondary enrollment status and gender	High school curriculum: Vocational Specialty									
	Total	Agriculture	Business	Distributive Ed	Health Occs	Home Econ.2/	Trade and Industry3/	Vocational Generalist	General	Academic
Not enrolled				**Median in Dollars Per Hour**						
Total	$4.39	4.60	4.12	4.14	--	4.69	4.54	5.05	4.43	4.47
Male	4.75	4.91	4.18	4.66	--	--	4.90	5.35	4.73	4.61
Female	4.00	--	4.11	3.93	--	--	3.91	4.27	3.98	4.20
Enrolled										
Total	3.99	3.55	3.82	3.84	--	--	3.97	4.10	4.05	3.99
Male	4.00	3.66	4.00	--	--	--	3.99	4.17	4.32	3.99
Female	3.80	--	3.74	--	--	--	3.49	3.96	3.90	3.82
Not enrolled				**95 Percent Confidence Bounds, Dollars Per Hour**						
Total, lower	$4.25	4.26	3.99	3.48	--	3.40	4.25	4.13	4.23	4.20
Total, upper	4.49	5.51	4.30	4.87	--	6.86	4.99	6.05	4.61	4.70
Male, lower	4.55	4.48	3.90	3.35	--	--	4.49	4.03	4.48	4.28
Male, upper	4.99	6.09	4.85	5.15	--	--	5.14	6.96	4.99	4.97
Female, lower	3.98	--	3.98	3.35	--	--	3.69	3.29	3.75	3.94
Female, upper	4.15	--	4.30	4.91	--	--	4.23	5.26	4.12	4.61
Enrolled										
Total, lower	3.93	3.08	3.65	3.34	--	--	3.68	3.58	3.95	3.89
Total, upper	4.00	4.48	3.99	5.23	--	--	4.85	4.98	4.44	4.00
Male, lower	3.99	2.92	3.73	--	--	--	3.86	3.51	3.98	3.96
Male, upper	4.23	4.78	4.72	--	--	--	4.95	5.36	4.75	4.20
Female, lower	3.73	--	3.58	--	--	--	3.34	3.48	3.59	3.66
Female, upper	3.99	--	3.98	--	--	--	4.82	5.03	4.24	3.99
Not enrolled				**Sample Size**						
Total	3,653	128	1,003	90	17	26	602	77	1,134	530
Male	1,983	115	216	45	1	8	475	42	744	306
Female	1,670	13	787	45	16	18	127	35	390	224
Enrolled										
Total	2,870	41	787	36	13	14	181	78	363	1346
Male	1,310	35	201	20	2	3	137	40	210	657
Female	1,560	6	586	16	11	11	44	38	153	689

1/ Business includes data processing applications.

2/ Home economics includes only vocational courses.

3/ Trade and industry includes technical occupations.

Notes: Postsecondary enrollment status is defined to be attendance in any 4-year college, 2-year college, or business, trade, vocational or technical school as of February 1984. High school curriculum is based on the number of Carnegie units earned in major curriculum areas. A Carnegie unit is a standard of measurement that represents one credit for the completion of a 1-year course.

A dash (--) indicates sample size less than 25 cases.

SOURCE: High School and Beyond study, 1982 transcript and 1984 second follow-up data, unpublished tabulations.

Table 15--Hourly wage rates at current job of 1980 sophomores, by socioeconomic status, and current postsecondary enrollment status: Spring 1984

Current postsecondary enrollment status	Total	Socioeconomic status: Lowest Quartile	Second Quartile	Third Quartile	Highest Quartile
		Median in Dollars Per Hour			
Not enrolled	$4.39	4.14	4.33	4.50	4.62
Enrolled	3.99	3.82	3.75	3.99	3.99
		95 Percent Confidence Bounds, Dollars Per Hour			
Not enrolled					
Lower bound	$4.25	3.69	3.83	3.99	3.94
Upper bound	4.49	4.06	4.17	4.49	4.63
Enrolled					
Lower bound	3.93	3.48	3.48	3.64	3.71
Upper bound	4.00	3.97	3.95	4.00	3.98
		Sample Size			
Not enrolled	3,653	1,198	1,062	851	477
Enrolled	2,870	417	571	831	1,045

Notes: Postsecondary enrollment status is defined to be attendance in any 4-year college, 2-year college, or business, trade, vocational or technical school as of February 1984.

SOURCE: High School and Beyond study, 1982 transcript and 1984 second follow-up data, unpublished tabulations.

Table 16--Weekly hours worked at current job of 1980 sophomores, by high school curriculum and graduation status, gender, and current post-secondary enrollment status: Spring 1984

Current post-secondary enrollment status and gender	Total	High school curriculum and graduation status: Vocational Specialist Grad	Vocational Specialist Dropout	Vocational Generalist Grad	Vocational Generalist Dropout	Academic Grad	Academic Dropout	General Grad	General Dropout
Average In Hours Per Week									
Not enrolled									
Total	39.2	39.1	37.0	41.5	--	39.2	--	39.4	39.5
Male	42.1	42.6	39.5	45.5	--	41.0	--	41.6	41.5
Female	36.0	36.0	32.8	34.7	--	36.8	--	35.7	34.9
Enrolled									
Total	26.7	27.8	--	27.7	--	24.4	--	30.2	--
Male	29.8	31.4	--	31.4	--	27.3	--	33.1	--
Female	23.9	25.4	--	23.7	--	21.6	--	26.3	--
Standard Deviation, Hours Per Week									
Not enrolled									
Total	12.1	12.7	12.2	16.2	--	10.9	--	12.0	9.7
Male	12.0	12.7	11.7	17.9	--	11.3	--	11.9	9.2
Female	11.2	11.7	12.3	11.2	--	9.7	--	11.1	9.7
Enrolled									
Total	12.9	13.5	--	12.6	--	12.1	--	13.1	--
Male	13.1	14.2	--	12.3	--	12.0	--	13.6	--
Female	12.1	12.5	--	11.7	--	11.7	--	11.3	--
Sample Size									
Not enrolled									
Total	3,874	1,885	109	81	6	566	5	837	384
Male	2,085	846	68	44	1	329	1	530	266
Female	1,789	1,039	41	37	5	237	4	307	118
Enrolled									
Total	3,068	1,159	0	81	0	1,446	0	366	16
Male	1,411	436	0	42	0	708	0	214	11
Female	1,657	723	0	39	0	738	0	152	5

Notes: Postsecondary enrollment status is defined to be attendance in any 4-year college, 2-year college, or business, trade, vocational or technical school as of February 1984. High school curriculum is based on the number of Carnegie units (a unit that represents one credit per 1-year course) earned in major curriculum areas. High school dropout status is determined as of February 1984 and excludes late graduates.
A dash (--) indicates sample size less than 25 cases.

SOURCE: High School and Beyond study, 1982 transcript and 1984 second follow-up data, unpublished tabulations.

Table 17--Weekly earnings at current job of 1980 sophomores, by high school curriculum and graduation status, gender, and current postsecondary enrollment status: Spring 1984

Current postsecondary enrollment status and gender	Total	High school curriculum and graduation status: Vocational Specialist Grad	Vocational Specialist Dropout	Vocational Generalist Grad	Vocational Generalist Dropout	Academic Grad	Academic Dropout	General Grad	General Dropout
Not enrolled				Average in Dollars Per Week					
Total	$195.75	194.99	186.21	224.20	--	199.96	--	193.21	196.59
Male	221.17	225.88	200.72	256.41	--	219.46	--	214.18	214.44
Female	166.53	168.55	160.16	151.19	--	173.59	--	157.78	155.22
Enrolled									
Total	124.19	127.28	--	136.42	--	114.06	--	143.16	--
Male	144.09	149.27	--	161.54	--	130.31	--	166.25	--
Female	107.06	113.17	--	109.07	--	98.47	--	112.07	--
Not enrolled				Standard Deviation, Dollars Per Week					
Total	123.38	143.26	96.58	124.15	--	105.39	--	93.69	104.24
Male	117.23	135.36	82.88	146.69	--	106.98	--	96.72	103.05
Female	123.19	143.12	112.46	38.57	--	97.68	--	75.04	97.82
Enrolled									
Total	90.20	87.35	--	116.65	--	87.80	--	96.76	--
Male	94.92	96.51	--	144.33	--	84.18	--	105.86	--
Female	82.64	78.47	--	69.37	--	88.92	--	72.01	--
Not enrolled				Sample Size					
Total	3,573	1,750	100	72	5	524	4	771	346
Male	1,932	792	62	41	1	305	0	490	241
Female	1,641	958	38	31	4	219	4	281	105
Enrolled									
Total	2,829	1,056	0	78	0	1,337	0	343	15
Male	1,294	391	0	40	0	654	0	199	10
Female	1,535	665	0	38	0	683	0	144	5

Notes: Postsecondary enrollment status is defined to be attendance in any 4-year college, 2-year college, or business, trade, vocational or technical school as of February 1984. High school curriculum is based on the number of Carnegie units earned in major curriculum areas. A Carnegie unit is a standard of measurement that represents one credit for the completion of a 1-year course.
A dash (--) indicates sample size less than 25 cases.

SOURCE: High School and Beyond study, 1982 transcript and 1984 second follow-up data, unpublished tabulations.

Table 18--Weekly hours worked at current job of 1980 sophomores, by race/ethnicity, gender, and current postsecondary enrollment status: Spring 1984

Current postsecondary enrollment status and gender	Total	Race/ethnicity: Black	Hispanic	Native American	Asian	White	Other
Not Enrolled			Average in Hours Per Week				
Total	39.2	36.8	38.2	36.3	38.3	39.7	--
Male	42.1	39.7	41.0	38.9	40.4	42.6	--
Female	35.9	32.9	34.6	31.9	35.9	36.5	--
Enrolled							
Total	26.7	27.2	27.9	24.3	22.5	26.6	--
Male	29.8	29.6	29.3	--	24.6	30.0	--
Female	23.9	25.4	26.7	--	20.9	23.7	--
Not enrolled			Standard Deviation, Hours Per Week				
Total	12.1	12.8	8.4	9.9	7.6	12.8	--
Male	12.0	11.8	8.4	10.2	7.9	13.0	--
Female	11.2	13.1	7.7	8.6	6.9	11.6	--
Enrolled							
Total	12.9	9.9	6.8	8.2	8.8	14.4	--
Male	13.1	10.2	6.7	--	10.6	14.5	--
Female	12.1	9.4	6.9	--	7.1	13.5	--
Not enrolled			Sample Size				
Total	3,874	450	640	92	78	2,602	12
Male	2,085	272	360	60	40	1,345	8
Female	1,789	178	280	32	38	1,257	4
Enrolled							
Total	3,068	321	420	25	136	2,159	7
Male	1,411	138	183	15	57	1,014	4
Female	1,657	183	237	10	79	1,145	3

Notes: Postsecondary enrollment status is defined to be attendance in any 4-year college, 2-year college, or business, trade, vocational or technical school as of February 1984.
A dash (--) indicates sample size less than 25 cases.

SOURCE: High School and Beyond study, 1982 transcript and 1984 second follow-up data, unpublished tabulations.

Table 19--Weekly earnings at current job of 1980 sophomores, by race/ethnicity, gender, and current postsecondary enrollment status: Spring 1984

Current postsecondary enrollment status and gender	Total	Race/ethnicity: Black	Hispanic	Native American	Asian	White	Other
			Average in Dollars Per Week				
Not enrolled							
Total	$195.75	179.49	196.35	178.15	164.12	198.64	--
Male	221.17	194.77	210.99	189.42	180.07	227.94	--
Female	123.19	157.86	177.64	157.27	144.53	166.79	--
Enrolled							
Total	124.19	124.48	141.60	--	110.18	123.32	--
Male	144.09	142.57	155.69	--	108.14	143.97	--
Female	107.06	110.11	128.85	--	111.54	105.45	--
			Standard Deviation, Dollars Per Week				
Not enrolled							
Total	123.38	105.42	79.48	60.74	55.17	137.28	--
Male	117.23	94.89	61.84	67.43	64.55	133.68	--
Female	123.19	116.58	96.25	40.93	40.84	132.03	--
Enrolled							
Total	90.20	65.63	51.72	--	86.85	153.00	--
Male	94.92	66.96	65.32	--	44.72	104.36	--
Female	82.64	62.34	36.68	--	48.49	93.09	--
			Sample Size				
Not enrolled							
Total	3,573	417	599	78	65	2,402	12
Male	1,932	256	340	52	33	1,243	8
Female	1,641	161	259	26	32	1,159	4
Enrolled							
Total	2,829	300	386	20	110	2,006	7
Male	1,294	130	169	11	43	937	4
Female	1,535	170	217	9	67	1,069	3

Notes: Postsecondary enrollment status is defined to be attendance in any 4-year college, 2-year college, or business, trade, vocational or technical school as of February 1984.
A dash (--) indicates sample size less than 25 cases.

SOURCE: High School and Beyond study, 1982 transcript and 1984 second follow-up data, unpublished tabulations.

Table 20--Weekly hours worked at current job of 1980 sophomores, by curriculum and vocational specialization, gender, and current postsecondary enrollment status: Spring 1984

Current postsecondary enrollment status and gender	Total	High school curriculum: Vocational Specialty: Agriculture	Business & Office 1/	Distributive Ed	Health Occs	Home Econ 2/	Trade and Industry 3/	Vocational Generalist	General	Academic
Average in Hours Per Week										
Not enrolled										
Total	39.2	42.2	37.1	39.6	--	35.5	41.3	41.3	39.5	39.2
Male	42.1	43.0	42.1	41.3	--	--	42.5	45.3	41.6	41.0
Female	35.9	--	35.9	37.7	--	--	36.2	34.7	35.5	36.8
Enrolled										
Total	26.7	36.4	26.3	29.0	--	--	29.9	27.7	30.3	24.4
Male	29.8	37.4	29.0	--	--	--	31.3	31.4	33.0	27.3
Female	23.9	--	25.4	--	--	--	25.1	23.7	26.5	21.6
Standard Deviation, Hours Per Week										
Not enrolled										
Total	12.1	14.6	12.1	11.9	12.3	13.3	12.5	15.8	11.3	10.8
Male	12.0	14.1	12.2	12.2	--	--	12.6	17.8	11.1	11.3
Female	11.2	--	11.7	11.5	--	--	10.9	11.0	10.7	9.6
Enrolled										
Total	12.9	19.5	12.1	13.6	--	--	14.3	12.6	13.0	12.1
Male	13.1	19.5	12.2	--	--	--	--	12.3	13.5	12.0
Female	12.1	--	11.7	--	--	--	12.3	11.7	11.2	11.7
Sample Size										
Not enrolled										
Total	3,874	138	1,076	91	18	31	641	87	1,221	571
Male	2,085	124	229	45	1	8	507	45	796	330
Female	1,789	14	847	46	17	23	134	42	425	241
Enrolled										
Total	3,068	52	844	40	12	14	197	81	382	1,446
Male	1,411	45	216	21	2	3	149	42	225	708
Female	1,657	7	628	19	10	11	48	39	157	738

1/ Business and office includes data processing applications.

2/ Home economics includes only vocational courses.

3/ Trade and industry includes technical occupations.

Notes: Postsecondary enrollment status is defined to be attendance in any 4-year college, 2-year college, or business, trade, vocational or technical school as of February 1984. High school curriculum is based on the number of Carnegie units earned in major curriculum areas. A Carnegie unit is a standard of measurement that represents one credit for the completion of a 1-year course.

A dash (--) indicates sample size less than 25 cases.

SOURCE: High School and Beyond study, 1982 transcript and 1984 second follow-up data, unpublished tabulations.

Table 21--Weekly earnings at current job of 1980 sophomores, by curriculum and vocational specialization, gender, and current postsecondary enrollment status: Spring 1984

Current postsecondary enrollment status and gender	Total	High school curriculum: Vocational Specialty: Agriculture	Business & Office 1/	Distributive Ed.	Health Occs	Home Econ.2/	Trade and Industry 3/	Vocational Generalist	General	Academic
					Average in Dollars Per Week					
Not enrolled										
Total	$195.75	239.27	176.79	198.96	--	188.71	212.21	224.88	194.07	199.84
Male	221.17	253.94	201.27	201.04	--	--	226.76	253.49	214.25	219.46
Female	166.53	--	171.04	196.66	--	--	154.88	162.54	157.23	173.77
Enrolled										
Total	124.19	157.38	120.95	137.94	--	--	139.84	136.42	143.92	114.06
Male	144.09	160.66	141.62	--	--	--	152.01	161.54	166.53	130.31
Female	107.06	--	114.04	--	--	--	98.42	109.07	112.54	98.47
					Standard Deviation, Dollars Per Week					
Not enrolled										
Total	123.38	164.87	143.87	167.66	--	101.75	122.59	122.28	97.04	105.07
Male	117.23	164.79	123.74	112.17	--	--	127.92	146.48	98.78	106.98
Female	123.19	--	148.37	208.70	--	--	68.11	56.31	81.74	96.99
Enrolled										
Total	90.20	152.80	82.01	102.83	--	--	87.66	116.65	96.74	87.80
Male	94.82	163.98	84.47	104.72	--	--	89.99	144.33	106.25	84.18
Female	82.64	--	80.09	--	--	--	66.36	69.37	71.05	88.92
					Sample Size					
Not enrolled										
Total	3,573	127	997	88	16	26	597	77	1,117	528
Male	1,932	114	215	43	1	8	473	42	731	305
Female	1,641	13	782	45	15	18	124	35	386	223
Enrolled										
Total	2,829	41	775	36	12	14	178	78	358	1,337
Male	1,294	35	197	20	2	3	134	40	209	654
Female	1,535	6	578	16	10	11	44	38	149	683

1/ Business and office includes data processing applications.

2/ Home economics includes only vocational courses.

3/ Trade and industry includes technical occupations.

Notes: Postsecondary enrollment status is defined to be attendance in any 4-year college, 2-year college, or business, trade, vocational or technical school as of February 1984. High school curriculum is based on the number of Carnegie units (a unit that represents one credit per 1-year course) earned in major curriculum areas. High school dropout status is determined as of February 1984 and excludes late graduates.

A dash (--) indicates sample size less than 25 cases.

SOURCE: High School and Beyond study, 1982 transcript and 1984 second follow-up data, unpublished tabulations.

REFERENCES

Meyer, Robert H., and Wise, David A. "High school preparation and early labor force experience." Ch. 9 in R.B. Freeman and D.A. Wise (eds.), The Youth Labor Market Problem: Its Nature, Causes, and Consequences. Chicago: The University of Chicago Press, 1982.

The National Institute of Education. The Vocational Education Study: Final Report. Vocational Education Study No. 8. Washington, DC: U.S. Department of Education, 1981.

Oakes, Jeannie. "Limiting opportunity: Student race and curricular differences in secondary vocational education." American Journal of Education 91(May): 328-355, 1983.

Oppenheimer, Valerie Kincade. The Female Labor Force in the United States: Demographic and Economic Factors Governing Its Growth and Changing Composition. Westport, CT: Greenwood Press, 1970.

Okun, Arthur M. Prices and Quantities: A Macroeconomic Analysis. Washington, DC: Brookings Institution, 1981.

Rumberger, Russell W., and Daymont, Thomas N. "The Economic Value of Academic and Vocational Training Acquired in High School." Paper presented at the annual meeting of the American Educational Research Association, New York City, March 1982.

Spence, Michael. "Job Market Signaling." Quarterly Journal of Economics. 87(August): 355-374, 1973.

Thurow, Lester C. Generating Inequality: Mechanisms of Distribution in the U.S. Economy. New York: Basic Books, Inc., 1975.

Tourangeau, Roger; McWilliams, Harold; Jones, Calvin; Frankel, Martin R.; and O'Brien, Frank. High School and Beyond First Follow-Up (1982) Sample Design Report. Chicago: National Opinion Research Center, 1983.

U.S. Department of Commerce, Office of Federal Statistical Policy and Standards, Standard Occupational Classification Manual. Washington: U.S. Government Printing Office, 1980.

Williamson, O. E.; Wachter, M. L.; and Harris, J. E. "Understanding the Employment Relation: The Analysis of Idiosyncratic Exchange." Bell Journal of Economics and Management Science 6, no. 1 (Spring 1975): 250-280.

Woods, Elinor M., and Haney, Walt. Does Vocational Education Make a Difference? A Review of Previous Research and Reanalyses of National Longitudinal Data Sets. Cambridge, MA: The Huron Institute, 1981.

APPENDIX A

APPENDIX A

Table A.--Detailed subject matter areas composing major occupational groups, for civilian classification used in Tables 9 and 10.

Occupational classification	Detailed subject matter areas
Management related occupations	
	04 Business certificate
	32 Manager
Social, rec. & religious occs.	
	23 Outdoor recreation internship
	90 Ordination certificate
Teachers	
	72 Various teaching certificates
	79 Counseling certificate
Writers, artists & entertainers	
	88 Photographer
Health technologists & technicians	
	14 X-Ray certificate
	22 Operating room tech diploma
	28 Practical nurse
Engineering & related technologies	
	11 Mechanic, drafting
Ins, real est & securities sales	
	02 Real estate license
Sales & sales related occs	
	06 Cashier checking certificate
	27 Modeling certificate
	34 Fashion merchandise diploma
Administrative support occs	
	05 Computer operator certificate
	10 Typist (secretary)
	17 Medical secretary certificate
	21 Data processing (keypunch)
	31 Shorthand certificate
	42 Clerk
	46 Keypunch operator
	57 Bookkeeping
Protective service occupations	
	15 Law enforcement weapons
Service occupations	
	01 Beautician
	03 Nursing assistant
	08 Medical asst certificate
	13 Dental asst certificate
	26 Cook, meat cutter certificate
	56 Air passenger specialist/steward(ess)
	78 Bartender license
	87 Notary public

Table A (cont).--Detailed subject matter areas composing major occupational groups, for civilian classification used in tables 9 and 10.

Occupational classification	Detailed subject matter areas
Mechanics & repairers	
	33 Mechanic
	37 Emergency repair certificate
	44 Electronics diploma
	45 Radio and TV repair
	69 Locksmith certificate
Construction trades	
	07 Carpenters license
	89 Electrician
Extractive occupations	
	24 Miners certificate
Precision production occs	
	62 Food inspector
Fabricators, assem & handworkers	
	39 Welder certificate
Trans & material moving occs	
	40 FAA commercial pilot
	43 Chauffeur
	51 Heavy equipment operators license
Other & not specified	
	12 Inhalation therapy
	16 Elementary accounting
	18 Marine technician certificate
	20 DHIR supervisor
	25 Marine aviation certificate
	30 Chlorinator
	35 Master craftsman
	38 Machine repair certificate
	47 Retail floristry
	49 Blueprint reading diploma
	52 Hotel mgmt diploma
	53 Pastry, cake decorator
	54 Lighting consultant certificate
	55 Military police
	58 Engineman certificate
	59 Commercial broadcasting
	61 Flagman certificate
	65 Inventory mgmt specialist
	66 Distributor license
	68 Baton twirling judge certificate
	71 US Jaycees license 1 And 2
	74 Insurance agent license
	75 USDA inspector
	76 Aviation electronics

Table A (cont).--Detailed subject matter areas composing major occupational groups, for civilian classification used in tables 9 and 10.

Occupational classification	Detailed subject matter areas
Other & not specified	
	77 Drama certificate
	81 Unspecified certificate
	82 Unspecified occ prof degree
	84 Public weighmaster
	85 Surveying certificate
	86 Unspecified license
	92 Other
Excluded, non-occupational fields of study	
	09 FCC 3rd class license
	19 First aid certificate
	29 Pre-medical certificate
	36 Private pilots license
	41 Arts degree (Associate)
	48 Art certificate
	50 Bible studies (certificate-diploma)
	60 Dancing certificate
	63 General Equivalency Diploma (GED)
	64 Honorary certificate
	67 Athletic certificate
	70 Military certificate
	73 Public service certificate
	80 Unspecified diploma
	83 Speed reading certificate
	91 Animal training certificate

Table B.--Detailed subject matter areas composing major occupational groups, for military classification used in Table 11.

Occupational classification	Detailed subject matter areas
Management related occupations . .	
	541 Auditing and accounting
	542 Disbursing
	551 Supply administration
	552 Unit supply
Natural scientists and math. . . .	
	531 Operators/analysts
	558 Functional analysis
Engineering & related technologies	
	411 Mapping
	413 Drafting
	420 Weather, general
Science technologies & technicians	
	661 Nuclear power
	821 Missile fuel and petroleum
Technicians, other	
	222 Air traffic control
	532 Programmers
	556 Flight operations
Sales & sales related occs . . .	
	822 Warehousing and equipment handling
	823 Sales store
Administrative support occs . . .	
	100 Radio/radar, general
	101 Communications radio
	102 Navigation, comm, & countermeasure
	103 Air traffic control radar
	104 Surveillance/radar
	150 ADP computers, general
	160 Teletype and cryptographic equip
	201 Radio code
	202 Non-code radio
	260 Communications center operations
	500 Personnel, general
	510 Administration, general
	520 Personnel and administration, genl
	554 Postal
	555 Aviation maintenance records
	570 Information and education, general
Protective service occupations . .	
	070 Security, guards
	495 Firefighting and damage control
	830 Law enforcement, general
Service occupations	
	800 Food service, general

Table B (cont).--Detailed subject matter areas composing major occupational groups, for military classification used in table 11.

Occupational classification	Detailed subject matter areas
Mechanics & repairers	
	198 Electronic instruments, n.e.c.
	600 Aircraft, general
	601 Aircraft engines
	602 Aircraft accessories
	603 Aircraft structures
	610 Automotive, general
	611 Track vehicle
	612 Construction equipment
	641 Small arms repair
	651 Main propulsion
	652 Auxiliaries
	704 Metal body repair
Construction trades	
	621 Lineman
	622 Central office
	623 Interior communications
	662 Electric power
	710 Construction, general
	720 Utilities, general
	721 Electrician
Precision production occs . . .	
	321 Food inspection and veterinary serv
	700 Metalworking, general
	702 Machinist
	712 Woodworking
Trans, & material moving occs . .	
	050 Air crew, general
	060 Boatswains
	061 Navigators
	210 Sonar operator, general
	221 Radar
	553 Transportation
	811 Motor vehicle operators

Table B (cont).--Detailed subject matter areas composing major occupational groups, for military classification used in table 11.

Occupational classification	Detailed subject matter areas
Military combat	
	010 Infantry, general
	012 Military training instructor
	020 Armor and amphibious, general
	030 Combat engineering, general
	041 Artillery and gunnery
	043 Missile artillery, operating crew
	112 Airborne fire control
	113 Shipboard and other fire control
	121 Missile guidance and control
	123 Torpedo
	130 Sonar, general
	140 Nuclear weapons equipment repair
	231 Intercept (code and non-code)
	241 Language interrogation/interpreting
	250 Combat operations control, general
	431 Explosive ordinance disposal/ underwater demolition team
	494 Nuclear, biological, or chemical warfare specialists
	604 Aircraft launch equipment
	642 Artillery repair
	643 Turret repair
	644 Nuclear weapons maintenance and assem
	645 Ammunition repair
	646 Aviation ordnance
	860 Forward area equipment support
Other categories, n.e.c.	
	232 Analysis
	300 Medical care and treatment, general
	301 Operating room
	302 Mental care
	311 Laboratory
	312 Pharmacy
	313 Radiology
	322 Preventive medical services
	330 Dental care, general
	331 Dental laboratory
	713 Construction equipment operation