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ABSTRACT

A study compared the economic and noneconomic effects of various combinations of high school curriculum and postsecondary school-to-work transition patterns. Data for the study were obtained from the National Longitudinal Survey of Labor Market Experience, Youth Cohort (NLS Youth). In some cases, the 1979 data from the high school class of 1972 database supplemented the NLS Youth, and, for noneconomic outcomes, class of 1972 data were used exclusively. These data indicated that high school vocational education is associated with a clear wage advantage for vocational graduates in jobs related to their area of training. Postsecondary education also appeared to add to this advantage. Although vocational education brought an increase in labor force participation for white women, no significant relationship between vocational education and employment stability was found for other demographic groups. Noneconomic outcomes of participation in a high school vocational education program turned out to be more difficult to assess; however, the noneconomic benefits of participation in postsecondary education were clear. Those who achieved a postsecondary degree were more likely to register and vote and to accept as positive the current societal trend toward broadening the role of women in the labor market. The earnings advantage of vocational education was most pronounced among white males and did not exist at all for minorities of either sex. The policy implications of these findings were examined. (Technical discussions of the survey data sources are appended, and 34 references end the document.) (MN)

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ECONOMIC AND NONECONOMIC EFFECTS OF ALTERNATIVE TRANSITIONS THROUGH SCHOOL TO WORK

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FOREWORD

An understanding of the process of school-to-work transition is useful to the formation of educational policies that may influence the labor market outcomes for young people. Educators are equally concerned with the noneconomic outcomes of vocational and other curricula; about these outcomes, little is known. Although the deterioration of the youth labor market has been a serious concern in recent years, little research has been done on the relative effectiveness of the various pathways young people follow after graduation from high school, in terms of both economic and noneconomic outcomes. This study builds upon previous work on the effect of curriculum patterns and other influences on labor market experiences and examines the impact of vocational and postsecondary schooling on labor market and noneconomic outcomes.

The combined data from the National Longitudinal Survey of Labor Market Experience, Youth Cohort, and the high school transcripts of a subsample of this survey were the major sources of information analyzed. An additional source of data was the National Longitudinal Study of the High School Class of 1972, funded by the National Center for Education Statistics.

The National Center for Research in Vocational Education extends its appreciation to the Office of Vocational and Adult Education, U.S. Department of Education, which funded both the National Center's analyses of these data and the effort to collect the transcripts. The continuing study planned on this issue is made possible through this source.

This study was conducted in the Evaluation and Policy Division of the National Center under the direction of N. L. McCaslin, Associate Director. Paul B. Campbell, Senior Research Specialist, served as project director. John Gardner contributed substantially to the preparation of the review material on previous studies and to the design of the analyses. Karen Basinger, Graduate Research Associate, prepared most of the tables in chapter 4 and contributed substantially to the text. Herbert Parnes while serving as a Visiting Scholar at The National Center, provided a thoughtful and invaluable review of the study, and contributed the final chapter. Additional reviews were provided by Kevin Hollenbeck, Senior Research Specialist, and Joel Magisos, Associate Director, both at the National Center, and by John Eric Fredland, Professor of Economics at the U.S. Naval Academy. Their contributions are acknowledged with thanks. Jeanne Desy assisted in the organization of the final draft. Gregory Martin and Karl Putz prepared the extensive computer programming, spending many hours beyond the regular day to complete the analysis. Editing was ably provided under the supervision of Janet Kiplinger.

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Robert E. Taylor
Executive Director
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in Vocational Education

EXECUTIVE SUMMARY

It is widely recognized that the pathways young people follow through schooling to work are varied and diverse. The cost of different pathways also varies, both for the society and for the individual. The concern of this study has been to estimate the influence of the various pathways on selected economic and noneconomic outcomes that were observable after the pathways were completed.

The Research Questions

The study addresses the following four questions:

- Which combinations of high school curriculum and postsecondary transition patterns are associated most often with high earnings and steady employment?
- Can similar associations be identified for such noneconomic outcomes as extent of community involvement, educational and occupational aspirations, and other societal values?
- Do apparent relationships continue to hold when personal characteristics (such as race and gender) or contextual factors (such as rural or urban residence) are controlled?
- To the extent that the frequency of following specific transition patterns can be influenced by public policy (educational or otherwise), do the relationships suggest that policies should be altered to promote or discourage participation in various patterns?

The Data

The analyses relied most heavily upon the data available in the National Longitudinal Survey of Labor Market Experience, Youth Cohort (NLS Youth). In some cases, the 1979 data from the High School Class of 1972 (Class of '72) database supplemented the NLS Youth. For noneconomic outcomes, the Class of '72 data were used exclusively.

The Results

With respect to the first question, there is clear evidence, contrary to much of the previously reported research, that high

school vocational education is associated with a wage advantage for vocational graduates who have jobs related to their training. Postsecondary education also adds an advantage, particularly for those who completed a 4-year degree, as well as for those, in some cases, who enrolled in 4-year colleges without following a program to graduation.

For other labor market outcomes, such as labor force participation and employment stability, the results are less clear. To be sure, vocational education brings an increase in labor force participation of white women, but in most cases no significant relationship is found.

With respect to the second question, we are reluctant to draw conclusions about the effects of high school curriculum on noneconomic outcomes. Although the academic high school curriculum has a simple association with greater-than-average participation in community activity and political participation (e.g., voting) and the vocational curriculum with below-average participation, the disadvantage of the vocational curriculum disappears in a multivariate analysis. It is therefore recommended that judgment on this question be withheld until more adequate data are available.

In contrast there is clear evidence of the effect of postsecondary education on noneconomic outcomes. Those who achieved a postsecondary degree (other things being equal) are more likely to register and vote and to accept as positive the current societal trend toward broadening the role of women in the labor market.

With respect to question three, the apparent relationships differ when the effects of race/ethnic group membership and gender are considered. The earnings advantage for high school vocational education is most pronounced among white males. It is somewhat less pronounced among white females and does not exist at all for minorities of both sexes.

There are two other noteworthy findings. One concerns the role of the transition pathways, both high school and postsecondary segments, in influencing other variables that have major effects upon outcomes such as wages. The analyses did not show that the pathways had any significant influence on the likelihood of being in a job covered by collective bargaining or on the extent of labor force exposure. At least in these respects, the effects of the pathways on economic outcomes tend to be direct rather than indirect.

The other is that the decision to elect a combination package of secondary and postsecondary schooling at the 9th or 10th grade does not appear to occur for the majority of students.

Although there is a tendency for vocational education graduates to attend postsecondary technical schools, the most common form of postsecondary education for every curriculum category is the 4-year college or university. The implications of this finding will be reviewed as the answer to question four is considered.

Policy Implications

The fourth question addressed the policy implications of the study, particularly whether the pathway combinations and outcomes suggested that policy should encourage participation in certain pathways. The results of this study suggest both a personal and societal benefit for high school vocational education, if the vocational graduate is employed in a training-related job. The implications for policy are twofold. The continuing provision of the vocational education opportunity, encouraged by present policy, appears warranted. The salience of training relatedness suggests that policy should encourage exploration of the failure of large numbers of vocational graduates to work in training-related jobs. If the result of this exploration shows the finding to be a matter of choice, then more effective counseling and career exploration should be encouraged. If it is a matter of lack of opportunity, then expansion of job opportunities and/or a better adaptation of training to occupational structure should be the objective of policy.

For the most part, postsecondary pathways that result in a credential have an economic benefit for those who follow them. In some cases (e.g., 4-year college pathways), there appears to be a benefit even without the credential. However, in others (e.g., incomplete postsecondary or 2-year college pathways), no economic benefits are evident, and in some cases an actual loss appears. Unless there are substantial benefits of other kinds associated with these pathways--and such evidence from this study is marginal--policy should encourage either an improvement of that type of educational experience, its avoidance, or at the very least a thorough awareness of its most likely consequences. The fact that, for most, pathway decisions are not made early enough to be maximally efficient poses a dilemma. More adequate counseling is clearly warranted, but whether young people should be encouraged to make more binding decisions at an early age or whether the curriculum should be made more flexible (although this would be somewhat more costly) depends upon the relative values of the society. This question requires thoughtful political debate as well as careful evaluation of the consequences of either approach.

The earnings differentials that have been found in favor of white males relative to white women, even when education and ability are controlled, underscore the need for continued attention to problems of discrimination. Not all of these, of course,

are amenable to solution through educational policy, but some of them may be--the disproportionate representation of women in the business and office specialty for example.

Finally, this research has highlighted the need for continued careful attention to the adequacy of data, appropriate specification of models for analysis, and selection of the best available analytical techniques if unambiguous and confident answers to the questions addressed by this study are to be obtained. The important questions raised cannot be answered unambiguously and with complete confidence. Continued efforts to improve the data and analytical techniques are clearly in order.

CHAPTER 1

INTRODUCTION

Over the past decade, youth labor market conditions have deteriorated steadily. Although improvements because of changing demographics have been forecast, the process of school-to-work transition is not understood well enough (despite recent advances in knowledge about the economic effects of participation in vocational education) to avoid continuing problems in the 1980s.

Previous studies that have used National databases to examine the effects of secondary or postsecondary vocational education on labor market and noneconomic outcomes have been limited by the nature of the data or the scope of the investigation and have not fully exploited the longitudinal character of the available data sets. In some cases the limitations have existed because analyses were performed when only 1 or 2 years of survey information were available. Other studies have not identified postsecondary education and training patterns with sufficient rigor and attention to detail to evaluate their impact appropriately. In still other cases, insufficient information on high school curriculum or on individual intellectual aptitude was available to permit use of appropriate statistical controls.

More adequate analysis can now be made using the National Longitudinal Survey of Labor Market Experience, the Youth Cohort (NLS Youth). These may be compared with results from the National Longitudinal Study of the High School Class of 1972 (Class of '72). Using these two databases, it is possible to measure effects more precisely than in the past. For instance, the availability in the NLS Youth Cohort of Armed Services Vocational Assessment Battery (ASVAB) scores now makes it possible to adjust estimates of effects for differences in intellectual ability, and the fact that respondents' labor market behavior has been tracked for several years allows more confident assessment of their experience in the world of work. More precise analysis is also aided by work at the National Center for Research in Vocational Education that has identified both the patterns of high school participation in vocational education (Campbell, Orth, and Seitz 1981) and the transition patterns from high school to work that involve postsecondary education and training (Campbell, Gardner, and Winterstein 1984).

Both interview and transcript data from the NLS Youth Cohort are used in the analyses. The Center for Human Resource Research (CHRR) at The Ohio State University, with support from the U.S. Departments of Labor and Defense, initiated the NLS Youth interviews in 1979. The National Center for Research in Vocational Education, with funding from the Office of Vocational and Adult

Education, U.S. Department of Education, and under a collaborative agreement with CHRR, supplemented the interview data with the high school transcripts of the cohort.

The NLS Youth is a National probability sample of 12,686 persons who were between the ages of 14 and 21 as of January 1, 1979. The sample was drawn by a three-stage household screening process and stratified by gender in order to obtain relatively equal proportions of men and women. The respondents were first interviewed early in 1979, with annual follow-ups through 1982. Information was collected on the respondent's family background, schooling, work history, and current educational and labor market activities.

Collection of high school transcripts began in 1980 and was completed in three rounds. The information gathered from the transcripts included the grade level at which a course was taken, a course code, the amount of credit received, and the letter grade received for the course. These data were used to identify the patterns of vocational participation in high school. Together, the interview and transcript data from the NLS make possible a better examination of the effects of vocational training on the labor market experiences of youth than has heretofore been possible.

The second major database used in this study is the Class of '72, which was collected under contract from the National Center for Education Statistics, Office of the Assistant Secretary for Educational Research and Improvement, U.S. Department of Education. That survey was initiated in the spring of 1972, with a stratified National probability sample of seniors from 1,200 schools. Base year information was obtained for a total of 19,001 students in 1,061 high schools from three sources: a test battery, a school record information form, and a student questionnaire. The school record includes information on courses taken in high school, although this is less complete than that provided by the transcripts of the NLS sample.

The first follow-up survey, conducted between October 1973 and April 1974, added 4,450 1972 high school seniors from 257 additional schools to the base year sample. Retrospective information on some of the base year variables was requested from these students. Sample members were asked where they were in October of both 1972 and 1973 and what they were doing with regard to work, education, and training.

The second, third, and fourth follow-up surveys were administered by means of mail questionnaires between October 1974 and May 1980. Key data elements for all time points were ultimately obtained for 16,450 respondents, whereas less complete information is available for approximately 6,500 additional respondents.

Because neither the NLS Youth nor the Class of '72 survey was designed specifically for this study, the variables ideally required for an analysis of the patterns of transition from school to work were not always present in a directly usable form, and some were missing altogether. Consequently, as the pathways were defined and the descriptive information was developed, direct comparability between the two databases could not always be maintained. Missing entries in many of the tables reflect this problem; nevertheless, a significant body of information is provided by the combined use of the two surveys.

Both the present study and other recent research on transition patterns between high school and work, much of which has used these same two databases, should be useful from several points of view. First, such research can guide counselors and teachers in recommending training programs to their students since it points to those patterns of participation and transition that have been most effective in increasing earnings, promoting community involvement, and the like. The research findings are also an aid to educational administrators and policymakers because from a National perspective, they indicate which combinations of course work, institutional attendance, and school policies have been most effective and which are candidates for possible improvement. At the same time, the findings also assist decision makers at all levels of government in the allocation of scarce resources among alternative programs. Finally, the results of such studies identify the most important questions for future research.

In this report, the following questions are addressed:

- Which combinations of high school curriculum and post-secondary transition patterns are associated most often with high earnings and steady employment?

- Can similar associations be identified for such non-economic outcomes as educational and occupational aspirations and extent of community involvement?

- Do apparent relationships between outcomes and post-secondary transition patterns continue to hold when personal characteristics (such as race or gender) or contextual factors (such as rural or urban residence) are controlled?

- To the extent that the frequency of following specific transition patterns can be influenced by public policy (educational or otherwise), do the relationships observed between transition patterns and outcomes suggest that policies should be altered to promote or discourage participation in various patterns?

Previous research and the research reported here cannot inform educational administrators or policymakers about the relative effectiveness of various teaching methods or of specific aspects of course content. Such research cannot (except by implication) distinguish between high-quality and low-quality courses in a subject matter area. However, to the extent that it identifies the high school curriculum and the sequences of post-secondary education or training associated with higher earnings and steadier and more frequent employment, it can aid students, teachers, counselors, administrators, and policymakers in allocating their time and scarce resources among programs.

CHAPTER 2

FINDINGS OF EARLIER STUDIES

The Nature of Transition

The pathways of transition through education to work may be compared to a network of trails in a park. There are a variety of ways to get from one side of the park to the other; there are many forks and branches. Some paths are difficult, even dangerous; some take more time than others, without necessarily providing a greater return. There are also human factors; each person chooses one of the many pathways. Some wander for a while, with destination secondary; others have a certain destination--a unique park feature--in mind. Some hurry to get to the opposite side; others are purposeful but unhurried. Some only think they know the way and the outcome of their choice; others are genuinely informed. Finally, some--reckless or independent--make their own paths.

The pathways people follow through school to work are likewise diverse. In part, they are imposed by the structure of the society--the available institutions, the traditions, the stereotypes. In part, they are chosen as a result of the inclination, the information (or lack of it), and the purposefulness (or lack of it) of the individual. The time spent, the choices and changes, and the consequences all vary.

The Pathways of Transition

A transition pathway is a progression of events beginning with the choice of a curriculum in high school and following it, with or without further changes, to the time of graduation, at which point the pathway continues through another choice--work, postsecondary education, or some form of delayed decision. It continues from this point, with the potential for changes, usually until work becomes the established major activity.

The pathways of transition through education to work were extensively analyzed in a study by Campbell, Gardner, and Winterstein (1984) that examined three interrelated topics: the processes of education, the choices among the processes, and the factors that influence those choices. The process of education varies through the high school years in the curriculum followed, in the quality of the program, and in the investment of the individual in the educational activity. It varies even more in the postsecondary years--by program, type of institution, whether a credential is earned, and length of time involved. Each of the many paths leads eventually to a portal--or perhaps to several alternative portals--to the world of work.

The educational processes within the transition pathways are characterized not only by their content, but also by their relative continuity or discontinuity. Some writers have argued that interruptions do not interfere with program completion up to the point of entry to the labor market portal job (Robertshaw and Wolfle 1980). The reduced likelihood of completing a 4-year degree reported by Breneman and Nelson (1981) for those enrolling in 2-year colleges suggests, however, that interruptions or changes of institution may have adverse effects. In any case, continuity should be considered in any study of the nature of transitions. Other variables in transition pathways pointed out by Campbell, Gardner, and Winterstein include delay, sequence, degree attainment, and kind of institution. These variables are used in the present study and are defined in chapter 3.

Several factors enter into the choice of an educational process and, ultimately, a job: available options, personal preference, individual circumstances, and community context. There are at least two schools of thought regarding the way these choices are made. Those who follow the premises of human capital theory assume that people make rational choices that maximize their economic well-being (e.g., Dresch and Waldenberg 1978; Olson, White, and Shefrin 1979). Other writers, operating from a counseling perspective, describe choice making as a "nonrational behavior" (e.g., Krumboltz 1983). From either point of view, conditions existing prior to and at the time of choice have a potential influence on the decision. From the rational point of view, current choice is also influenced by conditions that are expected to prevail in the future.

Pathway Segments

The elements involved in these pathways have been treated in a considerable body of literature, but we have been unable to find a study prior to the Campbell, Gardner, and Winterstein (1984) work that defines a pathway as a single unit from the time of first curriculum choice to point of entry into a relatively stable career position. Each pathway, however, has identifiable segments that have been the subject of considerable research.

The Secondary Segment

The first segment of the pathway covers the high school years. The initial choice in this segment concerns the selection of the high school and the curriculum. Many exogenous variables may influence this choice, including race, gender, parents' socioeconomic status, initial perception of the labor market, available options, and other environmental circumstances. These conditions, and the personal interactions of the individual with them, result in the choice of an academic, general, or vocational curriculum.

What constitutes a curriculum is not easily defined. The study by Campbell, Orth, and Seitz (1981) identified five kinds of participation in vocational education, independent of area of specialization (e.g., agriculture, trade and industry). The database for this study was NLS Youth, supplemented by the high school transcripts of those respondents who had graduated from high school prior to the initiation of the study.

The study used concepts of intensity, continuity, proximity, diversity, and supportive diversity to characterize and distinguish among the patterns. Because the present study makes use of these concepts, they are defined next. Intensity was defined by Campbell, Orth, and Seitz as the number of credits earned within a vocational specialty. Continuity was defined as the number of years a particular specialty was pursued. Proximity referred to the time elapsing between the training and its use in paid employment. The concept of diversity, defined as the number of specialty areas a student sampled, permitted differentiation between students who developed a specialty and students with comparable numbers of credits who did not. The concept of supportive diversity acknowledged the possibility of transferable skills by including credits earned in a specialty other than the major specialty but judged to be useful in the application of the major specialty. Scores based on each student's Carnegie credit units and pattern of course taking were assigned. Minor adjustments and refinements produced a set of ideal profiles of scores that identified differentially five patterns of participation.

The patterns were named Concentrator, Limited Concentrator, Concentrator/Explorer, Explorer, and Incidental/Personal. As the names imply, these patterns reflect decreasing levels of involvement with the high school vocational curriculum. The first three patterns can be expected to produce specific skills related to jobs in the specialty area pursued. They differ primarily in the intensity with which the specialty was followed and whether it was followed until the end of the high school experience. In contrast, Explorers did not develop specialties but sampled widely across the available vocational courses, whereas those in the Incidental/Personal group took one or two courses, apparently for reasons other than the development of specialty-related job skills.

In a related study, Campbell and Seitz (unpublished) analyzed academic or college preparatory courses. They found that approximately 20 percent of the NLS Youth high school graduates followed a pattern of study that could be designated academic. It includes four units of English, three units of math, two units of science, two units of social science, and sometimes two units of a foreign language. (The curriculum was also designated academic if only two units of math were taken when two units of foreign language were in the sequence.)

Campbell and Seitz found a modest overlap between the academic and vocational patterns. Six percent of the Concentrators qualified as academic, as did 12 percent of the Limited Concentrators and 9 percent of the Concentrator/Explorers. Among those with the least vocational concentration, the Incidental/Personal group, 26 percent were academic, and among those with no vocational credits, 33 percent met the criteria.

These two studies by Campbell and his colleagues offer a fairly rigorous basis for classifying the high school segment of the transition pathways into elements with potentially different outcomes. These elements, for example, frequently lead to differing postsecondary segments.

The Postsecondary Segment

Although some high school graduates move directly into the labor market, a majority choose some form of postsecondary education (Campbell, Gardner, and Seitz 1982). A transcript-based content-specific analysis of these post-high school patterns is not available, but the literature does contain a number of studies that deal with movement through the postsecondary options. Most are concerned with choices among kinds of institutions and with the fundamental choice to attend or not to attend. Representative studies are those of Breneman and Nelson (1981), Hyde (1982), and Nolfi et al. (1978).

The report by Breneman and Nelson (1981) concerns the effectiveness of one particular set of pathways, that which leads through community colleges. In an analysis of the Class of '72 data through the third follow-up, the authors concluded that a freshman at a community college has an 11 percentage point lower probability of attaining a bachelor's degree than a freshman at a university or 4-year college, even when attention is confined to respondents who aspired to at least a bachelor's degree. The study also found that community college attendance is associated with lower occupational status than university or college attendance among respondents who are employed full-time. Breneman and Nelson infer from the lower current occupational status that future earnings will be lower, even when current earnings are not. Their results and those of other studies have led to considerable discussion of the appropriate role that community colleges should play in the education and training process.

However, the study has limitations, some of which the authors acknowledge. The methods of analysis are not always consistent and are based only on data through the third follow-up of the database. Only short-term labor market outcomes are analyzed; Mertens and Gardner (1981) found long-term effects to be quite different. Breneman and Nelson's study is based on participation in, rather than completion of, programs. Finally, an

approach that includes all types of postsecondary programs can better compare the community college with other programs and relate such programs to high school experiences.

Hyde's study of community college access (1982) uses several sources, but primarily the Class of '72, to focus on the factors that appear to influence choice in the postsecondary segment. Hyde defines the options on an ordinal scale that includes working, attending a community college, attending a public 4-year college, and attending an elite or private institution. He hypothesizes that the likelihood of shifting from one pathway element to another decreases as the relative distance between them increases.

Community college attendance is the primary subject of the study. It appears to be influenced by a number of variables. Positive influences include being white, having peers who plan to attend college, and having enrolled in a high school academic curriculum. The community unemployment rate, on the other hand, is not significantly related to the decision to enroll, nor is the size of local enrollments. Large numbers of community colleges in an area are associated with higher attendance, whereas large numbers of other institutions make attendance less likely. Hyde cautions that the influences of these variables must be viewed together since the variables that are influential may shift from one specification to another.

The third significant study of the postsecondary segment is that of Nolfi and his associates (1978). This study is concerned primarily with choice among 14 alternative pathway segments, such as working, homemaking, part-time work and schooling, and full-time schooling. The emphasis is upon how high school graduates make choices and the relative success of these choices.

Nolfi notes that over time there is considerable movement of individuals from one pathway to another. His analysis of Class of '72 data shows that only 60 percent of the sample realized their plans, including many who hoped to gain further education. The more complex the plans were, the more likely they were to be unrealized.

A high percentage of respondents seemed to have no clear plans at all. Sex role sterotyping was probably a factor in choice, with 90 percent of the young women choosing traditionally female occupations. Race was also related to patterns of choice; a third of those who were undecided very late in their high school careers were nonwhite. Several factors influenced the success of choices. Among respondents who wanted to work full-time, success was more likely for those from middle-income families who believed in their personal control over the environment.

One final study relating to postsecondary pathways is that made by Kanouse et al. (1980), which identified eight tracks that could be viewed as postsecondary pathway segments. In addition to those identified in the studies discussed previously, these tracks included a military track, a postsecondary vocational and technical school track, and unemployment. Kanouse and his associates did not follow the respondents through the tracks and take into account any shifts that occurred, but rather, they evaluated the effect that starting on the track had on such personal qualities as aspirations, attitudes, and self-concept.

In general, these studies identify and describe a number of postsecondary pathway segments and emphasize the possible influences upon choice, but with the exception of Breneman and Nelson, say almost nothing relating to the consequences of following specific pathways. The question arises as to why such studies are so rare. A partial answer may be found in the next section, which considers that segment of the pathway defined by portal of entry to the labor market.

Portals of Labor Market Entry

An ambitious piece of work carried out by Luther Otto and his associates (1981) appears to be the landmark in this field. The long-term focus of their work is on career lines that begin at the termination of the pathways of transition. Through a series of studies, Otto and his colleagues have developed the concept of career line and have viewed it longitudinally by means of both a long-term follow-up of a high school class cohort and a synthetic series of cohorts derived from census data. One of the main contributions of this effort is the identification of the most probable job changes over time for a large cross section of, actual jobs. (The inverse of change, stability, is also recorded.)

The 1981 study by Otto and his associates manifests an interest in the contribution of education and training to the entry into career lines that is very similar to that underlying the present study. Their most recent work (Spenner, Otto, and Call 1982), however, does not discuss this aspect in detail. Rather, it provides separate estimates of the effects of path elements on outcomes that may be described as career line elements (e.g., complexity, status, and skill). The parallelism between the work pathways designate as career lines and the transition pathways that are used in the present study suggests that their approach might serve as a model. In turn, the concept of pathways of transition should shed light on access to career lines and should provide information on what may influence the choices, opportunities, and consequences of the various routes through education and training into and along career lines.

The present study was also guided by several well-known theories that attempt to account for the consequences of completing different pathways. Included among them are status attainment (Colclough and Horan 1983; Sewell and Hauser 1975), dual labor market (Hodson and Kaufman 1982), educational credentialing (Akerloff 1970; Spence 1973), and human capital (Blinder and Weiss 1976; Ghez and Becker 1975).

Defining Pathways

Conceptual Elements

Campbell, Gardner, and Winterstein (1984) selected and operationally defined conceptual elements that had potential for differentiating patterns of transition. Four of their five elements--delay, interruption, sequence, and degree--are used in the present study. The operating definitions of these conceptual elements are presented next.

Delay refers to the proximity of secondary and postsecondary education. The normal pattern for continuous schooling would have a student graduate from high school in May or June and begin postsecondary education in the fall (by October in the Class of '72). Respondents whose first postsecondary education began later than October 1972 are classified as experiencing a delay.

An interruption occurs if the student begins attending a postsecondary institution, spends most or all of the next year with no schooling, and then returns to a postsecondary institution (not necessarily the same institution, type of institution, or field of study). Although most interruptions last for at least a year, the algorithm used here identifies interruptions as short as 5 months for students who follow nontraditional attendance patterns (such as attending summer session, leaving school, and reentering in the winter or spring term). Few students, however, follow such patterns; for almost all, an interruption represents being out of school more than 5 months.

The concept of sequence reflects the order and purposefulness of postsecondary attendance. Some students attend the same type of institution for all of their postsecondary schooling, whereas others attend a variety of institutions. Sequence is used to distinguish purposeful combinations from those lacking direction or coherence. In examining sequence, 4 types of institutions are identified: vocational schools, 2-year academic institutions, 4-year colleges or universities, and graduate or professional schools. Progression refers to a sequence that presumably represents a purposeful advancement for the individual--e.g., attendance first at a 2-year academic institution and then at a 4-year college or university; or vocational school attendance followed by attending a 2-year academic institution or

a 4-year college or university. Sequences that appear to be less purposeful are identified as regressions--e.g., attendance at a 4-year college followed by a vocational school or 2-year academic institution. Of course, students who follow a regression sequence may have learned to their benefit that academic post-secondary institutions are not helpful in meeting their goals. In such cases the regression may be constructive for the individual and society, although costly. Similarly lacking in clear purpose is the mixed sequence, in which a person has attended at least two types of institutions, but in a pattern that fits neither the progression nor the regression sequence. Finally, respondents who attended more than one type of institution at a time, or attended at least one institution whose type was not clearly identified, are classified as having an indeterminate sequence.

Degree provides a broad measure of achievement. Campbell, Gardner, and Winterstein used three categories of postsecondary degrees: vocational, 2-year academic, and bachelor's and advanced degrees. Four combinations of degrees are also recognized: vocational and bachelor's, 2-year academic and bachelor's, vocational and 2-year academic, and "other combinations."

The concept of postdegree enrollment was used to indicate the current status of those who acquired 4-year degrees. Being enrolled could indicate either that respondents are pursuing a course of study for a higher degree or that they are taking some courses without expecting to earn another degree.

Common Pathways

There are a great many alternative pathways through education to work. Using the elements just identified, Campbell, Gardner, and Winterstein found 30 pathways that contained at least 1 percent of the sample for either database, and that together accounted for 87 and 90 percent of the respondents in the Class of '72 and the NLS Youth, respectively.* These more

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*For the Class of '72, 7 years had elapsed since high school graduation, allowing ample time to complete at least a master's program if the respondent had begun school without delay and had no interruptions. In contrast, only 2.4 percent of the NLS Youth had been out of high school for 7 years, and only 28.6 percent had had time to graduate from a 4-year postsecondary program. As a result, some pathways could not be defined for NLS Youth and others are implied rather than observed. NLS respondents were counted as though they would receive a degree if they had entered a postsecondary program without delay, had not interrupted, and were currently enrolled but had not had sufficient time to graduate.

common pathways and their relative numerical importance are grouped in table 2.1 according to some common characteristics.

No formal postsecondary education. The single pathway most often followed is that involving no formal postsecondary education. Twenty-five percent of the Class of '72 and 36 percent of the NLS Youth followed this pathway. Both of these figures will be reduced somewhat with the passage of time, although the reduction for the Class of '72 will probably be very small; these respondents had 7 years to make a start, and the likelihood of starting appears to decrease with the passage of time. The NLS Youth percentage will show more change because only 55 percent of this group had time to resume schooling after a delay of a year or more.

Four-year degrees. The next most frequently followed pathways, those leading to 4-year degrees, comprise only 21 and 22 percent of the two cohorts. The Class of '72 may increase slightly if those with prolonged delays or interruptions successfully complete 4-year degrees. However, the figure for the NLS is not likely to rise, and may actually fall, because of the assumption described in the footnote on page 20.

Traditional, no degree. The next most frequent pathways are those that start without delay, contain no interruptions, but yield no degree even though sufficient time has elapsed. Approximately 13 percent of the Class of '72 and 15 percent of the NLS Youth followed these pathways.

Campbell, Gardner, and Winterstein found that delays and interruptions appear to reduce the likelihood of program completion. The data in table 2.1 clearly outline that relationship. In the Class of '72, no pathway followed by 1 or more percent of the respondents and resulting in a degree included a delay. In the NLS Youth, pathways 1022 and 1033 did meet this criterion, but both contain some cases for which degrees have been assumed; final percentages may be smaller. In neither database was there a pathway containing an interruption and resulting in a degree that met this 1 percent criterion. In contrast, 22.3 percent of the Class of '72 respondents followed pathways that contained delays or interruptions and that did not result in degrees. The results are not as clear for the NLS Youth, presumably because NLS respondents had graduated more recently.

Choice of Pathways

In addition to identifying pathways, Campbell, Gardner, and Winterstein (1984) analyzed factors that seem to influence the choice of pathway. One is opportunity; the availability of nearby community colleges leads to higher postsecondary attendance. In considering opportunity, problems of equity cannot be ignored.

TABLE 2.1

THE RELATIVE POPULARITY OF ALTERNATIVE PATHWAYS THROUGH EDUCATION TO WORK
(PERCENTAGE WITHIN DATA SETS)

	Pathway	Class of '72	Subtotals	NLS Youth	Subtotals
No postsecondary	0000	24.8	24.8	35.6	35.6
Traditional pathway, no degree	0001	3.6		1.1	
	0002			5.7	
	0003	5.2		6.5	
	0006	1.8		1.0	
	0009	2.5		1.2	
Vocational degree	0011	.9	13.1	1.6	15.5
	0019	2.0			
	1011			.8	
	7011			1.6	
Community college degree	0022	.8	2.9	5.1	4.0
	1022			1.4	
	0029	2.4			
Four-year degree	0033	10.1	3.2	18.0	6.5
	1033			1.2	
	0035			3.1	
	0039	4.1			
Degree and continuing	0083	.8	14.2		22.3
	0093	6.0			
Interruption and no degree	0103	1.4	6.8		
	0105	1.0			
	0106	3.6		1.2	
	0107	2.0			
	0109	2.5			
Delay and no degree	1001	3.9	10.5	1.7	1.2
	1002	2.3		1.7	
	1003	1.5		1.4	
	1009	1.6			
Delay, interruption, and no degree	1106	1.0	9.3		4.8
	1109	1.5			
			2.5		
		Total 87.3	87.3	89.9	89.9
		100% n = 16,450		100% n = 7,060	

SOURCE: Campbell, Gardner, and Winterstein (1984, p. 44).

KEY: 1st Digit--Delay

0 No delay
1 Delay
7 Cannot be determined

2nd Digit--Interruption

0 No interruption
1 One or more interruptions

3rd Digit--Degree

0 No degree
1 Vocational-technical degree
2 Community college degree
3 Four-year college or university degree
8 Multiple degrees--classes after last degree
9 Classes after a degree

4th Digit--Sequence

0 Never enrolled
1 Vocational-technical school only
2 Community college only
3 Four-year college or university only
5 Progression
6 Regression
7 Mixture
9 Indeterminate

The socioeconomic status (SES) of the student's family is related to choice of pathway; most high SES students at least begin postsecondary school; those from low SES families are much less likely to do so. Students from high SES backgrounds are more likely to attend 4-year colleges or universities; those from middle SES backgrounds are more likely to attend community colleges or vocational schools. Both gender and race also seem to play distinct roles. At the time these data were collected, women were still less likely to obtain postsecondary education than men. Blacks and Hispanics of either gender are much less likely to follow pathways toward 4-year degrees than are whites. The relationship of pathway to race, however, may be attributable primarily to the relationship between race and family SES.

Choices are also influenced by significant others, in particular, parents and close friends, although relatives outside the family and other adults are also influential. However, a finding that has significance for policymakers is that relatively few students cite their high school teachers, and even fewer their counselors, as important influences.

The choice of postsecondary education is related to the high school experience: the higher the high school achievement, the higher the educational level the student will probably complete. Curriculum is also reflected in the pathway. Vocational students who continue their education are more likely than their counterparts to attend postsecondary vocational schools.

The Effects of Vocational Education

In addition to information regarding the pathways of transition, the present study relies upon a body of literature relating to the effects of education, and specifically vocational education. Some of those studies are reviewed next.

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. Grasso and Shea (1979) found no significant effects on hourly earnings in an analysis of data from the National Longitudinal Survey of Labor Market Experience (NLS-LME) data. The exception was a negative effect; black male vocational graduates appear likely in those data to earn less than other black males, although the difference is not statistically significant. Using the same data, Gustman and Steinmeier (1981) reported similar results, as did Mertens and Gardner (1981). Meyer's (1981) analysis of Class of '72 data found only small earnings effects for vocational education for men; these are statistically significant only for specialists in trade and industry, and for them, only in 1 year during the period of estimation. In their analyses of the same data, Gustman and

Steinmeier and Mertens and Gardner found similar effects. 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 the data by Woods and Haney (1981) usually showed white male vocational graduates earning less than comparable general curriculum graduates, though the estimates were seldom significant. Their study did report a more consistently significant positive pattern of effects for black men who specialize in trade and industry. The study by Mertens and Gardner, which used a specially designed survey of younger adult workers, found earnings advantages that were statistically significant only for a small group of specialists in marketing.

In studies of the NLS Youth, neither Rumberger and Daymont (1982) nor Campbell et al. (1981) could find convincing evidence of consistent and significant positive earnings effects for vocational concentration among men with 12 or fewer years of education. Rumberger and Daymont found that additional vocational credits were associated with higher hourly earnings if the credits were earned in a program that had provided skills used on the respondent's job; if not, additional credits reduced hourly earnings. However, when vocational course work was expressed as a proportion of total courses taken, the estimated effects of job-related courses were not significantly different from zero when compared to academic courses. 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.

For women in commercial or office specialties, the effect of secondary vocational education on hourly or weekly earnings is more consistently and significantly positive than for men. Grasso and Shea found statistically significant, positive earnings effects for women who specialized in commercial or business and office programs. In the Class of '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 and office area. Woods and Haney's reanalyses of Class of '72 data showed strongly positive effects for white women and somewhat less significant (but always positive) effects 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 specialization in home economics (found in Meyer's study) and vocational courses not used on the current job (in Rumberger and Daymont).

The longer the period to which the earnings measure applies, the greater are the apparent advantages associated with secondary vocational training either for men or women. Although advantages

in weekly or hourly earnings for male vocational graduates are difficult to detect, both Conroy (1979) and Li (1981) reported advantages in annual labor income for men. Gustman and Steinmeier also found a significant advantage, but only for specialists in trade and industry. Meyer found that any hourly earnings advantages for women were magnified in weekly earnings and annual income by the greater number of hours per week and weeks per year that women vocational graduates worked. Rumberger and Daymont found that both men and women with significant vocational education worked significantly longer hours and were usually unemployed fewer weeks per year. (Their analysis showed that more vocational credits reduce unemployment, but a higher proportion of vocational credits reduces unemployment for women by only a small amount and actually increases it for men.) These findings suggest results for weekly and annual earnings in the same direction as those of Meyer and Gustman and Steinmeier.

The findings of previous research are summarized here somewhat differently from the way they are by Woods and Haney (1981). Their review suggests, although it does not explicitly state, that regression analyses show significant advantages less frequently for male vocational graduates and more frequently for women than do simple descriptive comparisons of average earnings. Since regression analyses, if properly done, should provide better estimates of any effects of vocational education, we are more inclined than Woods and Haney appear to be to give greater weight to regression results as compared with the descriptive studies (which show positive differentials more often). This difference in emphasis explains the conclusion here that the differences between men and women in estimated effects of vocational education are somewhat sharper than are portrayed by Woods and Haney.

Woods and Haney pointed 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 course work, and their own reanalyses of the Class of '72 data support that difference. The results of a study at the National Center show that accurate specification of course work from transcript data more appropriately identifies curriculum (Campbell, Orth, and Seitz 1981). The use of these data again leads to a sharper contrast between estimated effects for men and women than Woods and Haney offer.

Preliminary work on the present study provides a sharp contrast to most previous research on the effects of vocational education. Initial analysis by a colleague at the National Center (Gardner 1984) examined the effects of vocational education on earnings, employment, and occupation. The results for all four race and gender groups showed that vocational education graduates in training-related employment have higher earnings

than otherwise comparable graduates of the academic and general curricula and that the differentials are larger for males than for females (see table 2.2).

Gardner also found that concentration in secondary vocational education and working in training-related employment are associated with fewer years of education but more months of labor market experience. Not surprisingly, unionization is uniformly associated with higher earnings, although vocational concentration is not consistently associated with unionized jobs.

The patterns of participation are associated with occupation and industry choice. Those in the three Concentrator patterns are usually less likely to work in professional, managerial, or service occupations and in trade and most service industries. For men, concentration is associated with craft employment and work in durable goods manufacturing, areas in which jobs have traditionally provided better-than-average returns. For women, concentration is associated with working in clerical jobs.

The study suggests that the relatively small total effects of vocational education on the earnings of males found in previous studies may be the result of imprecise specification of curricula and neglect of the importance of training-related work. Previous studies may have underestimated the effects of varying degrees of concentration in vocational education by failing to differentiate concentration from mere participation or from the number of vocational courses taken.

Among all race/sex groups there is evidence of negative indirect effects of vocational education on earnings through the lower educational attainment of vocational education students. But these are more than offset by the positive indirect effects operating through greater labor market experience of vocational graduates (and sometimes through the greater likelihood of their being in a unionized job). As a consequence, the <u>total</u> effects of vocational education on earnings are generally larger than the <u>direct</u> effects.

Gardner's estimates provide some clues to the channels, direct and indirect, through which vocational education affects these labor market outcomes. For both men and women, vocational education influences years of schooling, labor market experience the likelihood of being in a unionized job (in some cases), and the occupation and industry in which graduates find work. The greater likelihood that male vocational graduates will work in craft occupations and in durable manufacturing and the lower likelihood of work in service occupations is probably responsible for their average total earnings advantages. For female Concentrators, the greater tendency to work in clerical or public

TABLE 2.2

SUMMARY OF DIRECT AND TOTAL EFFECTS ON EARNINGS

(Vocational Graduates as Compared with Academic or General Graduates)

	Hourly Earnings				Monthly Earnings			
	Direct		Total		Direct		Total	
	%	$	%	$	%	$	%	$
White Male								
Concentrator	11.0	.64	8.5	.49	16.6	177	14.1	150
Limited Concentrator	12.9	.75	18.3	1.06	12.9	138	18.1	193
Concentrator/Explorer	.7	.04	6.6	.38	3.4	36	8.2	87
Vocational/unrelated	-.3	-.02	-.9	-.05	-1.1	-12	-1.5	-16
Minority Male								
Concentrator	15.7	.84	20.9	1.12	13.7	131	20.2	193
Limited Concentrator	5.6	.30	6.0	.32	2.8	27	3.9	37
Concentrator/Explorer	18.5	.99	27.0	1.44	9.6	91	19.8	189
Vocational/unrelated	.8	.04	2.5	.13	-.8	-8	1.5	14
White Female								
Concentrator	3.8	.18	2.7	.13	3.4	28	2.4	19
Limited Concentrator	9.9	.47	5.7	.27	7.4	60	2.9	23
Concentrator/Explorer	-3.0	-.14	-3.2	-.15	2.2	18	2.5	20
Vocational/unrelated	-5.4	.26	-5.1	-.24	-5.5	-45	-5.1	-41
Minority Female								
Concentrator	8.2	.36	5.3	.23	5.8	43	4.0	30
Limited Concentrator	1.4	.06	6.1	.27	6.5	48	11.3	84
Concentrator/Explorer	9.6	.42	15.4	.68	10.1	75	16.4	122
Vocational/unrelated	4.6	.20	7.6	.33	4.2	31	7.2	53

SOURCE: Gardner (1984).

administration jobs raises earnings above the average for all females. Indirect effects through educational attainment act to reduce earnings differentials; indirect effects through labor market experience operate to increase differentials for vocational Concentators working in jobs related to their training.

The difference between those in training-related employment and those who are not is one of Gardner's most striking findings. These data indicate the importance of training-related placement in generating earnings differentials and suggest that benefits from vocational education are attributable to occupationally specific skills rather than to general work habits or attitudes. If vocationally educated students acquire better general work habits or attitudes, and if these habits and attitudes lead to higher earnings, then earnings advantages should accrue regardless of whether or not the graduates find training-related employment. But this is not the case. The association of substantial earnings advantages with training-related employment suggests strongly that job skills are their source. These skills may be transferable within a class of occupations rather than specific to a narrowly defined job; training relatedness is defined very broadly in this analysis, but not so broadly as to obliterate the distinction between job-related and general skills.

The present study builds upon Gardner's work, adding the effects of postsecondary pathways. Aspects of the methodology of his study will be discussed in chapter 3.

CHAPTER 3

METHODOLOGY

Research Strategy

The general model for this study is shown in figure 1. Initially, personal characteristics influence the choice of high school curriculum. In turn, high school experience and other factors, such as the abilities measured by the Armed Forces Qualifying Test (AFQT)*, a subset of ASVAB, influence the choice of postsecondary education or training. After many possible turns in the post-high school pathway, a student may choose to move into the labor force. Those who do, may remain employed, become unemployed, or double back into postsecondary education. Eventually the pathway leads to outcomes, not only directly but indirectly through their influence on other factors. One of the most easily measured is rate of pay. The outcomes, as the figure shows, are influenced not only by the pathway but by such factors as unionization of the job. Occupation can be both an outcome of the pathway and an influence upon it.

It has not been possible within the constraints of the present study to explore all of the relationships shown in figure 1. The authors do, however, first examine briefly the relationship between high school curriculum and postsecondary educational experience and then focus on the independent effects of each of these two segments of educational pathways on important economic and noneconomic outcomes, acknowledging the possibility of both direct and indirect effects.

The conceptual distinction between direct, indirect, and total effects is shown in figure 2.** An outcome such as hourly earnings (Y) may be influenced directly by both high school curriculum (V) and an intervening factor such as work experience

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*This is the measure of ability used in the NLS Youth data. In the Class of '72, the measure is a specially constructed index of test scores constructed by the Educational Testing Service.

**Formally, the model can be written as a two-equation system:

$$Y = a + bX + cA + dV + n \qquad (1a)$$

$$A = e + fX + gV + u \qquad (1b)$$

where V is curriculum, X is a vector of other factors that may influence either Y or A or both, and n and u are random variables reflecting unobservable influences. In this representation, d is the magnitude of the direct effect of curriculum on the outcome, and cg is the indirect effect that operates through A.
Substitution for A in (1a) gives the reduced-form equation for Y:

$$Y = (a+ce) + (b+cf)X + (d+cg)V + (n+cu) \qquad (1c)$$

The coefficient of V in the reduced form is the total effect, d + cg.

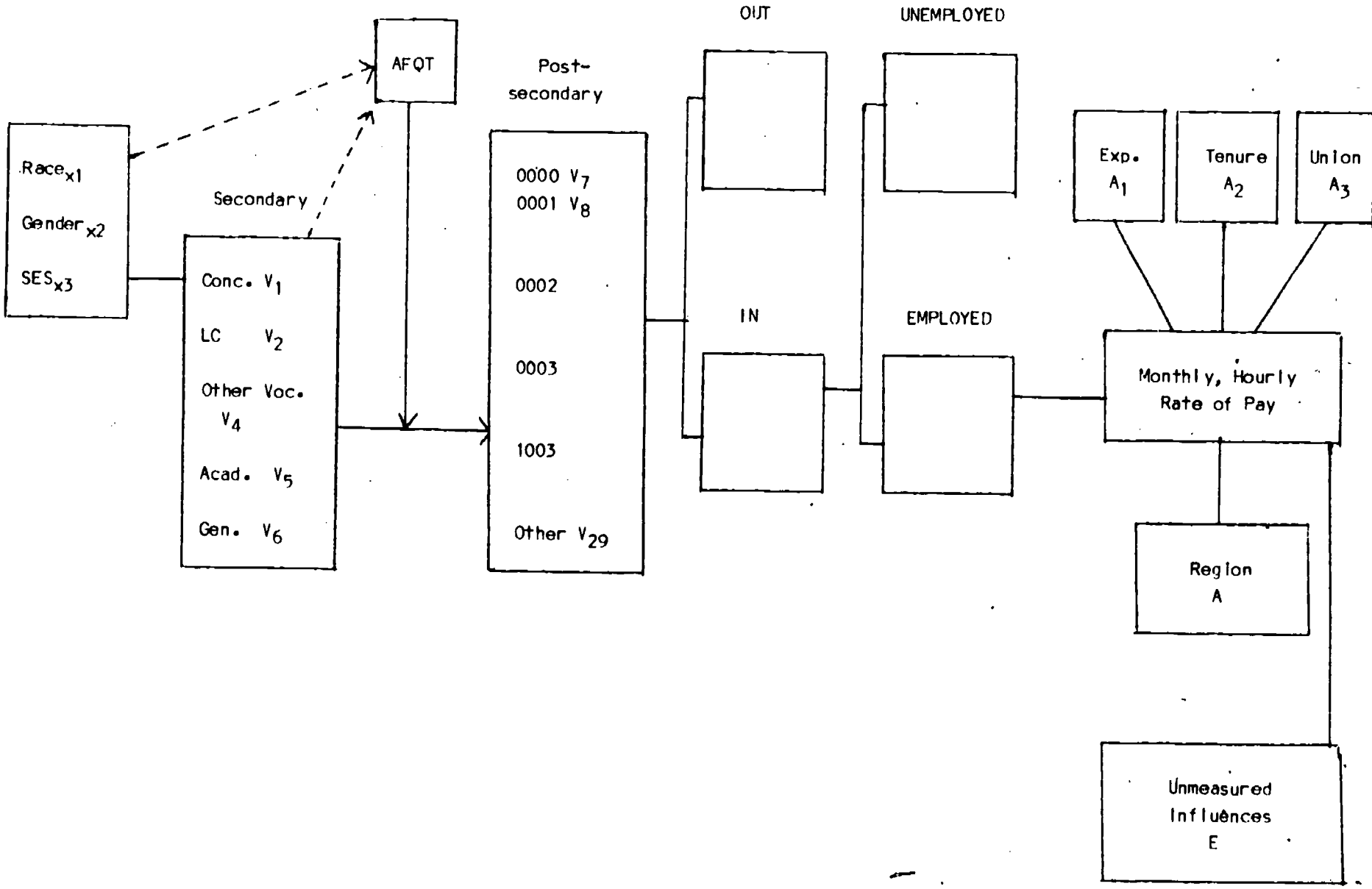

Figure 1. A model of expected relationships among patterns of curriculum, schooling, and labor market outcomes.

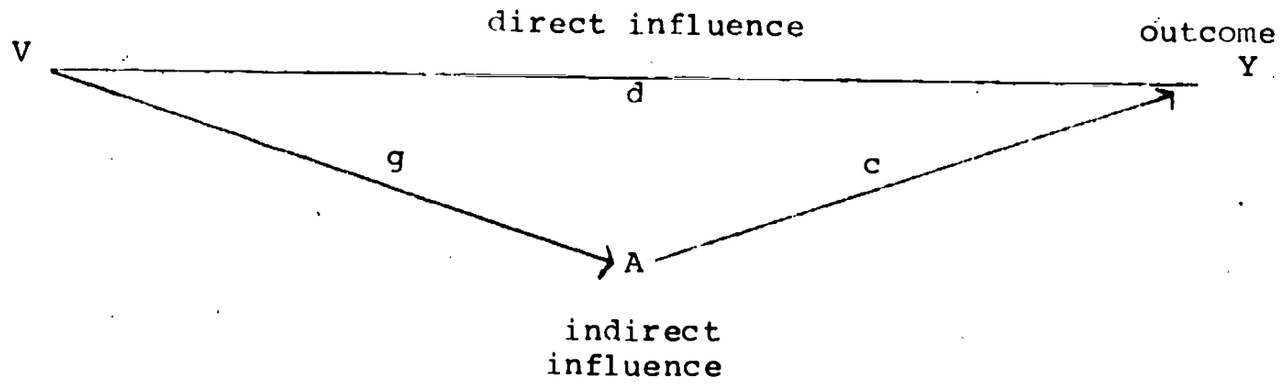

Figure 2. Direct and indirect effects on an outcome

(A), which itself is directly influenced by high school curriculum. These relationships are indicated, respectively, by the paths from V to Y, from A to Y, and from V to A. The diagram postulates that V affects Y not only directly (VY), but also indirectly through its influence on A (VA and AY). The total effect of curriculum on earnings, then, is the sum of its direct effect and all of its indirect effects.

Note that if one ignores intervening variables--that is confines the analysis to the top line of the diagram--one would ascertain the total effect of V (curriculum) on Y (earnings) irrespective of the ways in which the effect occurs. However, the introduction of an intervening variable (using the bottom two legs of the triangle in the diagram), allows one to separate the estimate of the direct effect (d) and the indirect effect (combination of g and c). The total effect is the sum of these two.

Viewed in this light, two important points become clear. One is that a precise estimate of direct and indirect effects requires identification and proper measurement of all of the intervening variables. Second, depending on the direction of the direct and indirect relationships, it is possible for V to be important even though its total effect is negligible, or conversely, for the total effect to be significant but almost exclusively as the result of one or more indirect effects. Identifying and measuring direct and indirect effects, in other words, permit one to know the ways in which the influence is exerted, and are thus an aid to policy formulation. Policies that enhance the positive indirect effects of secondary vocational education or that reduce its negative effects will enhance its economic value.

The present study does not go very far in the direction of exploring direct and indirect effects, but at least illustrates the approach. Only two intervening variables are explictly introduced: extent of labor market participation (work experience) and collective bargaining coverage. Others that might have been included are years of schooling, tenure in current job, and occupation.

In analyzing the economic and noneconomic effects of variations in high school curriculum and in postsecondary pathways, the following outcome variables are used:

A. Economic

1. Hourly earnings on the 1982 interview job

2. Monthly earnings for the same job

3. Earnings growth, 1981-1982

4. Labor force participation rate in percentage points (1 to 100) for the respondent in calendar year 1981 [100 x (weeks employed + weeks unemployed) / 52]

5. Employment rate in percentage points for the respondent in calendar year 1981 [100 x (weeks employed) / (weeks employed + weeks unemployed)]

B. Noneconomic

1. Occupational and educational aspirations

2. Extent of community involvement

3. Extent of political participation

4. Attitudes toward appropriate role of women

The principal explanatory variables (V in figure 2) are the following:

- The respondent's high school curriculum, using the mutually exclusive categories described in chapter 2. (It should be recalled that respondents are classified in the Concentrator categories only if they are currently in training-related jobs otherwise they are included in the Vocational Unrelated category. Each of the curriculum categories is indicated by a binary variable taking the value of 1 if the respondent falls into that category and a 0 if not. The "general" curriculum category is the comparison group in all equations.)

- The postsecondary pathways developed by Campbell, Gardner, and Winterstein (1984), also described in chapter 2. Based on the concepts of delay, interruption, sequence, degree attainment, and kinds of postsecondary institutions attended, a series of 30

dichotomous variables were developed (see table 3.1), each coded 1 if the condition described the respondent and 0 if it did not. The category "no postsecondary education" is the comparison group in all equations.

The intervening variables (A in figure 2) include the following:

- "Work experience," that is the number of months of employment since age 16, and
- Coverage by collective bargaining in the 1982 job, coded by a dichotomous variable that equals 1 if wages on that job are set through formal collective bargaining, 0 otherwise.

The work experience variable includes employment during 1981 when hourly and monthly earnings are the outcome variables. However, the equations estimating labor force participation and employment rate exclude employment during 1981. Also, tenure is omitted as an explanatory variable for those latter two outcomes because, by definition, it is related to them.

Several variables controlling for contextual or background influences on the individual that may be expected to be related to both the explanatory and outcome variables were included to avoid biased estimates of the effects of the former. These include--

- Socioeconomic status of respondent's family when respondent was 14;*
- Region of the country in which the respondent lived, indicated by binary variables for Northeast, South and West, with North Central being the comparison group;
- Whether respondent resided in a county with more than 50 percent of its population living in rural communities, indicated by a binary variable; and
- Academic achievement and motivation, as measured by AFQT scores on tests administered to NLS respondents, a special aspect of the survey.*

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*See Campbell, Gardner, and Seitz (1981) for a more detailed description of the creation of the scale used to measure SES.

TABLE 3.1

GLOSSARY OF PATHWAY SEQUENCES

Pathway Sequences	Description
0000	Never attended a postsecondary institution
0001	Attended only vocational/technical schools, no interruptions or delays, no degrees
0002	Attended only community college, no interruptions or delays, no degrees
0003	Attended only 4-year college or university, no interruption or delay, no degrees
0006	Regression sequence, no interruptions or delays, no degrees
0009	Indeterminate sequence, no interruptions or delays, no degrees
0011	Attended only vocational/technical schools, received vocational degree, no predegree interruptions or delays
0019	All sequences except only vocational/technical, received vocational degree, no predegree interruptions or delays
1011	Same as 0011 but with delay
7011	Attended only vocational/technical schools, received vocational degree, no predegree interruptions, delay cannot be determined (NLS Youth only)
0022	Attended community college only, 4-year college or university only, or a progression sequence, received 2-year degree, without predegree interuption or delay
1022	Same as 0022 but with a delay
0029	Regression, mixture, or indeterminate sequence, received 2-year degree, without predegree interruption or delay

SOURCE: Campbell, Gardner, and Winterstein (1984, 38-39).

NOTE: Training in the Armed Services is not included.

TABLE 3.1--Continued

Pathway Sequences	Description
0033	Progression sequence (in Class of '72 only) or attended only 4-year college or university, received a 4-year degree, without predegree interruption or delay, without courses beyond the degree
1033	Same as 0033 but with a delay
0035	Same as 0033 but the only sequence is progression (NLS Youth)
0039	Regression, mixture, or indeterminate sequence, received 4-year degree, without predegree interruption or delay
0083	Same as 0033 but with classes after the degree and without more than one degree
0093	Same as 0083 but with more than one degree
0103	Same as 0003 but with interruption
0105	Progression sequence, with interruption but without delay, no degree
0106	Same as 0006 but with interruption
0107	Mixture sequence, with interruption without delay, no degree
0109	Same as 0009 but with interruption
1001	Same as 0001 but with delay
1002	Same as 0002 but with delay
1003	Same as 0003 but with delay
1009	Same as 0009 but with delay
1106	Same as 0106 but with delay
1109	Same as 0109 but with delay

Including these variables and stratifying the sample by gender, race and ethnicity represents the best attempt to control the estimates of curriculum effects for various influences not captured by other variables.* These include the character of the local labor market, family background, intelligence, motivation, traditional gender-based differences in labor market experience, and racial/ethnic differences that may be attributable to some combination of discrimination and differences in background. Separate equations were run for each of the four combinations of gender and racial/ethnic characteristics: white males, white females, minority (black or Hispanic) males, and minority females.

In all analyses of earnings the sample was restricted to include only respondents who were high school graduates, had held at least one job within the preceding year at which they worked 30 or more hours per week, and were not students at the time of interview in 1982. (The restriction on hours of work was based on the fairly common practice of considering 30 hours a week the minimum limit for the purpose of granting fringe benefits such as health insurance.) Less restrictive populations were used when the dependent variable was something other than earnings. For a fuller description, see technical appendix.

The vectors n and u are random error terms that capture all of the effects on Y or A that are not observable in the model. The estimation techniques assume that the proper controls have been included to reflect all the systematic influences on Y or A. That is, each element of n and u is assumed to be normally distributed and uncorrelated with any of the explanatory variables in its equation. This assumption allows us to set aside for the moment the question of whether curriculum choice should be regarded as endogenous to this model. That question arises because estimates of (2a) will be biased if unobservable elements affect both the outcome variables and curriculum choice. That issue is important and should be the subject of future work.

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*In addition to the regressions stratified by gender and race/ethnicity, a regression was run for all respondents combined, using gender and race/ethnicity as control variables.

CHAPTER 4

RESULTS

This chapter presents the results of the statistical analyses designed to address the research questions posed in chapter 1. More specifically, after a brief examination of the relationship between high school curriculum and postsecondary education, data are presented that measure the association between each of these segments of the transition pathways and several economic and noneconomic outcomes. The economic outcome variables are current hourly and monthly earnings, earnings growth between 1981 and 1982, extent of employment and of labor force participation in 1981, and whether respondent's current job (1982) is covered by collective bargaining. The relationships of the two elements of transition pathways (high school curriculum and postsecondary educational experience) with these economic outcomes are explored by means of multiple regression analysis using the models described in chapter 3, although assessment of the direct and indirect effects of the pathways is not as systematic and complete as those models suggest. The several noneconomic outcomes are then examined by means of both simple bivariate and multiple regression analyses.

Both NLS and Class of '72 data are used in most of the analyses, and in all but a few instances it is possible to stratify by race/ethnicity and gender in order to ascertain whether the effects of transition pathways are similar for men and women and for whites and blacks or Hispanics. It should be recalled that all analyses include only those respondents who had graduated high school, and for whom a postsecondary path was ascertainable. The relationship between this subset and the total NLS samples, by gender, race/ethnicity, and SES is shown in table 4.1. The underrepresentation of minorities and of lower SES respondents in the subsample is a reminder that the results reported below cannot be generalized to the total population.

Relation between High School Curriculum and Postsecondary Education

Instead of the simple years-of-schooling variable typically used by economists in estimating the effects of education on labor market outcomes (e.g., earnings), this study also assesses the effects of school types (vocational and technical, community college, 4-year college or university). However, before examining the relationships between education and economic outcomes, it

TABLE 4.1

DISTRIBUTION OF NLS YOUTH TOTAL SAMPLE AND SUBSAMPLE BY GENDER, RACE/ETHNICITY, AND SES

Total Sample

RACE	GENDER	SES			
Frequency Percent		Low	Medium	High	Total
Hispanic	Male	359 2.83	583 4.60	57 .45	999 7.87
Black	Male	162 1.28	1359 10.71	85 .67	1606 12.66
White	Male	243 1.92	2879 22.69	671 5.29	3793 29.90
Hispanic	Female	346 2.73	624 4.92	33 .26	1003 7.91
Black	Female	187 1.47	1298 10.23	83 .65	1568 12.36
White	Female	218 1.72	2880 22.70	619 4.88	3717 29.30
Total		1515 11.94	9623 75.86	1548 12.20	12686 100.00

Subsample

RACE	GENDER	SES			
Frequency Percent		Low	Medium	High	Total
Hispanic	Male	133 1.68	293 3.70	41 .52	467 5.90
Black	Male	78 .99	735 9.28	69 .87	882 11.14
White	Male	86 1.09	1,784 22.54	544 6.87	2,414 30.50
Hispanic	Female	150 1.89	357 4.51	24 .30	531 6.71
Black	Female	107 1.35	852 10.76	69 .87	1,028 12.99
White	Female	97 1.23	1,988 25.11	509 6.43	2,594 32.77
Total		651 8.22	6,009 75.91	1,256 15.87	7,916 100.00

is informative to consider what influences seem to direct young people toward the different types of postsecondary training.*

The model that was evaluated focused primarily upon the influence of the secondary school curriculum, with controls for other potential influences such as ability, gender, minority group membership, region, SES, and aspects of labor market experience. A series of equations was estimated for each race/ethnicity group: (1) the probability of having any postsecondary schooling; (2) among those with some postsecondary work, the probability of attending a postsecondary vocational or technical school; and (3) among those with some college work, the probability of attending a 4-year college or university. The results are shown in tables 4.2, 4.3, and 4.4. An earlier work had addressed this question with a different specification and a smaller sample (Campbell, Gardner, and Seitz 1982). That study had suggested that high school curriculum had a limited impact on postsecondary schooling. The impact was manifested primarily in the kind (2-year or 4-year) of schooling undertaken. The present study provides an analysis with more appropriate statistical assumptions, a larger sample, and somewhat more adequate specification. The results, however, are fairly similar.

Graduates of the academic curriculum in high school (except for minority males) are significantly more likely than their counterparts in the general curriculum to continue with some form of postsecondary education (table 4.2). There is no corresponding effect of the vocational curriculum, however. Among those who do pursue postsecondary education, white vocational graduates are more likely than those from the general curriculum to choose vocational-technical schools; white males and minority females from the academic curriculum are less likely to do so (table 4.3). Except for white males, students who pursue the academic curriculum in high school are significantly more likely than general curriculum graduates to enter 4-year rather than 2-year colleges (table 4.4).

Ability, as measured by AFQT, shows the most striking influence on the likelihood of postsecondary attendance in general and on the successively higher academic levels of postsecondary schooling. SES behaves in substantially the same way, but less uniformly.

In summary, it appears from the overall results that the vocational curriculum does not increase the likelihood of postsecondary education but does tend to influence those who choose

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*The resources of this study permitted only a consideration of types (for example, technical, community college); subsequent research should also consider patterns.

TABLE 4.2

EFFECT OF SES, ABILITY, AND HIGH SCHOOL CURRICULUM ON THE PROBABILITY OF OBTAINING SOME POSTSECONDARY EDUCATION

Explanatory Variable[a]	White Males			Minority Males			White Females			Minority Females		
	Maximum Likelihood Estimate	Standard Error	Partial Deviations Evaluated At The Mean	Maximum Likelihood Estimate	Standard Error	Partial Deviations Evaluated At The Mean	Maximum Likelihood Estimate	Standard Error	Partial Deviations Evaluated At The Mean	Maximum Likelihood Estimate	Standard Error	Partial Deviations Evaluated At The Mean
SES	.04	.01**	.01	.01	.01**	.00	.04	.01**	.01	.01	.01**	.00
AFQT	.03	.00**	.01	.03	.00**	.01	.03	.00**	.01	.03	.00**	.01
High school curriculum												
Concentrator	.06	.17	.02	-.15	.28	-.06	-.29	.17*	-.10	.09	.27	.03
Limited Concentrator	.05	.17	.02	-.27	.27	-.10	-.12	.16	-.04	.33	.23	.11
Concentrator/Explorer	-.19	.27	-.06	-.31	.32	-.12	-.22	.24	-.07	.23	.30	.08
Explorer	.21	.22	.07	b	b	b	-.07	.28	-.02	-.62	.28**	-.20
Vocational unrelated	.07	.10	.02	.06	.14	.02	-.29	.09**	-.09	-.22	.13*	-.07
Academic	.54	.14**	.18	.16	.21	.06	.65	.19**	.21	.47	.24*	.16
		N = 2003			N = 982			N = 2011			N = 1081	

NOTE: All estimates are Probit.

[a] Equations controlled for region, work experience, marital status, postsecondary delay and interruption, missing data transcript, missing data rural, and missing data AFQT.

[b] Estimates are not shown where sample cases are fewer than 15.

* $p \leq .10$ ** $p \leq .05$

TABLE 4.3

EFFECT OF SES, ABILITY, AND HIGH SCHOOL CURRICULUM ON THE PROBABILITY OF ENTERING POSTSECONDARY VOCATIONAL/TECHNICAL SCHOOL; YOUTH WITH SOME POSTSECONDARY EDUCATION

Explanatory Variable[a]	White Males			Minority Males			White Females			Minority Females		
	Maximum Likelihood Estimate	Standard Error	Partial Deviations Evaluated At The Mean	Maximum Likelihood Estimate	Standard Error	Partial Deviations Evaluated At The Mean	Maximum Likelihood Estimate	Standard Error	Partial Deviations Evaluated At The Mean	Maximum Likelihood Estimate	Standard Error	Partial Deviations Evaluated At The Mean
SES	-.04	.01**	-.01	-.00	.01	-.00	-.04	.01**	-.01	-.00	.01	-.00
AFQT	-.03	.00**	-.01	-.02	.00**	-.00	-.03	.00**	-.00	-.02	.00**	-.00
High school curriculum												
Concentrator	.86	.23**	.16	b	b	b	1.08	.22**	.19	.03	.35	.00
Limited Concentrator	.51	.22**	.10	b	b	b	.64	.21**	.11	-.19	.30	-.03
Concentrator/Explorer	b	b	b	b	b	b	-.26	.43	-.05	-.44	.44	-.08
Explorer	.53	.30*	.10	b	b	b	.36	.38	.06	b	b	b
Vocational unrelated	.10	.15	.02	.51	.21**	.08	.48	.13**	.09	.13	.18	.02
Academic	-.42	.19**	-.08	-.43	.43	-.07	-.19	.23	-.03	-.68	.40*	-.12
		N = 1345			N = 584			N = 1378			N = 751	

NOTE: All estimates are Probit.

[a] Equations controlled for region, work experience, marital status, postsecondary delay and interruption, missing data transcript, missing data rural, and missing data AFQT.

[b] Estimates are not shown where sample cases are fewer than 15.

* $p \leq .10$ ** $p \leq .05$

TABLE 4.4

EFFECT OF SES, ABILITY, AND HIGH SCHOOL CURRICULUM ON THE PROBABILITY OF ENTERING A 4-YEAR COLLEGE; YOUTH WITH SOME COMMUNITY COLLEGE OR 4-YEAR COLLEGE EXPERIENCE

Explanatory Variable[a]	White Males			Minority Males			White Females			Minority Females		
	Maximum Likelihood Estimate	Standard Error	Partial Deviations Evaluated At The Mean	Maximum Likelihood Estimate	Standard Error	Partial Deviations Evaluated At The Mean	Maximum Likelihood Estimate	Standard Error	Partial Deviations Evaluated At The Mean	Maximum Likelihood Estimate	Standard Error	Partial Deviations Evaluated At The Mean
SES	.00	.01	.00	.01	.01	.00	.04	.01**	.02	.00	.01	.00
AFQT	.02	.00**	.01	.01	.00**	.01	.02	.00**	.01	.02	.00**	.01
High school curriculum												
Concentrator	.07	.32	.03	b	b	b	-.35	.28	-.13	-.15	.30	-.06
Limited Concentrator	-.39	.27	-.15	b	b	b	-.15	.21	-.06	-.11	.24	-.04
Concentrator/Explorer	b	b	b	b	b	b	.35	.32	.13	.26	.29	.10
Explorer	b	b	b	b	b	b	b	b	b	b	b	b
Vocational unrelated	-.28	.14**	-.11	-.07	.19	-.03	-.02	.12	-.01	.33	.16**	.13
Academic	.11	.12	.04	.57	.23**	.22	.28	.14**	.11	.57	.22**	.23
		N = 1105			N = 512			N = 1132			N = 639	

NOTE: All estimates are Probit.

[a] Equations controlled for region, work experience, marital status, postsecondary delay and interruption, missing data transcript, missing data rural, and missing data AFQT.

[b] Estimates are not shown where sample cases are fewer than 15.

* $p \leq .10$ ** $p \leq .05$

to go on to take technical schooling, at least in the case of whites. The academic curriculum, on the other hand, increases the likelihood of some kind of postsecondary work, and for all groups except white males tends to channel postsecondary students into 4-year rather than community colleges.*

Economic Outcomes

Earnings

Before turning to an examination of the effect of variation in transition pathways on earnings, it is of some interest to note the influence of some of the intervening and control variables (tables 4.5, 4.9, 4.12, 4.15, and 4.18). To begin with, controlling for educational background, ability, and socioeconomic status, both white and minority women earn significantly less per hour and per month than white males. Minority males also earn significantly less per month, but the small negative differential between them and white males for hourly earnings does not achieve statistical significance. For all four gender by race/ethnic groups, being in a unionized work setting bears a strong positive relationship with hourly and monthly earnings, creating an advantage over nonunion settings of between 11 and 28 percent. Work experience is also positively related to earnings except for the hourly earnings of minority females, and tenure with current employer generally shows a positive relationship but achieves statistical significance only for white men and minority women. Ability, as measured by the AFQT scores, bears a strong independent relationship with earnings for all groups. In contrast, the coefficient of the SES variable achieves statistical significance in less than one-half the cases, although its sign is uniformly positive. Being employed in a rural area creates a wage disadvantage for white men and women, but generally not for the minority groups. There are also regional differences in earnings, although these are not completely systematic.

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*However, it should be noted that, of those NLS Youth respondents whose curriculum can be classified from available transcript data, 28 percent of the vocational education graduates go on to 4-year colleges and 15 percent go on to technical schools. The corresponding percentages for academic graduates are 75 percent and 4 percent, and for general graduates 41 percent and 9 percent respectively. Thus, although there is a greater likelihood of postsecondary technical school attendance for vocational education graduates than for the graduates of other curricula, the most common form of postsecondary attendance for every category of high school curriculum is the 4-year college or university.

Among all NLS Youth respondents who have both graduated from high school and are not currently enrolled in postsecondary school, the average hourly wage for Concentrators in the jobs for which they were trained is approximately 7 percent higher than those of otherwise similar individuals in the general curriculum, and the corresponding advantage for Limited Concentrators is 10 percent (table 4.5). Average monthly earnings for both these groups are about 10 percent higher than those of their general curriculum counterparts.

Unlike these findings based on the NLS Youth data, for the Class of '72, intensity of vocational experience in high school as determined by number of vocational credits taken does not have a differential impact on average earnings for those respondents whose most recent job in 1979 was related to their vocational training in high school.* These findings are consistent with the longitudinal work of Meyer (1981) who found high school vocational experience to have relatively no effect on earnings in 1979. Designation of whether or not vocational education in high school was related to most recent job held in 1979 depended on the respondent's recall of vocational experience in high school. A majority of individuals with vocational credits indicated, when reflecting back on this experience, that high school vocational training was not related to their most recent job held in 1979.

As might be expected, the NLS Youth data show a pronounced earnings differential between holders of college or university degrees and those who merely complete high school (see pathways 0033 and 0035 in table 4.5). Respondents holding a university degree earn almost 20 percent more per hour and per month than those who had not gone on to postsecondary school; those with a community college degree earn 11 percent more per hour and month (table 4.6). Data from the Class of '72 sample confirm the significant wage advantage of receiving a university degree, but do not show a gain from a community college degree (tables 4.7 and table 4.8). These data also show that individuals with vocational and technical school degrees (see paths 0011 and 0019 in table 4.7) earn almost 10 percent more per hour and month than the comparison group. Even though the magnitude of the earnings effect differs depending on whether one chooses to examine the indicators of postsecondary participation (table 4.8) or the combination pathways (table 4.7), the wage advantage is nevertheless positive and significant for those Class of '72 respondents with a technical degree or a university degree.

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*A model specified identically with that used for NLS Youth, except for the high school vocational patterns, was estimated. Four levels of credits in a vocational speciality were specified. None of these approached a statistical nonchance probability of .10.

TABLE 4.5

EFFECT OF HIGH SCHOOL CURRICULUM AND
POSTSECONDARY PATHWAYS ON EARNINGS
(NLS Youth, All Respondents)

Variable	Hourly Earnings ($) (Mean = $5.13) Parameter Estimate	t-value	Monthly Earnings ($) (Mean = $902.34) Parameter Estimate	t-value
Minority male	-2.1	(-1.08)	-4.6**	(-2.22)
Minority female	-18.5***	(-9.19)	-25.9***	(-11.95)
White female	-21.8***	(-14.87)	-29.1***	(-18.47)
SES	.3***	(3.11)	.2***	(2.61)
Northeast	1.8	(1.00)	.6	(.30)
South	1.1	(.68)	3.2*	(1.89)
West	6.9***	(3.83)	8.6***	(4.43)
Rural	-5.9***	(-3.74)	-5.3***	(-3.09)
AFQT	.3***	(7.59)	.3***	(7.43)
Married	4.8***	(3.23)	4.7***	(2.92)
Marital status	2.6	(.97)	2.3	(.80)
Child	1.8	(.99)	2.5	(1.29)
Child work	-8.5***	(-2.66)	-12.1***	(-3.55)
Work experience	.7***	(5.88)	.8***	(6.59)
Tenure	2.2***	(5.34)	2.5***	(5.63)
Work experience squared	-.5***	(-2.99)	-.6***	(-3.45)
Tenure squared	-4.0	(-1.53)	-6.2**	(-2.21)
Union	20.0***	(14.12)	18.6***	(12.15)
Concentrator	7.2**	(2.36)	9.1***	(2.80)
Limited Concentrator	10.1***	(3.36)	10.2***	(3.14)
Concentrator/Explorer	5.9	(1.34)	6.0	(1.27)
Explorer	-1.8	(-.40)	-.6	(-.12)
Voc. unrelated	-1.8	(-1.02)	-2.5	(-1.32)
Academic	-.4	(-.14)	-.6	(-.20)
0001	-8.3*	(-1.74)	-9.9*	(-1.93)
0002	-0.0	(-.00)	-1.0	(-.40)
0003	.4	(.17)	.8	(.33)
0006	11.1*	(1.90)	8.3	(1.33)
0009	a	a	a	a
0011	a	a	a	a
1011	-.6	(-.10)	-2.0	(-.31)
7011	a	a	a	a
0022	10.2***	(2.61)	9.1**	(2.16)
1022	a	a	a	a
0033	20.0***	(7.09)	20.2***	(6.66)
1033	a	a	a	a
0035	12.9**	(2.14)	11.8*	(1.83)
0103	-.8	(-.12)	4.9	(.68)
0106	-.8	(-.19)	-.3	(-.07)
1001	-.6	(-.18)	-1.8	(-.49)
1002	2.6	(.84)	.5	(.15)
1003	2.7	(.70)	4.7	(1.14)
Else	6.1***	(2.72)	4.6*	(1.93)
	R^2= .2684		R^2= .2815	
	Adj. R^2= .2593		Adj. R^2= .2724	
	F-statistic = 29.19		F-statistic = 31.16	
	N = 3705		N = 3705	

NOTE: All estimates are OLS, with controls for missing data transcript, missing data rural, and missing data AFQT. Parameter estimates represent percents.

[a] Regression coefficient is not shown where it is based on fewer than 25 sample cases.

* $p \leq .10$ **$p \leq .05$ ***$p \leq .01$

TABLE 4.6

EFFECT OF INDICATORS OF POSTSECONDARY
PARTICIPATION ON EARNINGS
(NLS Youth, All Respondents)

	Hourly Earnings (%) (Mean = $5.13)		Monthly Earnings (%) (Mean = $902.34)	
Variable	Parameter Estimate	t-value	Parameter Estimate	t-value
Enrolled, no degree	1.1	(.68)	.6	(.36)
Delay	-.8	(-.41)	-1.9	(-.89)
Interrupt	-2.1	(-.81)	-1.6	(-.57)
Technical degree	.6	(.16)	1.3	(.33)
Community college degree	11.1***	(3.53)	11.0***	(3.25)
University degree	18.9***	(7.41)	19.2***	(6.99)
Progression	-.8	(-.20)	-3.9	(-.85)
Regression	1.2	(.38)	.4	(.13)
	R^2= .2669		R^2= .2805	
	Adj. R^2= .2599		Adj. R^2= .2736	
	F-statistic = 38.19		F-statistic = 40.88	
	N = 3705		N = 3705	

NOTE: All estimates are OLS, with controls for missing data transcript, missing data rural, missing data AFQT, high school vocational experience, region, aptitude, work experience and tenure. Parameter estimates represent percents.

*$p \leq .10$ **$p \leq .05$ ***$p \leq .01$

TABLE 4.7

EFFECT OF POSTSECONDARY PATHWAYS ON EARNINGS
(Class Of '72, All Respondents)

Variable	Hourly Earnings (%) (Mean = $5.37) Parameter Estimate	t-value	Monthly Earnings (%) (Mean = $916.16) Parameter Estimate	t-value
Minority female	-25.8***	(-19.27)	-36.4***	(-26.82)
White female	-25.7***	(-30.15)	-35.9***	(-41.56)
Minority male	-6.0***	(-4.52)	-9.0***	(-6.74)
Hispanic	-.7	(-.36)	-.2	(-.10)
0001	-.1	(-.05)	.1	(.03)
0003	6.1***	(3.97)	8.4***	(5.37)
0006	5.5**	(2.22)	6.4**	(2.52)
0009	2.3	(1.04)	2.0	(.91)
0011	9.8***	(2.97)	9.0***	(2.69)
0019	7.9***	(2.99)	8.9***	(3.34)
0022	1.9	(.47)	.7	(.16)
0029	3.6	(1.34)	4.0	(1.44)
0033	11.7***	(8.20)	14.3***	(9.87)
0039	13.2***	(5.64)	15.9***	(6.72)
0083	11.9**	(2.48)	18.1***	(3.73)
0093	13.9***	(7.53)	16.9***	(9.03)
0103	1.2	(.30)	2.1	(.51)
0105	2.7	(.55)	2.6	(.53)
0106	2.4	(1.01)	2.3	(.96)
0107	1.7	(.53)	4.7	(1.41)
0109	7.3**	(2.52)	6.6**	(2.26)
1001	.7	(.37)	.7	(.37)
1002	-.9	(-.36)	-3.0	(-1.14)
1003	-2.4	(-.75)	.1	(.02)
1009	.2	(.09)	-.2	(-.09)
1106	5.2	(1.09)	6.0	(1.23)
1109	7.0*	(1.69)	4.4	(1.05)
Else	4.9***	(3.71)	5.2***	(3.86)
	R^2 = .2173		R^2 = .2846	
	Adj. R^2 = .2135		Adj. R^2 = .2812	
	F-statistic = 57.13		F-statistic = 81.89	
	N = 9,720		N = 9,720	

NOTE: All estimates are OLS. Equations controlled for high school vocational experience, region, aptitude, work experience and tenure. Parameter estimates represent percents.

*$p \leq .10$ **$p \leq .05$ ***$p \leq .01$

TABLE 4.8

EFFECT OF INDICATORS OF POSTSECONDARY
PARTICIPATION ON EARNINGS
(Class Of '72, All Respondents)

Variable	Hourly Earnings ($) (Mean = $5.37) Parameter Estimate	t-value	Monthly Earnings ($) (Mean = $916.16) Parameter Estimate	t-value
Enrolled, no degree	1.1	(.99)	1.7	(1.58)
Delay	-2.1*	(-1.71)	-2.8**	(-2.26)
Interrupt	.3	(.15)	-.5	(-.27)
Technical degree	5.8***	(2.80)	5.7***	(2.70)
Community college degree	.1	(.03)	-.6	(-.25)
University degree	8.6***	(7.15)	10.7***	(8.81)
Progression	-1.7	(-.33)	-2.2	(-.44)
Regression	.2	(.12)	-.0	(-.01)
	R^2 = .2112		R^2 = .2768	
	Adj. R^2 = .2087		Adj. R^2 = .2745	
	F-statistic = 83.67		F-statistic = 119.65	
	N = 9,720		N = 9,720	

NOTE: All estimates are OLS. Equations controlled for high school vocational experience, region, race/gender, aptitude, work experience, and tenure. Parameter estimates represent percents.

*$p \leq .10$ **$p \leq .05$ ***$p \leq .01$

Up to this point, the discussion has related to all respondents aggregated across gender and race/ethnicity categories. The following sections examine the results for each of the four categories.

White males. Among NLS white males (table 4.9), the average hourly wages for Concentrators in the jobs for which they were trained are 11 percent higher than those of otherwise similar young men in the general curriculum. Monthly income is 16 percent higher, presumably because of longer hours of work. For purposes of comparison it may be noted that the corresponding percentage differentials for college graduates relative to similar youth with no postsecondary education were 17 percent in each case (table 4.10).

Based on data collected in 1979, Class of '72 white males who earned a 4-year university degree evince no significant earnings advantage over respondents without any formal postsecondary schooling. Those who had received a community college degree or had attended only a community college earn substantially less per month than those who comprise the comparison group (table 4.11). We have no explanation for these curious results.

Minority males. There are too few sample cases of minority males in the vocational education categories to allow any conclusion about the effect of high school curriculum on earnings (table 4.12). However, with respect to postsecondary paths, both the NLS data (table 4.13) and the Class of '72 data (see path 0033 in table 4.14) show a substantial earnings advantage accruing to college graduates.

White females. For NLS white females, average hourly earnings for Limited Concentrators in training-related jobs are 11 percent higher than those of otherwise similar young women without secondary vocational training, and the corresponding differential for monthly income is 9 percent. The Concentrators, on the other hand, enjoy no statistically significant advantage over the comparison group (table 4.15). White female college graduates in the NLS sample earn as much as one-fifth more than comparable women with no postsecondary education (tables 4.15 and 4.16), a differential approximately equal to that which prevails among white men in the sample.

The Class of '72 data for white females show earnings advantages for college graduates that are comparable to those shown by the NLS data, but unlike the latter, also indicate that those who pursued almost any postsecondary path earned substantially more per hour and per month than women whose education ended with a high school diploma (table 4.17). Specifically, earnings advantages exist for white female holders of all types

TABLE 4.9

EFFECT OF HIGH SCHOOL CURRICULUM AND
POSTSECONDARY PATHWAYS ON EARNINGS
(NLS Youth, White Males)

Variable	Hourly Earnings (%) (Mean = $5.86) Parameter Estimate	t-value	Monthly Earnings (%) (Mean = $1,074.04) Parameter Estimate	t-value
Hispanic	--	--	--	--
SES	.1	(.43)	.1	(.49)
Northeast	-2.7	(-.89)	-5.8*	(-1.74)
South	3.8	(1.32)	5.9*	(1.87)
West	6.6**	(2.03)	7.5**	(2.11)
Rural	-7.6***	(-2.67)	-7.0**	(-2.27)
AFQT	.2***	(3.00)	.2***	(2.66)
Married	--	--	--	--
Marital status	--	--	--	--
Child	--	--	--	--
Child work	--	--	--	--
Work experience	.9***	(3.85)	.9***	(3.79)
Tenure	3.5***	(3.00)	3.7***	(2.91)
Work experience squared	-.8**	(-2.52)	-.7**	(-2.17)
Tenure squared	-9.8	(-1.24)	-11.3	(-1.31)
Union	28.3***	(10.66)	24.8***	(8.60)
Concentrator	10.9**	(2.01)	16.2***	(2.76)
Limited Concentrator	12.1**	(2.20)	11.5*	(1.94)
Concentrator/Explorer	a	a	a	a
Explorer	-8.8	(-1.15)	-10.5	(-1.26)
Voc. unrelated	-.4	(-.12)	-1.8	(-.47)
Academic	6.6	(1.48)	5.3	(1.09)
0001	-20.9***	(-2.68)	-16.7**	(-1.96)
0002	.2	(.04)	.9	(.18)
0003	-1.7	(-.38)	.3	(.06)
0006	a	a	a	a
0009	a	a	a	a
0011	a	a	a	a
1011	a	a	a	a
7011	a	a	a	a
0022	a	a	a	a
1022	a	a	a	a
0033	18.7***	(3.61)	19.7***	(3.49)
1033	a	a	a	a
0035	a	a	a	a
0103	a	a	a	a
0106	a	a	a	a
1001	1.4	(.22)	1.4	(.20)
1002	-.4	(-.08)	-3.2	(-.52)
1003	1.0	(.14)	3.2	(.41)
Else	.4	(.09)	-.8	(-.16)
	R^2 = .2287		R^2 = .1991	
	Adj. R^2 = .2041		Adj. R^2 = .1736	
	F-statistic = 9.29		F-statistic = 7.79	
	N = 1261		N = 1261	

NOTE: All estimates are OLS, with controls for missing data transcript, missing data rural, and missing data AFQT. Parameters estimates represent percents.

[a] Regression coefficient is not shown where it is based on fewer than 25 sample cases.

* $p \leq .10$ **$p \leq .05$ ***$p \leq .01$

TABLE 4.10

EFFECT OF INDICATORS OF POSTSECONDARY PARTICIPATION ON EARNINGS (NLS Youth, White Males)

Variable	Hourly Earnings (%) (Mean = $5.86) Parameter Estimate	t-value	Monthly Earnings (%) (Mean = $1,074.04) Parameter Estimate	t-value
Enrolled, no degree	-1.4	(-.45)	.5	(.15)
Delay	-.3	(-.08)	-2.8	(-.72)
Interrupt	-1.3	(-.26)	1.3	(.24)
Technical degree	-8.4	(-1.23)	-9.7	(-1.30)
Community college degree	12.9*	(1.86)	18.1**	(2.39)
University degree	16.9***	(3.63)	17.0***	(3.38)
Progression	-.1	(-.02)	-4.7	(-.58)
Regression	4.8	(.76)	1.0	(.14)
	R^2 = .2229		R^2 = .1961	
	Adj. R^2 = .2052		Adj. R^2 = .1779	
	F-statistic =12.63		F-statistic = 10.74	
	N = 1261		N = 1261	

NOTE: All estimates are OLS, with controls for missing data transcript, missing data rural, missing data AFQT, high school vocational experience, region, aptitude, work experience, and tenure. Parameter estimates represent percents.

* $p \leq .10$ **$p \leq .05$ ***$p \leq .01$

TABLE 4.11

EFFECT OF POSTSECONDARY PATHWAYS ON EARNINGS
(Class Of '72, White Males)

	Hourly Earnings (%) (Mean = $6.19)		Monthly Earnings (%) (Mean = $1,109.59)	
Variable	Parameter Estimate	t-value	Parameter Estimate	t-value
0001	-.5	(-.17)	.0	(.00)
0003	2.3	(.95)	5.7**	(2.34)
0006	4.3	(1.10)	4.4	(1.13)
0009	-1.4	(-.38)	-1.0	(-.27)
0011	5.7	(1.18)	4.7	(.97)
0019	-6.7	(-1.40)	-6.2	(-1.28)
0022	-11.2*	(-1.79)	-14.2**	(-2.27)
0029	-2.7	(-.60)	-2.0	(-.40)
0033	1.2	(.53)	3.2	(1.45)
0039	1.7	(.47)	5.7	(1.59)
0083	4.7	(.67)	10.0	(1.41)
0093	3.3	(1.15)	6.1**	(2.15)
0103	1.3	(.19)	5.6	(.85)
0105	a	a	a	a
0106	-4.8	(-1.31)	-4.0	(-1.10)
0107	-6.8	(-1.20)	-2.4	(-.41)
0109	.3	(.06)	1.2	(.27)
1001	-1.2	(-.39)	-1.9	(-.60)
1002	-9.0*	(-1.90)	-11.2**	(-2.36)
1003	-6.6	(-1.45)	-1.9	(-.41)
1009	-5.9	(-1.38)	-5.0	(-1.15)
1106	a	a	a	a
1109	4.7	(.70)	2.0	(.30)
Else	-2.7	(-1.33)	-2.0	(-.97)
	R^2 = .0872		R^2 = .0882	
	Adj. R^2 = .0783		Adj. R^2 = .0793	
	F-statistic = 9.79		F-statistic = 9.90	
	N = 4241		N = 4241	

NOTE: All estimates are OLS, with controls for high school vocational participation, region, aptitude, work experience, and tenure. Parameter estimates represent percents.

[a] Regression coefficient is not shown where it is based on fewer than 25 sample cases.

*$p \leq .10$ **$p \leq .05$ ***$p \leq .01$

TABLE 4.12

EFFECT OF HIGH SCHOOL CURRICULUM AND POSTSECONDARY PATHWAYS ON EARNINGS
(NLS Youth, Minority Males)

Variable	Hourly Earnings (%) (Mean = $5.26) Parameter Estimate	t-value	Monthly Earnings (%) (Mean = $946.41) Parameter Estimate	t-value
Hispanic	2.7	(.70)	7.0*	(1.70)
SES	.3*	(1.64)	.2	(1.23)
Northeast	-9.3	(-1.62)	-10.9*	(-1.77)
South	-3.4	(-.71)	.4	(.09)
West	1.3	(.23)	.2	(.04)
Rural	-8.8*	(-1.69)	-4.6	(-.81)
AFQT	.3***	(3.35)	.3***	(3.30)
Married	--	--	--	--
Marital status	--	--	--	--
Child	--	--	--	--
Child work	--	--	--	--
Work experience	.8***	(3.00)	1.0***	(3.39)
Tenure	2.2	(1.44)	1.9	(1.16)
Work experience squared	-.6	(-1.37)	-.8*	(-1.65)
Tenure squared	-4.7	(-.45)	-2.6	(-.23)
Union	23.2***	(6.98)	22.4***	(6.25)
Concentrator	a	a	a	a
Limited Concentrator	a	a	a	a
Concentrator/Explorer	a	a	a	a
Explorer	a	a	a	a
Voc. unrelated	-1.6	(-.33)	-3.0	(-.59)
Academic	-8.0	(-1.08)	-11.5	(-1.43)
0001	a	a	a	a
0002	1.4	(.25)	1.9	(.31)
0003	5.3	(.96)	6.0	(1.00)
0006	a	a	a	a
0009	a	a	a	a
0011	a	a	a	a
1011	a	a	a	a
7011	--	--	--	--
0022	a	a	a	a
1022	a	a	a	a
0033	a	a	a	a
1033	a	a	a	a
0035	a	a	a	a
0103	a	a	a	a
0106	a	a	a	a
1001	a	a	a	a
1002	-2.8	(-.40)	-3.4	(-.46)
1003	a	a	a	a
Else	6.2	(.98)	1.6	(.24)
	R^2 = .2886		R^2 = .2783	
	Adj. R^2 = .2414		Adj. R^2 = .2304	
	F-statistic = 6.12		F-statistic = 5.81	
	N = 627		N = 627	

NOTE: All estimates are OLS, with controls for missing data transcript, missing data rural, and missing data AFQT. Parameters estimates represent percents.

[a] Regression coefficient is not shown where it is based on fewer than 25 sample cases.

* $p \leq .10$ ** $p \leq .05$ *** $p \leq .01$

TABLE 4.13

EFFECT OF INDICATORS OF POSTSECONDARY PARTICIPATION ON EARNINGS (NLS Youth, Minority Males)

Variable	Hourly Earnings ($) (Mean = $5.26) Parameter Estimate	t-value	Monthly Earnings ($) (Mean = $940.41) Parameter Estimate	t-value
Enrolled, no degree	2.8	(.72)	1.8	(.43)
Delay	-4.5	(-.93)	-4.6	(-.89)
Interrupt	4.4	(.57)	-2.3	(-.28)
Technical degree	a	a	a	a
Community college degree	a	a	a	a
University degree	28.1***	(3.35)	27.2***	(3.00)
Progression	a	a	a	a
Regression	a	a	a	a
	R^2 = .2761		R^2 = .2622	
	Adj. R^2 = .2410		Adj. R^2 = .2264	
	F-statistic = 7.87		F-statistic = 7.33	
	N = 627		N = 627	

NOTE: All estimates are OLS, with controls for missing data transcript, missing data rural, missing data AFQT, high school vocational experience, region, aptitude, work experience, and tenure. Parameter estimates represent percents.

[a] Regression coefficient is not shown where it is based on fewer than 25 sample cases.

*$p \leq .10$ **$p \leq .05$ ***$p \leq .01$

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TABLE 4.14

EFFECT OF POSTSECONDARY PATHWAYS ON EARNINGS
(Class Of '72, Minority Males)

	Hourly Earnings ($) (Mean = $5.62)		Monthly Earnings ($) (Mean = $974.58)	
Variable	Parameter Estimate	t-value	Parameter Estimate	t-value
0001	1.5	(.25)	4.6	(.75)
0003	8.5*	(1.69)	9.5*	(1.88)
0006	3.2	(.46)	4.6	(.67)
0009	8.0	(1.25)	7.9	(1.23)
0011	a	a	a	a
0019	a	a	a	a
0022	a	a	a	a
0029	a	a	a	a
0033	14.4**	(2.52)	17.4***	(3.04)
0039	a	a	a	a
0083	a	a	a	a
0093	17.9**	(2.19)	23.7***	(2.90)
0103	a	a	a	a
0105	a	a	a	a
0106	a	a	a	a
0107	a	a	a	a
0109	a	a	a	a
1001	.9	(.17)	1.7	(.31)
1002	-.1	(-.02)	-1.2	(-.15)
1003	a	a	a	a
1009	9.7	(1.25)	9.8	(1.26)
1106	a	a	a	a
1109	a	a	a	a
Else	7.7*	(1.90)	9.5**	(2.35)
	R^2 = .1592		R^2 = .1584	
	Adj. R^2 = .1256		Adj. R^2 = .1248	
	F-statistic = 4.74		F-statistic = 4.71	
	N = 1094		N = 1094	

NOTE: All estimates are OLS, with controls for high school participation, region, aptitude, work experience, and tenure. Parameter estimates represent percents.

[a] Regression coefficient is not shown where it is based on fewer than 25 sample cases.

*$p \leq .10$ **$p \leq .05$ ***$p \leq .01$

TABLE 4.15

EFFECT OF HIGH SCHOOL CURRICULUM AND
POSTSECONDARY PATHWAYS ON EARNINGS
(NLS Youth, White Females)

Variable	Hourly Earnings (%) (Mean = $4.73) Parameter Estimate	t-value	Monthly Earnings (%) (Mean = $804.26) Parameter Estimate	t-value
Hispanic	--	--	--	--
SES	.3**	(2.05)	.3**	(2.14)
Northeast	6.0**	(2.19)	6.3**	(2.18)
South	2.9	(1.12)	5.5**	(2.07)
West	7.9***	(2.63)	8.8***	(2.83)
Rural	-5.1**	(-2.11)	-5.1**	(-2.01)
AFQT	.3***	(3.26)	.3***	(3.14)
Married	1.2	(.51)	1.1	(.44)
Marital status	1.3	(.31)	1.9	(.46)
Child	-3.5	(-1.22)	-5.5*	(-1.80)
Child work	-5.6	(-1.00)	-7.8	(-1.35)
Work experience	.6***	(2.94)	.7***	(3.35)
Tenure	1.0	(.92)	1.2	(1.08)
Work experience squared	-.3	(-1.09)	-.4	(-1.49)
Tenure squared	3.5	(.50)	1.7	(.24)
Union	11.6***	(4.55)	12.2***	(4.62)
Concentrator	3.5	(.73)	3.3	(.66)
Limited Concentrator	10.8**	(2.17)	9.0*	(1.74)
Concentrator/Explorer	a	a	a	a
Explorer	a	a	a	a
Voc. unrelated	-4.3	(-1.57)	-4.8*	(-1.66)
Academic	-3.6	(-.86)	-3.0	(-.69)
0001	a	a	a	a
0002	.6	(.15)	-2.2	(-.54)
0003	7.2*	(1.87)	5.5	(1.36)
0006	a	a	a	a
0009	a	a	a	a
0011	a	a	a	a
1011	a	a	a	a
7011	a	a	a	a
0022	12.2**	(2.35)	11.7**	(2.17)
1022	--	--	--	--
0033	20.1***	(4.89)	19.5***	(4.55)
1033	a	a	a	a
0035	a	a	a	a
0103	a	a	a	a
0106	a	a	a	a
1001	-.5	(-.10)	-1.8	(-.32)
1002	19.8***	(3.20)	18.4***	(2.85)
1003	8.6	(1.36)	11.7*	(1.76)
Else	12.9***	(3.56)	12.6***	(3.34)
	R^2 = .2244		R^2 = .2242	
	Adj. R^2 = .1962		Adj. R^2 = .1959	
	F-statistic = 7.94		F-statistic = 7.93	
	N = 1195		N = 1195	

NOTE: All estimates are OLS, with controls for missing data transcript, missing data rural, and missing data AFQT. Parameter estimates represent percents.

[a] Regression coefficient is not shown where it is based on fewer than 25 sample cases.

*p ≤ .10 **p ≤ .05 ***p ≤ .01

TABLE 4.16

EFFECT OF INDICATORS OF POSTSECONDARY PARTICIPATION ON EARNINGS (NLS Youth, White Females)

Variable	Hourly Earnings (%) (Mean = $4.73) Parameter Estimate	t-value	Monthly Earnings (%) (Mean = $804.26) Parameter Estimate	t-value
Enrolled, no degree	6.4**	(2.40)	4.2	(1.52)
Delay	-2.3	(-.69)	-.9	(-.25)
Interrupt	-1.8	(-.41)	-.6	(-.13)
Technical degree	7.9	(1.41)	7.3	(1.26)
Community college degree	14.3**	(2.47)	10.0**	(2.09)
University degree	20.5***	(5.32)	19.6***	(4.88)
Progression	-2.5	(-.40)	.2	(.02)
Regression	-5.5	(-.99)	-6.5	(-1.13)
	R^2 = .2121		R^2 = .2104	
	Adj. R^2 = .1904		Adj. R^2 = .1887	
	F-statistic = 9.78		F-statistic = 9.69	
	N = 1195		N = 1195	

NOTE: All estimates are OLS, with controls for missing data transcript, missing data rural, missing data AFQT, high school vocational experience, region, aptitude, work experience, and tenure. Parameter estimates represent percents.

*$p \leq .10$ **$p \leq .05$ ***$p \leq .01$

TABLE 4.17

EFFECT OF POSTSECONDARY PATHWAYS ON EARNINGS
(Class Of '72, White Females)

Variable	Hourly Earnings (%) (Mean = $4.69) Parameter Estimate	t-value	Monthly Earnings (%) (Mean = $759.16) Parameter Estimate	t-value
0001	-.4	(-.15)	-1.7	(-.61)
0003	9.3***	(3.81)	10.8***	(4.30)
0006	2.3	(.51)	3.1	(.65)
0009	1.9	(.53)	.7	(.17)
0011	22.4***	(4.34)	19.8***	(3.72)
0019	21.5***	(6.27)	21.0***	(5.94)
0022	14.7**	(2.48)	13.9**	(2.27)
0029	7.9**	(2.13)	6.6*	(1.75)
0033	20.3***	(9.55)	22.0***	(10.02)
0039	20.3***	(6.01)	20.9***	(6.02)
0083	a	a	a	a
0093	21.6***	(8.05)	22.8***	(8.22)
0103	-.7	(-.13)	-4.5	(-.78)
0105	a	a	a	a
0106	7.2*	(1.79)	5.5	(1.34)
0107	15.2***	(2.95)	16.4***	(3.07)
0109	10.8**	(2.43)	8.5*	(1.84)
1001	4.3	(1.34)	4.4	(1.34)
1002	4.5	(1.17)	2.1	(.53)
1003	1.7	(.34)	2.0	(.39)
1009	3.5	(.76)	.1	(.03)
1106	a	a	a	a
1109	a	a	a	a
Else	9.2***	(4.18)	8.2***	(3.62)
	R^2 = .1928		R^2 = .1963	
	Adj. R^2 = .1822		Adj. R^2 = .1858	
	F-statistic = 18.24		F-statistic = 18.66	
	N = 3328		N = 3328	

NOTE: All estimates are OLS, with controls for high school vocational participation, region, aptitude, work experience, and tenure. Parameter estimates represent percents.

[a] Regression coefficient is not shown where it is based on fewer than 25 sample cases.

*$p \leq .10$ **$p \leq .05$ ***$p \leq .01$

of postsecondary degrees and are of the same order of magnitude for graduates of vocational-technical schools as for college graduates. The earnings advantage was lowest for those with a community college degree.

Minority females. Among NLS minority females, no significant wage advantages are found for those in jobs for which they were trained in high school (table 4.18). When postsecondary education is examined, the earnings effect of a 4-year university degree as compared with no postsecondary schooling is about as large as that prevailing for white females (table 4.19). A substantial hourly and monthly wage advantage--in the neighborhood of 15 or 20 percent--is also found for NLS minority females who had received a community college degree. Class of '72 data are consistent with those of the NLS in showing an earnings advantage for holders of a 4-year university degree (see path 0033 in table 4.20).

Earnings Growth, 1981-82

In addition to examining the effect of transitional pathways on level of earnings, this work has also looked at their effect on rate of growth of earnings over a 1-year period. This question has been approached by estimating the coefficients of the high school curriculum and postsecondary education path variables in an equation with controls identical to those used for considering hourly and monthly rates of pay, plus an additional variable measuring earnings in the preceding year (in log form). With that variable as a control, the dependent variable (1982 earnings) in effect measures change in earnings over the 1-year period. The results for the combined groups of NLS Youth respondents are presented in tables 4.21 and 4.22. Separate equations for the race/gender subgroups were also run, but these results are not shown because they differed very little from those for the total sample.

Intensity of vocational experience in high school appears to have no effect on growth of either hourly or monthly earnings over a 1-year period. That is, controlling for 1981 earnings level, respondents whose 1982 job was related to their vocational training in high school evidenced no higher 1982 earnings than comparable respondents who had followed a general curriculum in high school.

In contrast, postsecondary education does appear to make a difference. Youth with 4-year college degrees experienced substantially greater growth in earnings than did those with no postsecondary education, and the same is true, to a somewhat lesser degree, of community college graduates. It should be noted that a time interval of only 1 year is hardly sufficient to

TABLE 4.18

EFFECT OF HIGH SCHOOL CURRICULUM AND POSTSECONDARY PATHWAYS ON EARNINGS (NLS Youth, Minority Females)

Variable	Hourly Earnings (%) (Mean = $4.48) Parameter Estimate	t-value	Monthly Earnings (%) (Mean = $757.92) Parameter Estimate	t-value
Hispanic	1.2	(.37)	1.8	(.48)
SES	.3*	(1.89)	.3	(1.63)
Northeast	.4	(.07)	-.9	(-.16)
South	-6.0	(-1.36)	-5.2	(-1.04)
West	2.3	(.46)	6.1	(1.08)
Rural	-.1	(-.02)	.1	(.02)
AFQT	.4***	(4.31)	.4***	(3.98)
Married	-.1	(-.02)	-1.4	(-.38)
Marital status	6.5	(1.25)	3.5	(.59)
Child	-1.0	(-.28)	-2.2	(-.57)
Child work	-5.2	(-1.15)	-3.8	(-.74)
Work experience	.4*	(1.64)	.7***	(2.61)
Tenure	1.7**	(2.55)	2.0***	(2.71)
Work experience squared	-.1	(-.17)	-.5	(-1.12)
Tenure squared	-1.6	(-.50)	-4.1	(-1.14)
Union	13.1***	(4.16)	11.5***	(3.24)
Concentrator	a	a	a	a
Limited Concentrator	5.7	(.89)	11.4	(1.57)
Concentrator/Explorer	a	a	a	a
Explorer	a	a	a	a
Voc. unrelated	5.1	(1.29)	4.3	(.97)
Academic	-6.7	(-.95)	-4.3	(-.53)
0001	a	a	a	a
0002	-1.6	(-.34)	-5.1	(-.97)
0003	-7.9	(-1.55)	-7.6	(-1.32)
0006	a	a	a	a
0009	a	a	a	a
0011	a	a	a	a
1011	a	a	a	a
7011	a	a	a	a
0022	a	a	a	a
1022	a	a	a	a
0033	a	a	a	a
1033	a	a	a	a
0035	a	a	a	a
0103	a	a	a	a
0106	a	a	a	a
1001	a	a	a	a
1002	-1.3	(-.20)	-2.9	(-.38)
1003	a	a	a	a
Else	4.2	(.96)	.7	(.13)
	R^2 = .2688		R^2 = .2390	
	Adj. R^2 = .2128		Adj. R^2 = .1808	
	F-statistic = 4.80		F-statistic = 4.10	
	N = 619		N = 619	

NOTE: All estimates are OLS, with controls for missing data transcript, missing data rural, and missing data AFQT. Parameter estimates represent percents.

[a] Regression coefficient is not shown where it is based on fewer than 25 sample cases.

*$p \leq .10$ **$p \leq .05$ ***$p \leq .01$

TABLE 4.19

EFFECT OF INDICATORS OF POSTSECONDARY PARTICIPATION ON EARNINGS (NLS Youth, Minority Females)

Variable	Hourly Earnings ($) (Mean = $4.48) Parameter Estimate	t-value	Monthly Earnings ($) (Mean = $757.92) Parameter Estimate	t-value
Enrolled, no degree	-3.5	(-1.05)	-5.2	(-1.39)
Delay	6.3	(1.50)	4.0	(.84)
Interrupt	-7.4	(-1.45)	-6.7	(-1.17)
Technical degree	a	a	a	a
Community college degree	21.3***	(3.26)	15.7**	(2.13)
University degree	18.7***	(2.79)	18.3**	(2.43)
Progression	a	a	a	a
Regression	7.6	(1.17)	7.6	(1.03)
	R^2 = .2603		R^2 = .2330	
	Adj. R^2 = .2186		Adj. R^2 = .1898	
	F-statistic = 6.25		F-statistic = 5.39	
	N = 619		N = 619	

NOTE: All estimates are OLS, with controls for missing data transcript, missing data rural, missing data AFQT, high school vocational experience, region, aptitude, work experience, and tenure. Parameter estimates represent percents.

[a] Regression coefficient is not shown where it is based on fewer than 25 sample cases.

* $p \leq .10$ ** $p \leq .05$ *** $p \leq .01$

TABLE 4.20

EFFECT OF POSTSECONDARY PATHWAYS ON EARNINGS
(Class Of '72, Minority Females)

Variable	Hourly Earnings ($) (Mean = $4.47) Parameter Estimate	t-value	Monthly Earnings ($) (Mean = $719.36) Parameter Estimate	t-value
0001	2.0	(.42)	1.7	(.35)
0003	5.6	(1.24)	4.7	(1.06)
0006	9.1	(1.43)	8.9	(1.41)
0009	4.0	(.71)	2.4	(.42)
0011	a	a	a	a
0019	a	a	a	a
0022	a	a	a	a
0029	a	a	a	a
0033	18.9***	(4.19)	20.0***	(4.49)
0039	a	a	a	a
0083	a	a	a	a
0093	24.0***	(3.63)	24.2***	(3.71)
0103	a	a	a	a
0105	a	a	a	a
0106	12.7**	(2.17)	10.5*	(1.82)
0107	-4.3	(-.62)	-4.1	(-.60)
0109	a	a	a	a
1001	-4.1	(-.71)	-2.7	(-.48)
1002	a	a	a	a
1003	a	a	a	a
1009	2.5	(.35)	-.1	(-.01)
1106	a	a	a	a
1109	a	a	a	a
Else	11.8***	(3.08)	9.7**	(2.57)
	R^2 = .1797		R^2 = .1782	
	Adj. R^2 = .1441		Adj. R^2 = .1426	
	F-statistic = 5.06		F-statistic = 5.01	
	N = 1060		N = 1060	

NOTE: All estimates are OLS, with controls for high school participation, region, aptitude, work experience, and tenure. Parameter estimates represent percents.

[a] Regression coefficient is not shown where it is based on fewer than 25 sample cases.

*$p \leq .10$ **$p \leq .05$ ***$p \leq .01$

TABLE 4.21

EFFECT OF HIGH SCHOOL CURRICULUM AND POSTSECONDARY PATHWAYS ON EARNINGS GROWTH, 1981-1982
(NLS Youth, All Respondents)

Variable	Hourly Earnings ($) (Mean = $5.47) Parameter Estimate	t-value	Monthly Earnings ($) (Mean = $968.45) Parameter Estimate	t-value
Log hourly pay '81	48.9***	(30.60)	--	--
Log monthly pay '81	--	--	31.2***	(23.93)
Minority male	.3	(.12)	-1.1	(-.48)
Minority female	-11.3***	(-5.28)	-19.2***	(-8.12)
White female	-13.6***	(-8.83)	-23.0***	(-13.60)
SES	.1	(.81)	.2*	(1.66)
Northeast	1.7	(.93)	-.3	(-.17)
South	.5	(.30)	.2	(.11)
West	2.8	(1.48)	4.4**	(2.12)
Rural	-3.9**	(-2.37)	-5.8***	(-3.19)
AFQT	.2***	(5.48)	.3***	(6.65)
Married	1.7	(1.14)	1.4	(.83)
Marital status	-1.4	(-.52)	-.8	(-.27)
Child	-.6	(-.33)	1.6	(.83)
Child work	-6.1*	(-1.82)	-12.3***	(-3.32)
Work experience	.4**	(2.49)	.4**	(2.43)
Tenure	3.5***	(5.04)	4.1***	(5.28)
Work experience squared	-.4**	(-2.14)	-.4**	(-1.91)
Tenure squared	-16.3***	(-3.51)	-20.7***	(-4.04)
Union	13.2***	(8.85)	13.9***	(8.48)
Concentrator	5.1	(1.61)	4.5	(1.29)
Limited Concentrator	4.4	(1.47)	4.9	(1.48)
Concentrator/Explorer	5.2	(1.17)	4.8	(.98)
Explorer	1.6	(.33)	3.4	(.62)
Voc. unrelated	-1.6	(-.89)	-2.2	(-1.09)
Academic	-2.4	(-.95)	-2.6	(-.94)
0001	a	a	a	a
0002	.9	(.37)	.1	(.05)
0003	1.3	(.54)	4.1	(1.51)
0006	8.5	(1.44)	11.8*	(1.81)
0009	a	a	a	a
0011	a	a	a	a
1011	a	a	a	a
7011	--	--	--	--
0022	5.8	(1.62)	8.0**	(2.01)
1022	a	a	a	a
0033	14.0***	(5.15)	23.9***	(7.93)
1033	a	a	a	a
0035	8.6	(1.51)	10.7*	(1.71)
0103	-4.6	(-.77)	3.0	(.46)
0106	-1.7	(-.42)	-1.6	(-.35)
1001	.1	(.04)	-.8	(-.24)
1002	-.4	(-.14)	-1.4	(-.40)
1003	.2	(.05)	2.2	(.53)
Else	1.3	(.56)	3.5	(1.38)
	R^2 = .4646		R^2 = .4212	
	Adj. R^2 = .4546		Adj. R^2 = .4104	
	F-statistic = 46.47		F-statistic = 38.96	
	N = 2509		N = 2509	

NOTE: All estimates are OLS, with controls for missing data transcript, missing data rural, and missing data AFQT. Parameter estimates represent percents.

[a] Regression coefficient is not shown where it is based on fewer than 25 sample cases.

* $p \leq .10$ ** $p \leq .05$ *** $p \leq .01$

TABLE 4.22

EFFECT OF INDICATORS OF POSTSECONDARY
PARTICIPATION ON EARNINGS GROWTH, 1981-1982
(NLS Youth, All Respondents)

	Hourly Earnings (%) (Mean = $5.47)		Monthly Earnings (%) (Mean = $968.45)	
Variable	Parameter Estimate	t-value	Parameter Estimate	t-value
Enrolled, no degree	1.9	(.12)	2.8	(1.49)
Delay	-2.6	(-1.35)	-4.2*	(-1.95)
Interrupt	-5.4**	(-2.16)	-4.0	(-1.44)
Technical degree	2.1	(.52)	5.2	(1.18)
Community college degree	6.7**	(2.25)	9.5***	(2.91)
University degree	13.9***	(5.63)	24.0***	(8.76)
Progression	-4.4	(-1.03)	-12.0**	(-2.56)
Regression	1.3	(.42)	.5	(.13)
	R^2= .4645		R^2= .4232	
	Adj. R^2= .4567		Adj. R^2= .4148	
	F-statistic = 59.59		F-statistic = 50.40	
	N = 2509		N = 2509	

NOTE: All estimates are OLS, with controls for missing data transcript, missing data rural, missing data AFQT, high school vocational experience, region, aptitude, work experience and tenure. Parameter estimates represent percents.

*$p \leq .10$ **$p \leq .05$ ***$p \leq .01$

measure trends in earnings. As the NLS Youth cohort accrues more experience in the labor force, these findings should be reexamined.*

Labor Force Participation, Employment, and Collective Bargaining Coverage

In addition to earnings, there are other important aspects of labor market experience that may possibly be affected by the character and extent of one's education. Here the study turns to a brief examination of the influence of secondary and postsecondary education on labor force participation (table 4.23), steadiness of employment that is, employment rate (table 4.24), and the likelihood of holding a job in which wages are set by collective bargaining (table 4.25). Perhaps the most important generalization that can be made is that there appears to be no consistent relationship between high school curriculum or postsecondary degree and any of these three variables when other factors are controlled. Moreover, the few instances of statistically significant relationships are not readily explainable.

It will be recalled that extent of labor market participation (work experience) and coverage by collective bargaining both bear strong positive relationships, other things being equal, with hourly and monthly earnings (table 4.5). The fact that high school curriculum and postsecondary educational experience have no consistent effect on either of these variables suggests that the indirect effect of the transitional pathways on earnings through these hypothesized intervening variables are either nonexistent or minimal.

Noneconomic Outcomes

Irrespective of its emphasis, education obviously has important objectives in addition to preparing individuals for the world of work. Men and women play a variety of interrelated roles--as spouses, parents, citizens, workers, and above all, as thinking and feeling entities whose happiness and well-being are important ends in themselves. Ideally, education should make a contribution in all these respects. Up to this point this study has focused on the effects of variation in educational paths on the work role; this section examines effects on other aspects of life.

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*Among econometricians consulted in regard to the specifications for these equations, there was considerable lack of agreement about appropriate form. This further suggests the desirability of reanalysis with careful consideration of the conceptual issues and with additional data.

TABLE 4.23

EFFECT OF HIGH SCHOOL CURRICULUM AND INDICATORS
OF POSTSECONDARY PARTICIPATION ON LABOR FORCE PARTICIPATION
(NLS Youth)

Explanatory Variable	White Males		Minority Males		White Females		Minority Females	
	Parameter Estimate	t-value	Parameter Estimate	t-value	Parameter Estimate	t-value	Parameter Estimate	t-value
Hispanic	--	--	-3.0	(-1.59)	--	--	-2.8	(-1.55)
SES	-.1	(-.97)	-.0	(-.36)	-.0	(-.48)	.1	(1.55)
Northeast	-3.3**	(-2.55)	-1.7	(-.61)	2.3	(1.57)	-2.1	(-.80)
South	-3.0**	(-2.42)	-.6	(-.26)	3.0**	(2.18)	3.3	(1.49)
West	-1.9	(-1.37)	1.4	(.54)	1.9	(1.20)	.8	(.31)
Rural	.4	(.33)	-.6	(-.25)	-.3	(-.24)	.3	(.13)
AFQT	-.1*	(-1.73)	-.1	(-1.17)	.0	(.22)	.1	(1.06)
Child	--	--	--	--	-13.8***	(-8.90)	-6.8***	(-3.63)
Union	2.8**	(2.42)	-.3	(-.21)	.3	(.21)	.2	(.14)
Work experience	1.0***	(11.14)	1.3***	(9.77)	.6***	(5.74)	.8***	(5.76)
Work experience squared	-1.1***	(-8.50)	-1.6***	(-7.19)	-.5***	(-3.34)	-.8***	(-3.58)
Concentrator	1.6	(.70)	a	a	6.5**	(2.34)	a	a
Limited Concentrator	1.4	(.58)	a	a	.2	(.08)	4.9	(1.35)
Concentrator/Explorer	a	a	a	a	2.3	(.58)	a	a
Explorer	-5.5*	(-1.76)	a	a	a	a	a	a
Voc. unrelated	2.2	(1.45)	-2.6	(-1.11)	.7	(.46)	.7	(.32)
Academic	.5	(.26)	-7.3**	(-2.12)	-.6	(-.24)	.1	(.02)
Enrollment, no degree	.1	(.09)	-1.3	(-.70)	-2.0	(-1.34)	-.7	(-.38)
Delay	.3	(.19)	-.0	(-.01)	1.1	(.63)	1.6	(.68)
Interrupt	-3.3	(-1.56)	-.4	(-.10)	-3.2	(-1.38)	-2.3	(-.82)
Technical degree	1.6	(.59)	a	a	-1.6	(-.56)	-1.2	(-.33)
Community college degree	-.6	(-.21)	a	a	-3.2	(-1.22)	-1.9	(-.54)
University degree	-3.0	(-1.52)	-5.6	(-1.38)	-3.3	(-1.54)	-2.8	(-.74)
	R^2= .3483 Adj. R^2= .3352 F-statistic = 26.51 N = 1417		R^2= .3185 Adj. R^2= .2907 F-statistic = 11.46 N = 740		R^2= .4039 Adj. R^2= .3910 F-statistic = 31.32 N = 1511		R^2= .4799 Adj. R^2= .4569 F-statistic = 20.83 N = 778	

NOTE: Labor force participation is number of weeks in labor force divided by 52. All estimates are OLS, with complete set of control variables identical to those used in table 4.10. Estimates represent percents.

[a] Coefficients are not shown where sample cases are fewer than 25.

*$p \leq .10$ **$p \leq .05$ ***$p \leq .01$

TABLE 4.24

EFFECT OF HIGH SCHOOL CURRICULUM AND INDICATORS
OF POSTSECONDARY PARTICIPATION ON EMPLOYMENT RATE
(NLS Youth)

Explanatory Variable	White Males		Minority Males		White Females		Minority Females	
	Parameter Estimate	t-value	Parameter Estimate	t-value	Parameter Estimate	t-value	Parameter Estimate	t-value
Hispanic	--	--	3.7*	(1.80)	--	--	6.8***	(3.75)
SES	.2**	(2.07)	.0	(.51)	.1	(1.02)	.0	(.19)
Northeast	1.7	(1.27)	2.4	(.80)	-1.5	(-1.18)	7.2***	(2.73)
South	4.8***	(3.70)	8.9***	(3.57)	-.1	(-.09)	6.8***	(3.08)
West	2.4*	(1.66)	6.0**	(2.11)	2.0	(1.43)	5.5**	(2.15)
Rural	-.6	(-.48)	-5.2*	(-1.86)	-.2	(-.20)	-4.8**	(-2.14)
AFQT	.1*	(1.84)	.1**	(2.11)	.0	(.79)	.0	(.32)
Child	--	--	--	--	1.2	(.86)	.9	(.51)
Union	-1.6	(-1.36)	-1.7	(-.93)	-.3	(-.27)	-1.6	(-.95)
Concentrator	1.3	(.54)	a	a	1.8	(.72)	a	a
Limited Concentrator	3.4	(1.35)	a	a	-.4	(-.19)	1.3	(.36)
Concentrator/Explorer	a	a	a	a	.1	(.04)	a	a
Explorer	-.6	(-.19)	a	a	a	a	a	a
Voc. unrelated	-1.0	(-.61)	-.0	(-.02)	1.0	(.79)	-.3	(-.14)
Academic	-2.6	(-1.35)	.8	(.20)	2.1	(1.00)	-2.2	(-.62)
Enrollment, no degree	3.1**	(2.30)	-1.4	(-.68)	1.0	(.77)	5.5***	(3.12)
Delay	-1.4	(-.85)	-5.5**	(-2.09)	-1.4	(-.84)	-4.7**	(-2.05)
Interrupt	-1.7	(-.76)	2.8	(.68)	-.6	(-.27)	-2.8	(-1.00)
Technical degree	6.1**	(2.17)	a	a	1.4	(.58)	.9	(.25)
Community college degree	-1.0	(-.32)	a	a	2.3	(1.00)	3.4	(.96)
University degree	2.3	(1.14)	-1.4	(-.31)	.5	(.28)	5.6	(1.49)
	R^2= .3162 Adj. R^2= .3023 F-statistic = 22.81 N = 1409		R^2= .3101 Adj. R^2= .2819 F-statistic = 10.99 N = 738		R^2= .2606 Adj. R^2= .2445 F-statistic = 16.21 N = 1504		R^2= .3578 Adj. R^2= .3292 F-statistic = 1[illegible].51 N = 774	

NOTE: Labor force participation is number of weeks in labor force divided by 52. All estimates are OLS, with complete set of control variables identical to those used in table 4.10. Estimates represent percents.

[a] Coefficients are not shown where sample cases are fewer than 25.

*p ≤ .10 **p ≤ .05 ***p ≤ .01

TABLE 4.25

EFFECT OF HIGH SCHOOL CURRICULUM AND INDICATORS
OF POSTSECONDARY PARTICIPATION ON THE PROBABILITY
OF COLLECTIVE BARGAINING COVERAGE
(NLS Youth)

	White Males			Minority Males		
Explanatory Variable	Maximum Likelihood Estimate	Standard Error	Partial Derivatives Evaluated At Mean	Maximum Likelihood Estimate	Standard Error	Partial Derivatives Evaluated At Mean
Hispanic	--	--	--	-.28	.14*	-.09
SES	.00	.01	.00	-.01	.01	-.00
Northeast	.07	.11	.02	-.40	.21*	-.13
South	-.24	.11**	-.07	-.51	.17**	-.17
West	.10	.11	.03	-.48	.20**	-.16
Rural	-.02	.11	-.01	-.12	.20	-.04
AFQT	-.00	.00	-.00	.00	.00	.00
Concentrator	-.16	.21	-.04	-.08	.32	-.02
Limited Concentrator	.18	.20	.05	-.08	.33	-.03
Concentrator/Explorer	.42	.31	.12	a	a	a
Explorer	-.03	.28	-.01	a	a	a
Voc. unrelated	-.23	.14	-.06	-.12	.18	-.04
Academic	-.03	.18	-.01	-.12	.28	-.04
Enrolled, no degree	-.32	.11**	-.09	-.05	.14	-.02
Delay	.26	.14*	.07	-.08	.19	-.03
Interrupt	-.13	.19	-.04	.07	.27	.02
Technical degree	.17	.25	.05	-.61	.42	-.20
Community college degree	-.57	.30*	-.16	-.26	.37	-.09
University degree	-.72	.21**	-.21	-.68	.36*	-.23
		N = 1246			N = 621	

NOTE: All estimates are Probit, with controls for missing data transcript, missing data rural, and missing data AFQT. Collective bargaining coverage refers to jobs in which wages are set by collective bargaining.

[a] Estimates are not shown where sample cases are fewer than 15.

*$p \leq .10$ **$p \leq .05$

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TABLE 4.25--Continued

Explanatory Variable	White Females: Maximum Likelihood Estimate	White Females: Standard Error	White Females: Partial Derivatives Evaluated At Mean	Minority Females: Maximum Likelihood Estimate	Minority Females: Standard Error	Minority Females: Partial Derivatives Evaluated At Mean
SES	-.01	.01	-.00	.00	.01	.00
Northeast	-.17	.12	-.04	-.41	.24*	-.12
South	-.26	.11**	-.07	-.27	.19	-.08
West	-.14	.13	-.04	-.01	.21	-.00
Rural	.05	.11	.01	-.55	.21**	-.16
AFQT	-.01	.00*	-.00	-.01	.00*	-.00
Child	-.04	.11	-.01	.12	.12	.04
Concentrator	.15	.21	.04	-.27	.38	-.08
Limited Concentrator	-.39	.26	-.10	-.21	.30	-.06
Concentrator/Explorer	-.39	.40	-.10	a	a	a
Explorer	-.63	.52	-.16	.10	.37	.03
Voc. unrelated	-.05	.12	-.01	.06	.17	.02
Academic	.11	.19	.03	-.25	.33	-.07
Enrolled, no degree	.02	.12	.00	.18	.14	.05
Delay	.08	.15	.02	.05	.18	.01
Interrupt	.12	.16	.03	-.25	.21	-.07
Technical degree	.07	.25	.02	-.19	.38	-.06
Community college degree	-.03	.21	-.01	.18	.31	.05
University degree	.14	.17	.03	.55	.28*	.16
		N = 1181			N = 602	

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Unfortunately, neither the NLS Youth data nor those from the High School Class of '72 provide many measures of the quality of life of the respondents or of the degree of success they enjoy in their many roles outside the labor market. (Part of the problem is that there are no objective measures of success in these roles as simple as earnings or employment stability in the work role.) Nevertheless, this section attempts to shed some light on the relationship between both high school curriculum and post-secondary pathways and such noneconomic outcomes as degree of involvement in organizations, political behavior, and attitudes toward the appropriate role of women in society. The findings on these issues are based primarily on 1979 interview data from Class of '72, although limited information obtained from previous surveys of that sample has also been used.*

Group Involvement

Our investigation of the relationship between high school curriculum and participation in a variety of social organizations rests on simple bivariate analysis. Table 4.26 shows only gross relationships between curriculum and the specified activities and ought not, therefore, to be interpreted as indicating the effect of curriculum on such activity. With this caveat, it may be noted that graduates of the academic curriculum have rather consistent above-average participation rates in a variety of types of organizations (youth groups such as Scouting, work-related organizations, sport clubs, literary and art groups, student organizations, and political organizations). Graduates of the vocational curriculum, on the other hand tend rather consistently to be below average in their rates of involvement in such organizations.

Political Participation

The relationships between educational background and political behavior are explored by means of both bivariate and multiple regression (Probit) analyses. Information on the political activity of members of the Class of '72 includes their responses to questions relating to their registration status and voting

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*The authors also executed a multiple regression analysis of the influence of high school curriculum and postsecondary pathways on the occupational aspirations and expectations held by members of the NLS Youth sample in 1981, using the same model as that used for analyzing earnings. However, the model explained virtually none of the variance in job aspiratons and job expectations. Consequently the results are not shown.

TABLE 4.26

RELATIONSHIP BETWEEN HIGH SCHOOL CURRICULUM AND
PARTICIPATION RATE IN SELECTED ORGANIZATIONS
(Class of '72)

Type of Organization	Academic	Academic/ Vocational	General	Vocational	% Total Respondents
Youth organizations	5.7* 11.86	4.7* 13.55	0.2 10.69	5.6* 9.38	10.45
Union, farm, trade, or professional organization	30.2* 33.55	0.2 29.24	24.7* 32.44	27.0* 24.37	28.23
Political organization	8.3* 10.96	1.1 10.75	1.7 9.99	9.1* 8.06	9.35
Church or church-related activities	0.1 36.09	3.9* 41.77	0.3 35.94	0.4 37.05	36.49
Community centers; social action	0.5 11.99	0.4 12.49	3.8* 12.63	2.1 10.88	11.57
Organized volunteer work	2.9 7.73	4.1* 9.27	2.4 7.57	4.4* 6.15	6.91
Sport teams or clubs	25.7* 38.90	1.0 36.14	1.8 34.81	28.3* 29.25	33.56
Literary, art, or discussion group	8.1* 12.53	0.9 9.44	59.8* 14.90	60.3* 7.24	10.83
Service organizations	2.7 6.28	4.3* 7.74	1.9 6.10	2.7 5.03	5.58
Student government; newspaper, yearbook	26.8* 4.32	.4 2.31	1.4 3.08	19.9* 1.72	2.76
Another voluntary group	10.5* 12.47	.6 11.69	9.3* 12.15	12.5 8.94	10.56

NOTE: This table is an aggregate of independent runs. Values are chi squares and column percents.

*$p \leq .05$, the probability of a chance occurrence is less than 5%.

behavior and on the extent of active participation in political campaigns (contributions, speeches, and so forth) in the several years prior to 1979.

Somewhat under one-third of the respondents indicated that they had not registered to vote (table 4.27). But nonregistration was significantly below average among graduates of the academic curriculum and significantly above average for the vocational graduates. The pattern is identical when the criterion is failure to have voted in the 1976-1979 period. Finally, vocational graduates were significantly less likely than academic graduates to have engaged in direct political campaign activity (table 4.28).

These gross relationships cannot, of course, be interpreted to reflect the effects of variation in high school curriculum because the latter is highly correlated with other variables (e.g., socioeconomic status) that are known to be related to extent of political participation. The data in table 4.29 however, control for such factors and allow an examination of the independent effects of both high school curriculum and character of postsecondary education on registration and voting behavior. These data constitute strong evidence of the positive effects of all forms of postsecondary education on the likelihood of being politically active. Among white youth, the holders of all types of postsecondary degrees are significantly more likely to have voted than those with no postsecondary education. The one exception to the same generalization with respect to registration is among male holders of technical degrees, in which case the same tendency is evident but does not achieve statistical significance. Among minorities the relationships are somewhat less pronounced in that technical degree holders do not differ significantly from youth with no postsecondary work. Nevertheless, the relationships for 2-year and 4-year college graduates are almost as strong as they are among whites.

There is much weaker evidence for an independent influence of high school curriculum on political participation, with postsecondary education controlled. The negative relationships between the vocational curriculum and political activity that are discernable in the bivariate relationship (table 4.27) disappear in the multivariate analysis. There remains among whites, however, a significantly greater tendency to vote for graduates of the academic curriculum compared with comparable youth who have pursued the general curriculum.

Attitude toward Role of Women

It is widely held that education is, or at least should be, "liberating" in the sense of freeing individuals from blind

TABLE 4.27

RELATIONSHIP BETWEEN HIGH SCHOOL CURRICULUM AND THE PROBABILITY OF VOTING ACTIVITY
(Class Of '72)

Item	Academic	Academic/ Vocational	General	Vocational	% Total Respondents
Registered to vote					
No	8.3* 27.26	0.3 31.44	12.3* 27.08	20.3* 33.56	30.13
Yes	3.6 72.74	0.1 68.56	5.3* 72.92	8.7* 66.44	69.87
Voted in the past three years					
No	34.0* 24.99	4.3* 35.91	26.6* 26.31	42.3* 35.87	30.84
Yes	15.2* 75.01	1.9 64.09	11.9* 73.69	18.9* 64.13	69.16

NOTE: Values are chi squares and column percents.

*$p \leq .05$, the probability of a chance occurrence is less than 5%.

TABLE 4.28

RELATIONSHIP BETWEEN HIGH SCHOOL CURRICULUM
AND POLITICAL PARTICIPATION
(Class Of '72)

Frequency	Academic	Academic/ Vocational	General	Vocational	% Total Respondents
Never	2.5 84.87	0.1 86.01	0.2 86.93	3.2 89.88	87.55
Sometimes	16.3* 14.86	1.1 13.87	1.2 12.90	20.7* 10.08	12.29
Frequently	2.8 0.28	0.0 0.12	0.0 0.16	4.3* 0.04	0.16

NOTE: Includes such activities as making campaign contributions, making speeches, etc.
Values are chi squares and column percents.

*$p \leq .05$, the probability of a chance occurrence is less than 5%.

TABLE 4.29

EFFECT OF HIGH SCHOOL CURRICULUM
AND POSTSECONDARY EDUCATION ON VOTING BEHAVIOR
(Class Of '72)

Educational Characteristics[a]	White Males						Minority Males					
	Probability of Being Registered to Vote			Probability of Having Voted			Probability of Being Registered to Vote			Probability of Having Voted		
	Maximum Likelihood Estimate	Standard Error	Partial Deviations Evaluated At The Mean	Maximum Likelihood Estimate	Standard Error	Partial Deviations Evaluated At The Mean	Maximum Likelihood Estimate	Standard Error	Partial Deviations Evaluated At The Mean	Maximum Likelihood Estimate	Standard Error	Partial Deviations Evaluated At The Mean
High school curriculum												
Academic	.05	.04	.02	.16	.04**	.05	-.04	.09	-.02	-.05	.08	-.02
Vocational: Intensity 1	.14	.13	.47	.22	.13*	.07	.09	.27	.03	.16	.28	.06
Vocational: Intensity 2	-.00	.18	-.00	.15	.19	.05	b	b	b	b	b	b
Vocational: Intensity 3	-.24	.20	-.08	-.30	.20	-.10	b	b	b	b	b	b
Vocational: Intensity 4	-.07	.19	-.03	-.02	.19	-.01	-.30	.30	-.11	-.38	.30	-.14
Vocational: unrelated	-.02	.03	-.01	-.03	.03	-.01	-.17	.07**	-.06	-.20	.07**	-.08
Postsecondary education												
Enrolled, no degree	.05	.05	.01	.03	.05	.01	.22	.10**	.08	.30	.11**	.11
Technical degree	.13	.11	.04	.18	.11*	.06	.05	.24	.01	.30	.24	.11
Community college degree	.47	.11**	.16	.50	.11**	.17	.08	.22	.03	.50	.23**	.19
University degree	.46	.05**	.16	.57	.05**	.19	.37	.13**	.14	.70	.13**	.27
		N = 6443			N = 6443			N = 1530			N = 1530	

NOTE: Results obtained by Probit analysis using the same set of control variables as those used in earnings equations, e.g., table 4.8 except for training-related placement.

[a] Reference group for high school curriculum consists of graduates of the general curriculum. Reference group for postsecondary education consists of respondents with no postsecondary work.

[b] Estimates are not shown where sample cases are fewer than 15.

*$p \leq .10$ **$p \leq .05$

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TABLE 4.29--Continued

Educational Characteristics[a]	White Females						Minority Females					
	Probability of Being Registered to Vote			Probability of Having Voted			Probability of Being Registered to Vote			Probability of Having Voted		
	Maximum Likelihood Estimate	Standard Error	Partial Deviations Evaluated At The Mean	Maximum Likelihood Estimate	Standard Error	Partial Deviations Evaluated At The Mean	Maximum Likelihood Estimate	Standard Error	Partial Deviations Evaluated At The Mean	Maximum Likelihood Estimate	Standard Error	Partial Deviations Evaluated At The Mean
High school curriculum												
Academic	.02	.05	.01	.12	.05**	.04	.14	.10	.05	.06	.09	.02
Vocational: Intensity 1	.21	.12*	.07	.16	.12	.05	.05	.25	.01	.32	.26	.12
Vocational: Intensity 2	.22	.17	.08	.01	.16	.01	.18	.27	.07	.04	.25	.01
Vocational: Intensity 3	.19	.16	.06	.23	.16	.07	.03	.29	.01	.17	.29	.06
Vocational: Intensity 4	.04	.12	.01	[illegible]	.13	.02	-.02	.30	-.01	.57	.32*	.21
Vocational: unrelated	.01	.04	.00	-.03	.04	-.01	-.09	.07	-.03	-.02	.06	-.01
Postsecondary education												
Enrolled, no degree	.06	.05	.02	.09	.05	.03	.09	.09	.03	.01	.09	.00
Technical degree	.19	.09**	.06	.20	.09*	.07	-.15	.20	-.05	.17	.21	.06
Community college degree	.29	.09**	.10	.37	.09**	.13	.40	.24*	.13	.43	.23*	.15
University degree	.36	.05**	.12	.57	.09**	.19	.55	.12**	.18	.40	.11**	.14
		N = 6491			N = 6491			N = 1765			N = 1765	

TABLE 4.30

EFFECT OF HIGH SCHOOL CURRICULUM AND POSTSECONDARY PATHWAYS ON ATTITUDE TOWARD ROLE OF WOMEN (Class Of '72)

Variable	Parameter Estimate	t-value
Minority female	3.18***	20.17
White female	2.80***	28.29
Minority male	.76***	4.64
Hispanic	-.11	-.47
Academic	.12	1.07
Academic/Vocational	.10	.43
Intensity 1	.07	.25
Intensity 2	-.50	-1.17
Intensity 3	.04	.09
Intensity 4	-.10	-.27
Vocational unrelated	-.08	-.89
Northeast	.21*	1.68
South	-.35***	-3.18
West	.05	.36
Rural	-.87***	-7.53
Aptitude	-.00***	-4.19
Work experience	.03***	11.97
Tenure	-.01***	-3.34
Work experience squared	-.01***	-8.13
Tenure squared	.01**	2.11
Union	.92***	9.17
SES	.01**	2.15
0001	-.16	-.65
0003	.44**	2.15
0006	.74**	2.28
0009	-.31	-1.06
0011	-.37	-.81
0019	.54*	1.72
0022	.47	.93
0029	1.04***	3.48
0033	1.39***	7.98
0039	1.40***	6.03
0083	.98*	1.95
0093	1.48***	7.23
0103	1.53***	4.26
0105	1.45***	3.35
0106	.76***	3.21
0107	1.42***	4.52
0109	1.44***	5.12
1001	.65***	2.78
1002	.75***	2.59
1003	1.01***	2.86
1009	.09	.29
1106	.15	.36
1109	.80**	2.23
Else	1.13***	7.35
Ever married	-.25**	-2.39
Child	-.16	-1.49

R^2 = .4159
Adj. R^2 = .4142
F-statistic = 249.13
N = 17,209

NOTE: Estimates are OLS regression, controlling for missing data rural.

*$p \leq .10$ **$p \leq .05$ ***$p \leq .01$

adherence to the status quo and making them more willing to accept cultural change. One rather dramatic example of such a change that has occurred in recent years is the increase in the role options available to women. Data available in the Class of '72 surveys presented an opportunity to consider whether the type and level of education would be related to more "liberal" or "permissive" views on this matter, and in particular, whether vocational education would fit the pattern attributed to education in general. The data available were in the form of a scale based upon agreement or disagreement with statements such as:

- A working mother of preschool children can be just as good a mother as the mother who does not work.

- Most women are happiest when they are making a home and caring for children.

A regression model with this attitude scale as the dependent variable was estimated for the aggregate Class of '72 sample. Controls included gender, minority group membership, region, and SES. Because experience in the labor market could very reasonably be expected to have an impact on the attitudes that the scale purports to measure, several variables reflecting this experience were also included. The results are presented in table 4.30.

The data indicate that those individuals who had pursued most of the postsecondary schooling routes report a broader attitude concerning women's role in society. Such individuals are more likely than those with no postsecondary education to believe that women can have a career in the world of work as well as successfully raise a family. No such significant relationships, however, are found with respect to differing degrees of concentration in high school vocational education or, indeed, with any high school curriculum.

CHAPTER 5

SUMMARY, CONCLUSIONS, AND POLICY IMPLICATIONS

Stated most succinctly, the aim of this study has been to ascertain the effect of high school curriculum and of post-secondary educational experience on several measures of adaptation to the labor market and to life in general of young persons whose school experience is in the recent past. The indicators of labor market "success" that have been used are hourly and monthly earnings in current job, growth in earnings over a 1-year period, extent of labor force participation over the preceding year, employment stability as measured by the ratio (over the same year) between weeks employed and weeks in the labor force, and whether the individual is covered by collective bargaining. The principal noneconomic ("psychosocial maturity") measures are the extent of participation in social organizations and in political activity and attitude toward the appropriate role of women.

Transitional Pathways and Economic Outcomes

Analysis of the economic outcomes has relied most heavily on the National Longitudinal Surveys of Youth (NLS), all of whom were under 25 years old when their labor market status was observed in 1982. Supplemental analysis of earnings has utilized 1979 data from the High School Class of 72, when the respondents were in their midtwenties. Investigation of the noneconomic outcomes has been based exclusively on Class of '72 data.

In an attempt to isolate the independent effects of high school curriculum and of postsecondary educational pathways on these outcomes, this study has used a multivariate framework that (1) has controlled for personal and contextual factors likely to be correlated with both the explanatory and dependent variables and (2) has incorporated several variables presumed to mediate the influence of educational experience on, say, earnings. For instance, the analysis permits one to assess the degree to which high school curriculum affects earnings directly and the extent to which it operates indirectly through its effect on, say, employment stability.

The evidence on economic outcomes of educational pathways that is contained in tables 4.5-4.25 and described in the preceding chapter is detailed and complex. This brief summary draws together the most significant generalizations that the evidence appears to warrant. For this purpose, tables 5.1 and 5.2 serve as useful guides. The first of these shows whether a net relationship has been found to exist between each of the two principal explanatory variables and earnings, stratifying by gender and

TABLE 5.1

EFFECTS OF HIGH SCHOOL CURRICULUM, POSTSECONDARY EDUCATION PATH, AND POSTSECONDARY DEGREE ON EARNINGS BY GENDER AND RACE/ETHNICITY AND BY SOURCE OF DATA

Explanatory Variable	Earnings Variable, Gender/Ethnicity, and Source of Data																			
	All Respondants				White Males				Minority Males				White Females				Minority Females			
	NLS		Class '72		NLS		Class '72		NLS		Class '72		NLS		Class '72		NLS		Class '72	
	Hourly $	Monthly $	Hourly $	Monthly $	Hourly $	Monthly $	Hourly $	Monthly $	Hourly $	Monthly $	Hourly $	Monthly $	Hourly $	Monthly $	Hourly $	Monthly $	Hourly $	Monthly $	Hourly $	Monthly $
High school curriculum: general = reference group																				
Concentrator	+*	+*	na	na	+*	+*	na	na	d	d	na	na	0	0	na	na	d	d	na	na
Limited Concentrator	+*	+*	na	na	+*	+	na	na	d	d	na	na	+*	+	na	na	0	0	na	na
Concentrator/Explorer	0	0	na	na	d	d	na	na	d	d	na	na	d	d	na	na	d	d	na	na
Explorer	0	0	na	na	0	0	na	na	d	d	na	na	d	d	na	na	d	d	na	na
Vocational unrelated	0	0	na	na	0	0	na	na	0	0	na	na	0	-	na	na	0	0	na	na
Academic	0	0	na	na	0	0	na	na	0	0	na	na	0	0	na	na	0	0	na	na
Postsecondary transition Pattern 0000 (no postsecondary education) = reference group																				
0001	-	-	0	0	-*	-	0	0	d	d	0	0	d	d	0	0	d	d	0	0
0002 Traditional path,	0	0	na	na	0	0	na	na	0	0	na	na	0	0	na	na	0	0	na	na
0003 no degree	0	0	+*	+*	0	0	0	+*	0	0	+	+	+	0	+*	+*	0	0	0	0
0006	+	0	+*	+*	d	d	0	0	d	d	0	0	d	d	0	0	d	d	0	0
0009	d	d	0	0	d	d	0	0	d	d	0	0	d	d	0	0	d	d	0	0

Source: Tables 4.2 - 4.20

NOTE: Effects are net of the control and intervening variables shown in table 5.2
A plus or minus indicates a coefficient for the variable (positive or negative) that is significant at p. ≤ .10.
An asterisk (*) after the sign signifies a significance level of p. ≤ .05.
A zero means that the variable is not statistically significant.
*A "d" means that the coefficient has been ignored as meaningless because it is based on fewer than 25 sample cases.

In the NLS data, non Hispanic Caucasians are referred to as "white", and all others combined are designated "minority".
For minority men and women, the coefficient for "Hispanic" purports to show the effect within the minority group of being Hispanic.
In the Class '72 data, there are simply two racial groups: white (Caucasian) and minority (all other).

Entry of "na" in body of table means either that the variable was not used in the regression or that there were no sample cases in the category.

TABLE 5.1--Continued

Explanatory Variable		All Respondents				White Males				Minority Males				White Females				Minority Females			
		NLS		Class '72		NLS		Class '72		NLS		Class '72		NLS		Class '72		NLS		Class '72	
		Hourly $	Monthly $	Hourly $	Monthly $	Hourly $	Monthly $	Hourly $	Monthly $	Hourly $	Monthly $	Hourly $	Monthly $	Hourly $	Monthly $	Hourly $	Monthly $	Hourly $	Monthly $	Hourly $	Monthly $
0011	Vocational degree	d	d	+*	+*	d	d	0	0	d	d	d	d	d	d	+*	+*	d	d	d	d
0019		na	na	+*	+*	na	na	0	0	na	na	d	d	na	na	+*	+*	na	na	d	d
1011		0	0	na	na	d	d	na	na	d	d	na	na	d	d	na	na	d	d	na	na
7011		d	d	na	na	d	d	na	na	na	na	na	na	d	d	na	na	d	d	na	na
0022	Community college degree	+*	+*	0	0	d	d	-	-*	d	d	d	d	+*	+*	+*	+*	d	d	d	d
1022		d	d	na	na	d	d	na	na	d	d	na	na	na	na	na	na	d	d	na	na
0029		na	na	0	0	na	na	0	0	na	na	d	d	na	na	+*	+	na	na	d	d
0033	4-year degree	+*	+*	+*	+*	+*	+*	0	0	d	d	+*	+*	+*	+*	+*	+*	d	d	+*	+*
0039		na	na	+*	+*	na	na	0	0	na	na	d	d	na	na	+*	+*	na	na	d	d
1033		d	d	na	na	d	d	na	na	d	d	na	na	d	d	na	na	d	d	na	na
0035		+*	+	na	na	d	d	na	na	d	d	na	na	d	d	na	na	d	d	na	na
0083	Degree and additional education	na	na	+*	+*	na	na	0	0	na	na	d	d	na	na	d	d	na	na	d	d
0093		na	na	+*	+*	na	na	0	+*	na	na	+*	+*	na	na	+*	+*	na	na	+*	+*
0103	Interruption and no degree	0	0	0	0	d	d	0	0	d	d	d	d	d	d	0	0	d	d	d	d
0105		na	na	0	0	na	na	d	d	na	na	d	d	na	na	d	d	na	na	d	d
0106		0	0	0	0	d	d	0	0	d	d	d	d	d	d	+	0	d	d	+*	+
0107		na	na	0	0	na	na	0	0	na	na	d	d	na	na	+*	+*	na	na	0	0
0109		na	na	+*	+*	na	na	0	0	na	na	d	d	na	na	+*	+	na	na	d	d
1001	Delay and no degree	0	0	0	0	0	0	0	0	d	d	0	0	0	0	0	0	d	d	0	0
1002		0	0	0	0	0	0	-	-*	0	0	0	0	+*	+*	0	0	0	0	0	0
1003		0	0	0	0	0	0	0	0	d	d	d	d	0	+	0	0	d	d	d	d
1009		na	na	0	0	na	na	0	0	na	na	0	0	na	na	0	0	na	na	0	0
1106	Delay, interruption and no degree	na	na	0	0	na	na	d	d	na	na	d	d	na	na	d	d	na	na	d	d
1109		na	na	+	0	na	na	0	0	na	na	d	d	na	na	d	d	na	na	d	d
Other		+*	+	+*	+*	0	0	0	0	0	0	+	+*	+*	+*	+*	+*	0	0	+*	+*
Postsecondary Degree (no postsecondary education = reference group)																					
Technical degree		0	0	+*	+*	0	0	na	na	d	d	na	na	0	0	na	na	d	d	na	na
Community college degree		+*	+*	0	0	+	+*	na	na	d	d	na	na	+*	+*	na	na	+*	+*	na	na
University degree		+*	+*	+*	+*	+*	+*	na	na	+*	+*	na	na	+*	+*	na	na	+*	+*	na	na

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TABLE 5.2

EFFECTS OF CONTROL AND INTERVENING VARIABLES ON EARNINGS, BY GENDER AND RACE/ETHNICITY AND BY SOURCE OF DATA

Explanatory Variable	All Respondents				White Males				Minority Males				White Females				Minority Females			
	NLS		Class '72		NLS		Class '72		NLS		Class '72		NLS		Class '72		NLS		Class '72	
	Hourly $	Monthly $	Hourly $	Monthly $	Hourly $	Monthly $	Hourly $	Monthly $	Hourly $	Monthly $	Hourly $	Monthly $	Hourly $	Monthly $	Hourly $	Monthly $	Hourly $	Monthly $	Hourly $	Monthly $
Gender/Race: non-minority males = reference group																				
Minority Males	0	-*	-*	-*	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Minority Females	-*	-*	-*	-*	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Nonminority Females	-*	-*	-*	-*	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Hispanic	na	na	0	0	na	na	na	na	0	+	0	+	na	na	na	na	0	0	-	-
Socioeconomic Status	+*	+*	0	0	0	0	0	0	0	0	-	-	+*	+*	0	0	+	0	0	0
Ability	+*	+*	0	0	+*	+*	0	0	+*	+*	+	+	+*	+*	0	0	+*	+*	0	0
Region: North Central = reference group																				
Northeast	0	0	-	-*	0	-	-*	-*	0	-	0	-	+*	+*	0	0	0	0	0	0
South	0	+	-*	-*	0	+	-*	-*	0	0	-*	-*	0	+*	-*	-*	0	0	-*	-*
West	+*	+*	+*	+*	+*	+*	+*	+*	0	0	0	0	+*	+*	+	+	0	0	0	0
Rural Residence	-*	-*	-*	-*	-*	-*	-*	-*	-	0	-*	-*	-*	-*	-*	-*	0	0	-*	-*
Work Experience (months[a])	+*	+*	+*	+*	+*	+*	+*	+*	+*	+*	0	0	+*	+*	+*	+*	0	+*	+*	+*
Tenure with Current Employer (months[b])	+*	+*	+*	+*	+*	+*	+*	+*	0	0	+*	+*	0	0	+*	+*	+*	+*	+*	+*
Coverage by Collective Bargaining	+*	+*	+*	+*	+*	+*	+*	+*	+*	+*	+*	+*	+*	+*	+*	+*	+*	+*	+*	+*

NOTE: Effects are net of the high school curriculum variable and the postsecondary transition pattern variable shown in table 5.1 See NOTE in table 5.1.

[a] Months of employment since age 16 plus months of employment squared.

[b] Months plus months squared.

race/ethnicity, and indicating whether the analysis is based on NLS or Class of '72 data. Table 5.2 does the same for most of the control and the intervening variables. In the body of the tables, a 0 signifies the absence of a statistically significant ($p \leq .10$) relationship, whereas significant relationships are indicated by a + or a -, depending on the sign of the coefficient.* An asterisk after the sign indicates that the relationship is significant at $p \leq .05$ (no distinction is made between the .05 and .01 significance levels).

Painting with a very broad brush and with no attempt to repeat any of the detail that has already been presented, the following conclusions may be drawn:

1. There is utility in conceptualizing the transition pathways between school and work as comprising two distinct segments: the high school curriculum and the pattern of postsecondary schooling. Each segment has an independent effect upon one or more important labor market outcomes, controlling for the other (as well as for other appropriate variables).

2. These two segments are not unrelated to each other, although the relationships that exist are perhaps not so pronounced as one might have expected. Among whites and minority females (but not minority males), graduates of the academic high school curriculum are more likely than those in the general curriculum to obtain some form of postsecondary education. The same is not true of vocational education graduates, although the white vocational graduates who do go on are more likely than their general curriculum counterparts to enter vocational and technical schools. Considering all the results, there is little evidence, except for students in the academic curriculum, that decisions on high school curriculum and postsecondary education are made simultaneously in the 9th or 10th grade. On the other hand, the few relationships that do exist mean that part of the effect of high school curriculum on economic and noneconomic outcomes occurs <u>indirectly</u> through the effect of high school curriculum on the postsecondary pathway.

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*In all cases, regression coefficients based on fewer than 25 sample cases are ignored.

3. Contrary to the findings of most previous research, there is clear evidence, when high school curriculum is ascertained by an examination of students' actual records rather than by self-report, that vocational graduates employed in training-related jobs enjoy an earnings advantage over the graduates of the general curriculum who are comparable in all other respects.

4. The earnings advantage imparted by vocational specialization in high school is not uniform when youth are classified by gender and race/ethnicity. The advantage is most pronounced among white males and may not exist at all for minorities. A more positive effect of the vocational curriculum for men than for women is contrary to the findings of most previous research, which has generally shown just the opposite. Although there is not yet any confident explanation for this difference in findings, it may result from the fact that this study has classified as vocational graduates only those persons who currently serve in training-related jobs, and that this restriction excludes more men than women because of the large proportion of the latter who specialize in office work and take jobs in that occupational category.

5. The effect of high school curriculum on the other economic outcomes that have been examined is considerably less clear. For example, of the 48 possible relationships between vocational curriculum and either labor force participation, employment stability, or collective bargaining coverage, only a small minority show significant relationships, all of which, however, are positive. Thus, even though collective bargaining coverage and extent of labor force exposure bear strong positive relationships with earnings, one can conclude that very little of the total effect of high school curriculum on earnings operates through these two intervening variables. On the basis of an earlier work (Gardner, Campbell, and Seitz 1982), it seems likely that had educational attainment been included as an intervening variable (which would have been highly correlated with the pathway variable), somewhat larger indirect effects would have been discernable.

6. With high school curriculum controlled, what a youth does after graduation has a great deal of influence on subsequent earnings. Not surprisingly, the most pervasive and strongest effect is that

generated by a 4-year degree; youth who have graduated from a 4-year college or university earn significantly more than those who end their education with a high school diploma. There are a few inexplicable variations in the regression results--for example, Class of '72 data show no earnings advantage for white males with college degrees.

7. Many other pathways of postsecondary education also lead to higher earnings, but none so strongly as attainment of a 4-year degree. For instance, a community college degree has a smaller positive coefficient than a university degree in four out of the five regressions that have been run. On the other hand, attending a 4-year college--even without graduating (path 0003)--frequently confers an earnings advantage. Finally, it is worth noting that youth in the catchall "other" pathway category in many cases (with the notable exception of white males) enjoy a significant earnings advantage over those with no postsecondary education.

8. On the other hand, there are at least two pathways that seem to confer no earnings advantage on those who have pursued them. Specifically, with the possible exception of white females* there is no evidence in our data that young men or women who have attended, but not completed, either postsecondary vocational programs or community colleges were subsequently better off with respect to earnings than comparable youth with no postsecondary education.

9. Whether delays in entering and interruptions during postsecondary educational pathways have independent effects on subsequent earnings cannot be said with any confidence on the basis of the findings. There is no evidence that they do, but the numbers of sample cases may in many instances be too small to detect such influences even if they exist.

10. The control and intervening variables that have been used in these models generally behave as expected. In the nonstratified regressions for the total samples, being female imparts a significant earnings disadvantage, other things equal. Minority males earn significantly less per month than

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*The NLS Youth data show a significant positive coefficient for attending community college, but the Class of '72 data do not.

comparable white males, but the differential in hourly pay is not significant. Ability (AFQT score) is strongly related to earnings. Rural residence imposes an earnings disadvantage on whites (but not on minorities). Coverage by collective bargaining is strongly and uniformly related to higher earnings. Duration of total work experience bears a significant positive relation to earnings for all groups; the effect of length of service with current employer is generally, but less uniformly, similar. The strong positive effects that unionism and work experience have on earnings do not imply important indirect effects of curriculum through these variables; the relationship between curriculum and these intervening variables is either small or nonexistent.

Transitional Pathways and Noneconomic Outcomes

1. Limitations of the databases make it more difficult to explore noneconomic than economic outcomes associated with variations in high school curriculum and postsecondary educational experience.

2. There are simple relationships between high school curriculum and participation in a variety of social and political activities. Academic graduates display above-average, and vocational graduates below-average tendencies to engage in a variety of social and political activities. These relationships almost certainly do not reflect the influence of the curriculum but rather result from correlations between curriculum and other variables (e.g. socioeconomic status) that are related to the outcome variables. In the case of political activity it is virtually certain that this is the case, because the simple relationships described above tend to disappear when the data are analyzed in a multivariate framework.

3. In contrast to high school curriculum, postsecondary education bears a strong relationship with noneconomic outcomes. Specifically, youth with postsecondary degrees, other things equal, are significantly more likely than those whose education stopped with a high school diploma to be registered to vote, to have voted recently, and to hold "permissive" attitudes toward the propriety of labor market activity on the part of married women with children.

Interpretations and Policy Implications

The conclusions presented above have been generalizations that emerge from data that are largely devoid of interpretation or evaluation. There remains the more subjective task of pointing out the significance that some of the findings appear to have either from the standpoint of public policy or from the standpoint of future research on the issues with which this study has been concerned.

The Vocational Curriculum in High Schools

The higher cost of vocational relative to "general" education has been an important factor in motivating research aimed at ascertaining whether there is a corresponding "payoff". A complete answer to this question would of course require a benefit-cost analysis that the present study has obviously not attempted. Nevertheless, the findings summarized above constitute clearer justification for the vocational education curriculum than most earlier studies had provided. Both young men and young women who specialize in vocational courses and who end up in jobs related to their training tend to earn more than otherwise comparable youth who do not. On the assumption of economic theory that wage differentials reflect differences in (marginal) productivity, this means that the vocational training yields a social benefit as well as making its recipient better off.

The fact that positive earnings differentials accrue only to the vocational education graduates who are in training-related jobs suggests that what the curriculum contributes primarily is job skills rather than (1) generalized work habits and attitudes that are attractive and profitable to employers or (2) general labor market skills that enable individuals to find better jobs. Both of the latter two categories of advantage should be expected to have a payoff irrespective of the kind of work the individual is in.

In any case, the fact that vocational training yields earnings benefits only to those who enter training-related jobs is a reason for some concern. It suggests the need to know more than is currently known about the factors responsible for the failure of many vocational curriculum graduates to do so. To the extent that it is lack of opportunity, the relevant policy objective is either to expand the number of jobs in the economy or to improve the match between the structure of job opportunities and enrollments in the various vocational education specialties, or both. On the other hand, to the extent that it is a matter of choice on the part of graduates, the appropriate remedy is more effective counseling prior to and during the high school years. In any case, it is clear that on the basis of economic considerations alone it would be desirable to minimize the proportion of vocational curriculum graduates who fail to use their training in the labor market.

If one is concerned with the efficiency with which resources are utilized, there is an additional guide for policy inherent in these findings. Irrespective of ability, level of education, and extent of labor market experience, women earn less than men. The present study has not attempted to ascertain the reasons for this disparity, and even the studies by economists designed specifically to do so have been unsuccessful in producing unanimity among students of the subject. Yet it is difficult to avoid the conclusion that such differentials stem at least in part from differences in the socialization process for men and women that lead women into lower-paying work (that is, less productive work as evaluated by the market). Quite aside from the issue of equity, this means that resources are being used inefficiently.

The relevance of all of this to vocational education, of course, is that women are disproportionately represented in the business and office programs that lead to lower-paying jobs than, say, the trade, industry, or technical fields in which larger proportions of men than of women are represented. It is not clear to what extent this situation is amenable to control or influence by those responsible for educational policy, but the attention they are beginning to give to it is clearly justified.

The findings are less clear with respect to the relationship between race/ethnicity and earnings. Where hourly earnings is the dependent variable, the negative coefficient for minority group membership is not statistically significant. In the case of monthly earnings, on the other hand, minority males earn significantly less than comparable whites. Resolution of this ambiguity requires further research

Postsecondary Education

The fact that different postsecondary paths apparently produce different degrees of economic benefit, other things being equal, provides no basis for either individual or social choice in the absence of information on relative costs. However, if as these data suggest, some paths produce no economic benefits (starting but not completing a 2-year college or a postsecondary vocational program), then policy should be directed at minimizing the incidence of such transition patterns--unless they can be justified on noneconomic grounds. At the very least, the facts should be made as widely known as possible to counselors and, through them, to potential students.

Future Research

The experience of conducting a study based on two different data sets and involving some variation in the specification of

models is especially sobering, for it underscores the difficulties inherent in arriving at confident and unambiguous answers to important questions. In this study, for example, evidence of a clear earnings advantage for vocational education graduates emerges from the NLS Youth data but not from the Class of '72 data. Also, one finds differences in the effects of alternative postsecondary educational pathways depending upon whether NLS Youth data or Class of '72 data are being used. In some measure the differences may be attributable to the fact that explanatory variables could not be constructed in precisely the same way from the two data sets; in part, they may stem from differences in the age composition of the two samples: all of the members of the Class of '72 sample were old enough to have completed a 4-year college degree, whereas this was true of only a portion of the NLS sample.

Even with a single data set, findings differ depending upon how models are specified. Indeed, the evaluation in this study of the effects of high school curriculum differs from that offered by the authors' previous work (Gardner, Campbell, and Seitz 1982) in part because of differences in definition of the reference group, in part because the present study confines vocational specialists to those currently working in training-related jobs, and in part because of the inclusion of an ability variable not previously available. What the relative importance of each of these differences is, however, is not yet known, and this is a question that merits further research. More generally, the present study highlights the importance of sensitivity analysis that will permit more confident assessment of the effect of variations in model specification upon findings relating to the economic and noneconomic effects of the several major pathways from school to work.

Finally, the crucial importance of being in a training-related job, together with the large proportion of vocational graduates who are not (more than 50 percent, based on NLS data), invites attention to the reasons why vocational curriculum graduates move into unrelated jobs (even when the criteria of "relatedness" are rather loose, as they have been in the present study). As has been indicated, policy measures designed to reduce the inefficiencies resulting from such discrepancies between training and work differ depending upon whether they result from voluntary choices or occur by force of circumstances.

TECHNICAL APPENDIX

Data Sources

All of the data in this report come from two sources: The National Longitudinal Surveys of Youth (NLS Youth) and the National Longitudinal Survey of the High School Class of 1972 (Class of '72). The basic characteristics of each of these have been described in chapter 1. For the analysis of economic outcomes chief reliance has been placed upon the NLS Youth data, primarily because transcripts that were available for most of the respondents permitted a more confident and more precise classification of the content of their high school education than the self- or administrator-reported curriculum available in the Class of '72 data.

NLS Youth Sample Sizes

Of the 12,686 members of the original NLS Youth sample, only selected subsets have been used in the analyses contained in this report. The basic requirement for inclusion in any of the analyses was that the individual had completed high school and that there was enough information to ascertain what (if any) postsecondary educational path had been pursued. The number screened out by the high school graduation requirement was 4,356 and the number for whom there were no data on postsecondary path was 414, leaving a total of 7,916. This was the subsample used in table 4.2 to explore the relationship between high school curriculum and the probability of obtaining some postsecondary education.

For the analysis of earnings and the probability of collective bargaining coverage, (tables 4.5, 4.6, 4.9, 4.10, 4.12, 4.13, 4.15, 4.16, 4.18, 4.19, and 4.25) additional screens were imposed: (1) that the individual not be enrolled in school at the time of the 1982 survey; (2) that the youth had been employed at some time during the preceding 12 months at a job involving at least 30 hours a week; and (3) that the calculated rate of pay was over $1.00 and under $25.00 per hour (to eliminate the effect of probable reporting errors). These 3 requirements further reduced the sample to 3,840 members. (In examining earnings growth between 1981 and 1982, the sample was further reduced by eliminating persons who graduated high school later than 1979, in order to assure sufficient labor force exposure to permit meaningful comparisons.) Where labor force participation is the dependent variable (table 4.23), the only screen (in addition to the two basic ones) eliminates persons currently enrolled in school; for analyzing employment rate (table 4.24) there is the additional requirement that the individual has spent at least one week in the labor force during the 12 months prior to the 1982 interview.

Table A-1 shows the sample size after each of these screens--for all respondents combined as well as for the gender, race/ethnicity subsets used in the analysis. In the instances in which class of '72 data are used in the report, the samples were defined in as nearly the same ways as the available data permit.

Sampling weights. The NLS Youth sample was created by means of a complex design involving deliberate oversampling of Hispanics, blacks, economically disadvantaged whites, and military personnel. Individual case weights are assigned in order to permit accurate estimates of the total U.S. population of men and women within the designated age limits (14 to 21 in January, 1979). Except in table 4.1, all percentages reported in this study are based on weighted data. In regressions, on the other hand, unweighted data are used. Weighted and unweighted regressions each have a set of advantages and disadvantages, and authorities are divided on which procedure is preferable. We have opted to follow the advice of Cramer (1971, p. 143) and the example of Zvi Griliches (1984)--using NLS Youth data.

High School Curriculum

The way in which the high school curriculum variable has been created from transcripts of the NLS Youth respondents is described in chapter 2. It is worth reemphasizing that to be classified as a Concentrator, Limited Concentrator, or Concentrator/Explorer the individual must be in a training-related job. Respondents who otherwise meet the criteria for inclusion in these three categores but who are not in training-related jobs are classifed as Vocational/Unrelated. The relatedness of an individual's high school specialty to the job was determined by reference to the NOICC (1979) Occupational and Educational Crosswalk, which uses both the Census 3-digit occupational code and the Census 3-digit industrial code to determine training relatedness.

Missing Data

With three exceptions that are described below, respondents for whom there is no information on a variable used in a regression are dropped from that regression. The "N" reported in each regression is the number of respondents whose data files are actually used in that regression. The difference between that number and the relevant sample size shown in table A-1 indicates the number of respondents dropped because of missing data.

The three exceptions to the above generalization, for the NLS Youth data, are the high school curriculum variable, the ability (AFQT) variable, and the rural-urban variable. In each

TABLE A-1

THE EFFECT OF SCREENS ON NLS YOUTH SAMPLE SIZE, BY GENDER AND RACE/ETHNICITY

	Total	White Males	Minority Males	White Females	Minority Females
Total sample	12,686	3,793	2,605	3,717	2,571
Less: Non-high school graduates	4,356	1,222	1,164	1,022	948
High school graduates	8,330	2,571	1,441	2,695	1,623
Less: No data on postsecondary path	414	157	92	101	64
Basic sample	7,916	2,414	1,349	2,594	1,559
Less: Not currently enrolled	2,101	689	335	631	446
Nonstudent sample	5,815	1,725	1,014	1,963	1,113
Less: Nonworkers	1,798	381	334	659	424
Nonstudent workers, 30+ hours/week	4,017	1,344	680	1,304	689
Less: Invalid wage rates	177	59	29	52	37
Sample for analyzing earnings	3,840	1,285	651	1,252	652

of these instances, cases of missing data are classified as a dummy variable in each regression, although the coefficients do not appear in the tables shown in the report. To illustrate, the number of cases of missing data for these variables in the earnings regressions for all respondents are: 1,310 for high school curriculum (transcript); 429 for urban-rural; and 104 for AFQT.

The portion of the NLS Youth sample for which high school curriculum (transcript) data are not available has been compared with the portion for which the data are available, cross-classified by SES (high, medium, and low) and gender, race/ethnicity (6 categories). A Chi-square test indicates a significant difference between the distributions.

The effects of being unable to classify some high school graduates according to their vocational education experience can be summarized as follows. Middle SES black males are overrepresented in the remaining sample, but low and high SES black males are not. There is a moderate underrepresentation of low SES Hispanic females. It should be noted that for neither of these two minority categories do the reported findings show a significant relationship between high school curriculum and outcome variables. The substantial effect of missing transcripts occurs in the case of white females. These respondents are underrepresented in both the middle and high SES categories. Positive and significant coefficients are reported in the earnings equations for this category. Although one cannot determine from these data the probable effects of the missing transcripts, it is plausible to expect that the obtained results might have achieved greater significance, because SES was held constant in the equation, and an increase in number of cases might have sufficiently improved the precision of the estimate.

Military Experience

It will be recalled that the NLS Youth sample includes 1,200 members who were selected from Department of Defense rosters to represent men and women within relevant age ranges who were in the armed services when the surveys began. In addition to this group, members of the original civilian sample may have entered the armed service prior to the 1982 survey. Finally, some of the members of both these groups may have reentered civilian life by the time of the 1982 survey. The total number of respondents in the overall sample with military experience is 1,718. Of these, 1,148 remain after the screens for high school graduation, postsecondary path, and current school enrollment are applied. When the remaining screens are applied for the earnings regressions, the number with military service is reduced to 449.

It should be kept in mind that no occupational training that may have been received in the armed services is included in postsecondary education or training. Moreover, military service is

not included in labor market or employment experience. Finally, because high school transcripts were obtained for some of the 1,200 members of the armed services in the original sample, none of that group is classified by high school curriculum; they all fall into the dummy variable category for "no information on high school curriculum" that has been described. Consequently, no attempt was made to consider the possible effects of military training upon any of the outcomes addressed.

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