

THE EFFECTS OF PARTICIPATION IN PUBLIC SCHOOL VOCATIONAL  
EDUCATION UPON POST HIGH SCHOOL ACTIVITIES

by

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(ABSTRACT)

Vocational education has become a huge enterprise in the United States. Federal involvement and the emphasis on the evaluation of vocational education has increased in recent decades. Many positive results concerning the effects of vocational education have been found by research. Since many factors other than the program itself may influence the effects of participation in vocational education, studies which include those factors are needed.

This study focused on participation in public school vocational education, along with student background factors and in-school factors to determine their effects upon students post high school activities. The study used the information collected by the High School and Beyond surveys and analyzed those data using path analysis to determine the effects of selected factors upon post high school activities. However, the effects of participation in vocational education were of primary concern in the study.

Six basic and five composite activities with a total of sixteen dependent variables were studied. Vocational education participation was found to have no effects upon the post high school activities of military service, homemaking, unemployment, and employability, and have negative effects upon participation in academic education related activities. The findings concerning vocational types of activities were mixed. Vocational education participation does not influence specific vocational types of activities such as only working or only pursuing additional vocational education. However, when vocational types of activities were studied in combination with other activities positive effects were found.

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## TABLE OF CONTENTS

CHAPTER I: ORIGIN AND IMPORTANCE OF THE STUDY . . . . .	1
Introduction . . . . .	1
Definition of Vocational Education . . . . .	2
Goals of Vocational Education . . . . .	5
Implementation at Secondary School Level . . . . .	7
Background of the Problem . . . . .	9
Evaluation of Vocational Education . . . . .	9
Indicators of Successful Programs . . . . .	11
Results of Evaluation . . . . .	13
Statement of the Problem . . . . .	15
Purpose of the Study . . . . .	15
Assumption of the Study . . . . .	16
Limitations of the Study . . . . .	16
Definition of Terms . . . . .	17
Summary . . . . .	19
CHAPTER II: REVIEW OF LITERATURE . . . . .	20
Status Attainment Through Schooling . . . . .	20
Outcome Evaluation . . . . .	26
Nationwide Longitudinal Studies of High School Students	28
Effects of Vocational Education . . . . .	30
Students Characteristics and Other Factors . . . . .	35
Research Problems and Approaches . . . . .	40
Table of Contents	v

Summary . . . . .	43
 CHAPTER III: RESEARCH METHODOLOGY . . . . .	 45
High School and Beyond Data . . . . .	45
Sampling . . . . .	46
Survey Instruments . . . . .	47
Applications to Present Study . . . . .	48
Research Design . . . . .	49
Dependent Variables . . . . .	49
Causal Model . . . . .	50
In-school Variables . . . . .	51
Descriptive Variables . . . . .	54
Aspirations . . . . .	55
Analysis . . . . .	57
Summary . . . . .	60
 CHAPTER IV: FINDINGS . . . . .	 61
Activities Investigated . . . . .	61
Basic Activities . . . . .	61
Composite activities . . . . .	63
Adjustment in the Model . . . . .	64
Effects upon Activities . . . . .	64
Activity 'Work' . . . . .	65
Activity 'Academic Education' . . . . .	70
Activity 'Vocational Education' . . . . .	75
Activity 'Unemployment' . . . . .	78
 Table of Contents	 vi

Activity 'Work and Study' . . . . .	81
Activity 'Vocational' . . . . .	83
Effects among Independent Variables . . . . .	86
Activity 'Homemaking' . . . . .	92
Activity 'Military Service' . . . . .	93
Activity 'Different Education' . . . . .	100
Activity 'Employability' . . . . .	108
Activity 'Work vs. Academic Education' . . . . .	115
Summary . . . . .	134
CHAPTER V: SUMMARY, DISCUSSION, AND RECOMMENDATIONS	135
Summary . . . . .	135
Introduction . . . . .	135
Statement of the Problem . . . . .	136
Procedure . . . . .	137
Findings . . . . .	137
Discussion and Conclusion . . . . .	144
Recommendations . . . . .	150
REFERENCES . . . . .	153
VITA . . . . .	160

LIST OF ILLUSTRATIONS

Figure 1. Status Attainment Model by Sewell and Hauser,  
1972. . . . . 24

Figure 2. Proposed Model. . . . . 52

Figure 3. Example of Path Diagram . . . . . 58

LIST OF TABLES

Table 1. Means, Standard Deviations, and Number of Cases of Six Activities . . . . . 66

Table 2. Correlations between Dependent and Independent Variables of Six Activities . . . . . 67

Table 3. Correlations among Independent Variables of Six Activities . . . . . 68

Table 4. Direct Effects upon Two Variables of Activity Work by Independent Variables . . . . . 71

Table 5. Indirect Effects upon Two Variables of Activity Work by Independent Variables . . . . . 72

Table 6. Path Coefficients between Dependent and Independent Variables of Six Activities . . . . . 73

Table 7. Direct Effects upon Two Variables of Activity Academic Education by Independent Variables . . . . . 76

Table 8. Indirect Effects upon Two Variables of Activity Academic Education by Independent Variables . . . . . 77

Table 9. Direct Effects upon Two Variables of Activity Vocational Education by Independent Variables . . . . . 79

Table 10. Indirect Effects upon Two Variables of Activity Vocational Education by Independent Variables . . . . . 80

Table 11. Direct and Indirect Effects upon Activity Unemployment by Independent Variables . . . . . 82

Table 12. Direct and Indirect Effects upon Activity Work and Study by Independent Variables . . . . . 84

Table 13. Direct Effects upon Two Variables of Activity Vocational by Independent Variables . . . . . 86

Table 14. Indirect Effects upon Two Variables of Activity Vocational by Independent Variables . . . . . 87

Table 15. Direct Effects among Independent Variables of Six Activities . . . . . 89

Table 16. Indirect Effects among Independent Variables of Six Activities . . . . . 90

Table 17.	Path Coefficients among Independent Variables of Six Activities . . . . .	91
Table 18.	Means, Standard Deviations, and Number of Cases of Activity Homemaking . . . . .	94
Table 19.	Correlation Matrix of Activity Homemaking . . . . .	95
Table 20.	Direct and Indirect Effects upon Activity Homemaking by Independent Variables . . . . .	96
Table 21.	Path Coefficients of Activity Homemaking . . . . .	97
Table 22.	Direct Effects among Independent Variables of Activity Homemaking . . . . .	98
Table 23.	Indirect Effects among Independent Variables of Activity Homemaking . . . . .	99
Table 24.	Means, Standard Deviations, and Number of Cases of Activity Military Service . . . . .	101
Table 25.	Correlation Matrix of Activity Military Service . . . . .	102
Table 26.	Direct and Indirect Effects upon Activity Military Service by Independent Variables . . . . .	103
Table 27.	Path Coefficients of Activity Military Service . . . . .	104
Table 28.	Direct Effects among Independent Variables of Activity Military Service . . . . .	105
Table 29.	Indirect Effects among Independent Variables of Activity Military Service . . . . .	106
Table 30.	Means, Standard Deviations, and Number of Cases of Activity Different Education . . . . .	109
Table 31.	Correlation Matrix of Activity Different Education . . . . .	110
Table 32.	Direct and Indirect Effects upon Activity Different Education by Independent Variables . . . . .	111
Table 33.	Path Coefficients of Activity Different Education . . . . .	112
Table 34.	Direct Effects among Independent Variables of Activity Different Education . . . . .	113

Table 35.	Indirect Effect among Independent Variables of Activity Different Education . . . . .	114
Table 36.	Means, Standard Deviations, and Numbers of Cases of Two Variables of Activity Employability . . . . .	116
Table 37.	Correlation Matrix of Activity Employability (a) Work vs. Unemployment . . . . .	117
Table 38.	Correlation Matrix of Activity Employability (b) Work Only vs. Unemployment . . . . .	118
Table 39.	Direct Effects upon Two Variables of Activity Employability by Independent Variables . .	119
Table 40.	Indirect Effects upon Two Variables of Activity Employability by Independent Variables	120
Table 41.	Path Coefficients of Activity Employability (a) Work vs. Unemployment . . . . .	121
Table 42.	Path Coefficients of Activity Employability (b) Work Only vs. Unemployment . . . . .	122
Table 43.	Direct Effects among Independent Variables of Activity Employability (a) Work vs. Unemployment . . . . .	123
Table 44.	Indirect Effects among Independent Variables of Activity Employability (a) Work vs. Unemployment . . . . .	124
Table 45.	Direct Effects among Independent Variables of Activity Employability (b) Work Only vs. Unemployment . . . . .	125
Table 46.	Indirect Effects among Independent Variables of Activity Employability (b) Work Only vs. Unemployment . . . . .	126
Table 47.	Means, Standard Deviations, and Number of Cases of Activity Work vs. Academic Education	128
Table 48.	Correlation Matrix of Activity Work vs. Academic Education . . . . .	129
Table 49.	Direct and Indirect Effects upon Activity Work vs. Academic Education by Independent Variables . . . . .	130

Table 50. Path Coefficients of Activity Work vs. Academic Education . . . . .	131
Table 51. Direct Effects among Independent Variables of Activity Work vs. Academic Education . . .	132
Table 52. Indirect Effects among Independent Variables of Activity Work vs. Academic Education .	133
Table 53. Number of Cases and Percentage of Cases Coded 1 by Activity Groups . . . . .	138
Table 54. Effects of Vocational Education Participation upon Activity Variables in Standardized Form	149

## CHAPTER I: ORIGIN AND IMPORTANCE OF THE STUDY

### INTRODUCTION

In the early stages of civilization, society was simple. There was no recognition of social ties except those of blood and the family. Learners imitated the acts of older members of the family or tribe to learn how jobs were done (Graves, 1915, p. 16-18).

As civilization developed further, job specialization became necessary. Industries and related crafts developed and more efficient methods of learning to work were needed. Initially sons learned a trade or craft from their fathers or other male family members. This informal system was eventually replaced by a formal, and legal, apprenticeship system. Through apprenticeship a youth could learn a trade from a master, who was not necessarily a family member. The master-apprentice method of training served society well for thousands of years and is, in fact, still used today (Barlow, 1967, p. 27-28).

The Industrial Revolution profoundly changed the occupational structure and manpower needs of industrialized society. The simple relationships of the past could no longer produce enough trained manpower. Jobs were divided into operations and workers were trained to perform not all but a

part of the total operations required to make a product. A new and more efficient way of providing training was clearly required. As a result, the idea of training provided through formal schooling emerged.

In 1862, an Act of Congress, the Morrill Act, placed the United States government and the states in support of publicly financed education designed to train youth in the two classes of occupations that predominated at that time-- agricultural and industrial.

#### DEFINITION OF VOCATIONAL EDUCATION

Being a segment of American educational systems for almost a century, vocational education has become a familiar term to teachers, students, parents, and most general publics. But for different people, vocational education may have different meanings. To some, the term includes any education or training related to the world of work. Thus, any program designed to impart skills, knowledge, and attitudes to improve an individual's career competence would be a part of vocational education. To others, vocational education is narrowly defined as the training for very specific jobs. The term is used so widely and applied in so many different ways that it often eludes precise definition and confusion about what vocational education is about.

A common misconception is that vocational education is concerned only with manual skills. Other misconceptions identify vocational education as being the same as industrial arts, practical arts, industrial education, or career education. In fact, vocational education is a comprehensive term referring to educational programs which involve the study of technologies and related sciences and the acquisition of practical skills and knowledge relating to occupations in various sectors of economic and social life. It is a specialized education with courses or programs elected only by those individuals who have a special interest in preparing for a particular occupation or family of occupations--whereas industrial arts, practical arts, industrial education, and career education are totally or partially non-specialized.

Swanson (1981) described vocational education and the problem of definition:

To some degree, vocational education does not describe a kind of education at all, but rather it has come to be identified with a wide range of issues and problems in society -- unemployment, defense preparedness, serving the disadvantaged and helping the poor. Since vocational education occurs in many places in addition to that provided in schools, it will continue to be seen and defined by the force of external perceptions perhaps more than by the choice of internal managers. (p. 2)

Within the educational systems, the term vocational education is mainly used to describe a group of programs for which expenditures are allowable under the federal statutes. Federal legislation has always been an important reference in defining vocational education. Taylor(1982) stated that

"Vocational education has for many decades assumed a key role in meeting the nation's demand for skilled workers. Historically, vocational education has been defined as those activities supported by the federal vocational education acts" (p. 2002).

The first federal vocational education act, Smith-Hughes Act of 1917, which established federal support for vocational education in the public secondary school, limited vocational education to agriculture, home economics, and the trade and industrial occupations. In 1928, the Federal Board for Vocational Education redefined vocational education as "that form of education and training in any field of human activity which assists people, young and old, to get a job, to keep a job, to improve on the job, to get a better job, and to believe in their job" (Federal Board for Vocational Education, 1928, p. 1).

The Vocational Education Act of 1963 removed all restrictions as to occupational categories and stated in the definition section:

The term "vocational education" means vocational or technical training or retraining which is given in schools or classes under public supervision and control or under contract with State board or local educational agency, and is conducted as part of a program designed to fit individuals for gainful employment as semi-skilled or skilled workers or technicians in recognized occupations . . . but excluding any program to fit individuals for employment in occupations which . . . are generally considered professional or as requiring a baccalaureate or higher degree. (Sec. 8, Public Law 88-210, Dec. 18, 1963)

The 1963 Act and its Amendments of 1968 assigned a high priority to vocational education as a program for meeting the nation's manpower needs and increasing economic opportunity for the disadvantaged and the handicapped.

The 1974 Amendments (Public Law 93-380, Aug. 21, 1974) further broadened the definition by adding "or subprofessionals" to "workers or technicians" to increase the employment levels for which vocational education program could train individuals, and by adding "and in new and emerging occupations" after "recognized occupations" to encourage the development of programs to meet future labor market needs.

The definition was altered again in the 1976 Amendments:

The term "vocational education" means organized educational programs which are directly related to the preparation of individuals for paid or unpaid employment, or for additional preparation for a career requiring other than a baccalaureate or advanced degree. (Sec. 195, Public Law 94-482, Oct. 12, 1976)

This latest definition has moved vocational education free from all narrow focus or specification. Since the modern world is a rapidly changing world, such a flexible and generic definition of vocational education may allow vocational education to better adapt to changes.

#### GOALS OF VOCATIONAL EDUCATION

Based on the latest legislative definition, the intent of vocational education is to prepare people for (a) employment, or (b) additional preparation for a career requiring less

than a baccalaureate degree. In other words, it is to prepare people for (a) work, or for (b) more vocational education.

A more specific statement concerning the goal of vocational education is that:

All persons of all ages in all communities, those in high school, those who have completed, or discontinued their formal education and are preparing to enter the labor market but who need to upgrade their skills, or learn new ones, those with special educational handicaps, and those in postsecondary schools, will have ready access to vocational training or retraining which is of high quality, which is realistic in light of actual or anticipated opportunities for gainful employment, and which is suited to their needs, interests, and ability to benefit from such training. (Public Law 94-482, Oct. 12, 1976)

Without question, a fundamental goal of vocational education is to prepare people to become and remain gainfully employed. It is widely believed that by accomplishing this primary goal, several other valuable outcomes will be realized. These may also be included as goals of vocational education:

1. Provide the trained workers needed to maintain the nation's economic health and growth.

2. Reduce or eliminate the unemployment and underemployment caused by lack of training and education.

3. Diminish many social evils associated with unemployment and economic deprivation.

4. Help individuals become productive and contributing members of society rather than its dependents, and that many personal as well as social gains will result.

5. Make the educational system more democratic by offering equal opportunities and benefits to all, rather than bestowing most of its rewards upon the academically talented.

6. Teach students subjects in relation to occupational goals, thus providing them options while encouraging them to continue their education. (Leighbody, 1972, p. 15-16)

#### IMPLEMENTATION AT SECONDARY SCHOOL LEVEL

The present vocational education system is an umbrella for a wide range of programs. Programs are not uniform across states and localities. Most programs attempt to supply students with a marketable skill while providing them with a basic knowledge of English, arithmetic, and social studies. Others offer training in homemaking skills and consumer education, activities that contribute to the welfare of individuals although this contribution is not included in the measures of the gross national product or the labor force. (Lecht, 1974, p. 2)

The nine program areas traditionally used to categorize vocational program offerings are: Agriculture, Distribution, Health, Consumer and Homemaking, Occupational Home Economics, Industrial Arts, Office Occupations, Technical, and Trade and Industrial.

Nationwide, approximately 28,000 institutions offer vocational education programs. The vast majority, more than

17,500 institutions with close to 16,000,000 students, are secondary level institutions. These secondary institutions can be classified into three different types of settings: the comprehensive high school, the vocational high school, and the area vocational center.

Comprehensive high school. A comprehensive high school is a general high school offering programs in both vocational and general academic subjects, but in which a majority, of the students are not enrolled in programs of vocational education.

Vocational high school. A vocational high school is a specialized secondary school that offers a full-time program of study in both academic and vocational subjects and in which all of the students are enrolled in vocational education programs.

Area vocational center. An area vocational center is a shared-time facility that provides instruction only in vocational education to students from throughout a school system or region. Students attending an area vocational center receive the academic portion of their education program in regular high schools or other institutions. (Golladay and Wulfsberg, 1980)

## BACKGROUND OF THE PROBLEM

Accompanying the legislative emphases on the development of vocational education, there has been an organized effort to establish evaluation requirements for the system. While the mandated evaluation requirements and procedures have changed over the years, they have primarily focused on outcomes or products. That is, the nature of the evaluation of vocational education traditionally has been summative. The most important function of outcomes evaluation is to determine the effectiveness of a program or course after it has been completed. However, outcomes evaluation provides little, if any, information about why a program has been successful. The causes of success can best be identified through process evaluation. Nevertheless, results of outcome evaluations have been seen as helpful to educators, legislators, and the general public in understanding the status of vocational education, its successes and problems.

## EVALUATION OF VOCATIONAL EDUCATION

With the passage of the VEA in 1963, each state was required to establish a state advisory committee for vocational education which would be responsible for evaluation within that state. The Vocational Education Amendments of 1968 re-emphasized the need for evaluation of vocational education

by the individual states, advisory councils within each state and the national advisory council. Specific references to evaluation within that Act are:

1. The national council shall review the administration and operation of vocational education programs, including the effectiveness of such programs in meeting the purposes for which they were established.

2. The national council shall conduct independent evaluations of programs carried out under the 1968 Amendments.

3. The national council shall review the possible duplication of programs at the post-secondary and adult levels within geographic areas.

4. The state advisory council shall evaluate vocational education programs, services, and activities assisted under this act.

The Educational Amendments of 1976 expanded evaluation mandates relating to vocational education. Title II of the Amendments included 28 references to different forms of evaluation. These references focused on the evaluation responsibilities of many agencies including State Advisory Councils, State Boards, the Commissioner (now Secretary) of Education, the Bureau of Occupational and Adult Education, the National Center for Education Statistics, the National Occupational Information Coordinating Committee, the National Advisory Council, the National Institute of Education, and others.

States were required to evaluate programs annually, by collecting data on job placement rates of completers and leavers and employers' satisfaction with the training of former vocational students in their employ. The Secretary of Education was required to evaluate the programs of at least ten states per year and all the annual state plans. Additionally, national and state advisory councils were to conduct independent evaluations. (Public Law 94-482)

#### INDICATORS OF SUCCESSFUL PROGRAMS

Since vocational education programs include both educational and manpower objectives, the criteria by which their success is evaluated must take into account both educational and the economic dimensions. The relevant indexes of economic success include the earnings and unemployment rates of vocational students as compared with similar students in academic and general programs. The indicators of successful programs should also allow for differences in the likelihood of students in different curricula continuing with further education after leaving high school and for differentials in their dropout rates.

On occasion, economic efficiency has been used as a criterion of evaluation. That is, seeking to determine which programs have resulted in the highest economic benefit to cost ratio. However, since recent legislation assigns a high

priority to increasing the enrollment of students from disadvantaged backgrounds in vocational education, comparisons of economic returns must allow for the variation in socioeconomic backgrounds and in learning ability of the students in different high school curricula (Lecht, 1974).

The VEA as amended in 1976 specified that occupationally specific programs should be evaluated "according to the extent to which program completers and leavers--(i) find employment in occupations related to their training, and (ii) are considered by their employers to be well-trained and prepared for employment, except that in no case can pursuit of additional education or training by program completers or leavers be considered negatively in these evaluations" (Sec. 112, Public Law 94-482).

Therefore, the outcomes of education which have traditionally been used to evaluate vocational education are:

1. Employment/unemployment rates
2. Training related employment rates
3. Earnings/program cost
4. Employee satisfaction
5. Employee satisfactoriness
6. Rates of continuing education
7. Satisfaction with training
8. Rates of specialized placement (military, housewife, etc.)

Since there are many external program factors that influence student success (placement) during and after program completion, these outcomes should not be investigated without considering many educational, economic, and sociodemographic influences.

## RESULTS OF EVALUATION

The result of studies of the effects of vocational education conducted between 1968 and 1979 have been synthesized by the National Center for Research in Vocational Education. Among the results were:

1. More vocational students entered the labor market than nonvocational students, but the unemployment rates for the two groups did not differ significantly.

2. A majority of vocational students found employment that was related to the occupational area in which they were trained.

3. There was no consensus regarding whether vocational students outearned nonvocational students or that the opposite was true.

4. A substantial majority of former vocational students were satisfied with their jobs.

5. Employers were generally satisfied with the preparation that vocational programs had given their employees and in

some cases were more satisfied with former vocational education students than with other comparable entry level workers.

6. About one-third of vocational graduates continued their education beyond the secondary level.

7. Eighty to ninety percent of vocational graduates were satisfied with their vocational training. (Mertens, McElwain, Garcia, and Whitmore, 1980)

Findings regarding placements other than job and educational were not included in this synthesis.

As to the educational, economic, and sociodemographic factors which influenced placements, researchers found that:

1. High school experiences did affect the post high school choices.

2. Family background, individual ability, and gender had direct influence on students' aspirations and curriculum selection.

3. Level of parental education and encouragement of their children to continue education affected their children's aspirations and choices.

4. Type of occupation in which parents were employed influenced their children's aspirations and occupational choices. (Hofferths, 1980)

Two primary measures of the success of vocational education are employment related outcomes and education related outcomes. In the past, the former has been the focus of much research while the later has largely been ignored.

Many factors which have potential to influence student placement have been examined before, examples are: the curriculum itself, work experience while in high school, student ability, parent, teacher, and peer influences, educational and occupational aspirations, family background, race, and sex. However, research which identifies the relative importance of each factor as well as the importance of combinations of those factors is still lacking.

Educational placement may not be affected by the same set of factors which affect employment placement. On the other hand, the factors may be the same but their effects may be different. Research is needed to determine the facts of the matter.

#### STATEMENT OF THE PROBLEM

The problem of this study was to determine the relative and combined effects of participation in public school vocational education, along with student characteristics and selected in school factors, upon post high school activities.

#### PURPOSE OF THE STUDY

The purpose of this study was to make use of a well conducted nationwide survey -- High School and Beyond (1980, 1982) to (a) provide useful information to help understand

how and how much vocational education and other factors may contribute to the differences of public high school students' post high school activities, and (b) apply useful methods to enrich the evaluation of the effects of vocational education.

#### ASSUMPTION OF THE STUDY

An assumption of this study was that the data of the High School and Beyond (1980) and its first follow-up (1982) accurately defined the secondary school population and that the nature of that population has not changed significantly since 1980.

#### LIMITATIONS OF THE STUDY

The limitations of this study were:

1. This study could not control variables such as motivation and student attitudes which are usually considered to have some effect upon students' post high school activities.
2. This study could not control the nonresponse bias, if any, which may be present in the data.
3. This study had to accept the definition of vocational education used by the researchers who conducted the High School and Beyond Survey.

## DEFINITION OF TERMS

The following terms were defined according to their specific meanings as they were applied in this study.

Background Factors. Student personal and family characteristics such as sex, race, and family socioeconomic status.

Direct Effect. The amount of deviation of the dependent variable which is directly attributable to fluctuation in the designated factor.

Educational Plan. The highest level of education a student realistically intended to complete.

Endogenous Variables. Variables which have predecessors in the model that may be used as both dependent and independent variables.

Exogenous Variables. The variables in the model without predecessors. The total variation of which is assumed to be caused by variables outside the model.

Grade. Student self-reported high school grade level collected by the HSB survey.

Indirect Effect. The amount of deviation of the dependent variable which is attributable to fluctuation in one independent variable causing fluctuation in a related independent variable.

Intervening Variable. A variable which affects or modifies the effects of one variable on another.

Occupational Aspiration. The kind of job or occupation a student perceived he/she be most likely involved in at the age of 30.

Others' Influences. The sum of total measures of influences by father, mother, teacher, guidance counselor, and peer toward each of the four different post high school activities: work, academic education, vocational education, and military service as collected by the HSB survey.

Path Coefficient. The standardized form of a direct effect.

Post High School Activities. Activities included in the items or the combinations of items high school graduates were asked by the HSB first follow-up questionnaire with the question: 'What were you doing in the first week of October 1981?' The items were, working for pay at a full-time or part-time job, taking academic courses at a two- or four-year college, taking vocational or technical courses at any kind of school or college, serving in an apprenticeship program or government training program, on active duty in the Armed Forces (or service academy), homemaker (without other job), with a job but on temporary layoff from work or waiting to report to work, looking for work, taking a break from working, and other.

Vocational Education Participation. The sum of total semesters that student completed in four areas of vocational

courses -- business, office, or sales; trade and industry; technical courses; and other vocational courses.

Work Experience. Hours student worked per week on a most recent job while in high school.

### SUMMARY

Initiated from family crafts and apprenticeship, the modern form of vocational education has been developing in America for almost a century. With joined federal, state, and local efforts, vocational education has become a huge enterprise and can not be perfectly described by any single definition. In recent decades, federal involvement has increased and so has the emphasis on the evaluation of vocational education. Many positive results concerning the effects of vocational education had been found by researches. However, since many factors other than the vocational education program itself may influence the effects of vocational education, studies which include those factors are needed. This study focused on participation in public school vocational education, student background factors, and in-school factors, to determine their effects upon student post high school activities.

## CHAPTER II: REVIEW OF LITERATURE

This chapter presents a review of literature and studies which are directly or indirectly relevant to the purposes and procedures of this study. The chapter is divided into the following sections: status attainment through schooling, outcome evaluation, effects of vocational education, students' characteristics and other factors, and research problems and approaches.

### STATUS ATTAINMENT THROUGH SCHOOLING

The role of education in social stratification systems was first spelled out in some detail by Sorokin (1927). In his classic book Social Mobility, he saw the school to be a major channel of social testing, selection, and distribution of individuals within different social strata. Parsons (1959) elaborating on Sorokin's theme stressed not only the selection and allocation functions of the school but also emphasized its role in the socialization of the child and its stress on achievement.

Empirical studies began to appear in the 1960s to study the mechanisms of social origin's influence upon educational attainment and the importance of educational attainment in the determination of one's place in the social hierarchy. A

pioneer study was made by Blau and Duncan (1967) . In their study, The American Occupational Structure, they used data from a 1962 national sample survey of males 20 to 64 years old to propose a causal model of status attainment beginning with educational and occupational status of the father, followed by son's educational attainment, son's first job, and son's occupation in 1962. In their findings, son's educational attainment accounts for nearly all of the effects of father's occupational status and father's education on son's occupational status in 1962. Holding social background constant, education was more influential than the first job in determining later occupational status. Also because educational attainment was largely independent of family background it had a large independent influence on later achievements. The conclusion was made that education plays an important role in the occupational attainment process.

During the same period, Sewell and associates made a series of closely related studies of social, economic, and psychological factors in educational and occupational aspirations using data collected from Wisconsin high school seniors in 1957. Information was obtained regarding the socioeconomic origins, educational experiences, and educational and occupational aspirations of seniors. They found in the studies that socioeconomic origins, such as father's and mother's education, father's occupation, family income, and/or a combination of those characteristics had an impor-

tant influence on educational and occupational aspirations (Sewell and Shah, 1968, Sewell, Hauser, and Featherman, 1976). The finding held true even when intelligence, community background, and various social psychological characteristics (e.g. parental encouragement) of the students were controlled.

In 1964, a follow-up of the 1957 Wisconsin seniors was conducted. Information was obtained regarding post high school educational and occupational attainments, marital status, military service, and current residence. Sewell and Hauser (1975) compared the follow-up respondents to the 1957 original sample found no significant differences. With the available follow-up data, Sewell, Haller, and Portes (1969) developed a causal model to explain the status attainments of young farm boys. They included socioeconomic status, measured by a weighted index composed of father's education, mother's education, parental income, and father's occupation, and academic ability as the exogenous variables. For the intervening variables, they used son's grades in high school, a significant others index, based on the son's perceptions of encouragement for high educational aspirations by parents, teachers, and peers, followed by son's educational and occupational aspirations. Son's post high school educational attainments and the socioeconomic level of son's occupation in 1964 were the dependent variables. This model was then tested on boys from various rural and urban situations. A

general model which seemed to work well for all residential groupings was finally adopted (Sewell, Haller, and Ohlendorf, 1970). The model accounted for more than half of the variance in educational attainment and two-fifths of the variance in occupational status. In addition, the model showed that educational attainment had a large direct effect on occupational status, and that it mediates most of the effects of the variables preceding it.

A later model was developed by Sewell and Hauser (1972) to include occupational attainment and earnings. This extended model is described by a path diagram in Figure 1 on page 24. The model has proved to be a powerful predictor of status attainments. It explains 54% of the variance in educational attainment and 43% of the variance in occupational attainment. However, the model was less effective in predicting earnings, explaining only about 7% of the variance in 1967 earnings of the subjects involved in the study. When only considered a basic model which links socioeconomic background and (mental) ability with educational attainment, occupational attainment and earnings, it could explain no more than 9% of the variance in measured ability, 28% of the variance in educational attainment, 41% of the variance in occupational attainment, and 8% of the variance in earnings.

Obviously, the inclusion of social psychological factors substantially increased the ability of the model to explain

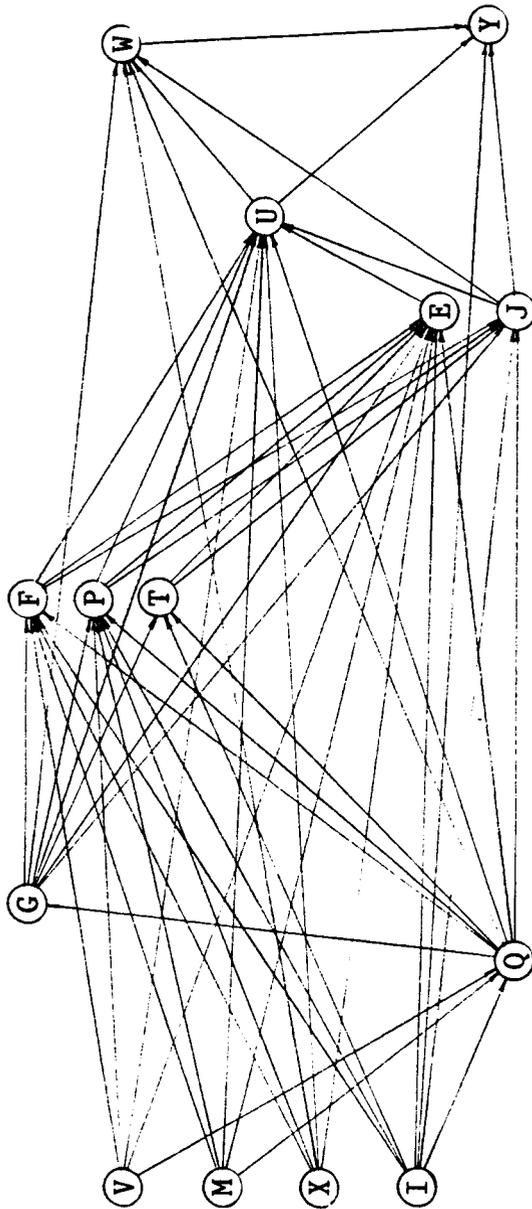


Figure 1. Status Attainment Model by Sewell and Hauser, 1972. Variables: V = father's education; M = mother's education; X = father's occupation; I = parental income; Q = mental ability; G = high school grades; T = teachers' encouragement; P = parental encouragement; F = friends' plans; E = college plans; J = occupational aspiration; U = educational attainment; W = occupational attainment; Y = earnings, 1967.

variance in educational attainment (schooling). Further, because the factors also depend to a moderate degree on socioeconomic background and ability, the social psychological variables account for a substantial share of the effects of background and ability on schooling. The findings were that the intervening social psychological variables account for 60% to 80% of the effects of the background variables on schooling and about 85% of the effects of ability on schooling. However, the social psychological factors were of less direct importance in the equations for explaining occupational attainment and earnings. Only high school rank and occupational aspiration had statistically significant effects in the final equation for explaining occupational attainment, and only occupational attainment had a significant coefficient in the final equation for explaining earnings.

Lately, Hauser, Tsai, and Sewell (1983) reanalyzed the Wisconsin model and its extended models by taking measurement error into account. Composite variables such as socioeconomic status, academic performance, and significant others' influence on college attendance were studied along with their factor variables. In their revised estimates, they found empirical support for the earlier specifications of the Wisconsin model. They also found that the revised model is more powerful in explaining the process of educational and occupational attainment.

Educational and occupational development of young people gradually became an important concern to educators and educational policymakers as well as sociologists. A number of studies have been conducted over the years to identify factors that are related to young people's entry into higher education and their subsequent educational and occupational attainment (e.g. Bailey and Collins, 1977, Peng, Bailey, and Eckland, 1977, and Thomas, Alexander, and Eckland, 1977). These studies have been particularly concerned with the equality of educational opportunities. Because postsecondary education is an important determinant of income and occupational status, it is important to understand the links between high school education and postsecondary schooling (Griliches, 1977). As to the direct labor market effects of high school education, especially vocational education, research findings are usually scattered among studies concerning the outcomes of high school education as well as the outcomes of high school vocational education.

#### OUTCOME EVALUATION

Student's post high school activities (employment, education, and others) are the indicators commonly used to describe differences among students after they complete their high school curricula. The information can usually be found in many outcome evaluations.

Stufflebeam, Foley, Gephart, Guba, Hammond, Marrison, and Provus (1971) identified four forms of evaluation encountered in an educational or training program. They were:

1. Context evaluation -- to define the educational environment, to identify student and other needs, to delineate problems, and to formulate goals.

2. Input evaluation -- to identify and assess alternative strategies for achieving goals or overcoming problems which are identified in context evaluation.

3. Process evaluation -- to observe program operation, attempting to ascertain procedural events and activities and to identify problems in design and implementation.

4. Product evaluation -- to assess program outcomes and to relate outcomes to objectives and to relate them to context, input, and process evaluation.

Product evaluation is also called outcome evaluation. The most important function of outcome evaluation is to determine the effectiveness of a program or course after it has been completed. But it provides little or no information concerning why the program was or was not successful or how program effectiveness might be improved.

Traditional outcome evaluation has been accomplished solely through measuring learner accomplishments. However, there are several techniques which can be used to obtain a more realistic and ultimate measure of the product of voca-

tional education. The follow-up survey and the employer survey are examples (Wentling, 1980, p. 34).

#### NATIONWIDE LONGITUDINAL STUDIES OF HIGH SCHOOL STUDENTS

If outcome evaluations are not planned at the beginning of educational programs, outcome data useful in evaluating the effects of educational programs may still be obtained. Nationwide longitudinal surveys are examples of data bases which have been useful in studying the effects of vocational education. Data from such surveys have been viewed as being particularly pertinent to such studies for the following reasons.

First, they are national in scope, and thus relevant to national policy making. Second, most of the (longitudinal) studies encompass several years of follow-up data and so can potentially illuminate both short-term and longer-term consequences of vocational education. Third, such studies are generally carried out in accordance with scientific principles. (Woods, 1980, p. 35).

Most of the early outcome studies were the result of federally or foundation-funded projects. Tyler's (1965) Eight Year Study, conducted in the 1930s, did much to emphasize the evaluation of student outcomes. This study included students from thirty high schools in the United States and assessed student performance on many different instruments. The Coleman Study (Coleman, Campbell, Hobson, McPartland, Mood, Weingeld, and York, 1966), conducted in the 1950s, focused on the opportunities available to minorities within the

United States. Project TALENT (Flanagan, Davis, Dailey, Shaycroft, Orr, Goldberg, and Neyman, 1964) was conducted in 1960s with a sample of about 450,000 high school students in the United States (grades nine through twelve). This study involved the measurement of student abilities and characteristics and an attempt was made to associate those identified abilities and characteristics with success or failure in post high school jobs.

The passage of the Vocational Education Act of 1963, its subsequent amendments in 1968, and the Elementary and Secondary Education Act of 1965 placed considerable pressure on state and local school systems to conduct outcome evaluations and thus shifted much of the emphasis away from national studies. However, the national efforts have never ended. Some more recent national studies and data bases which may also shed light on the effects of vocational education are:

1. Youth in Transition (Bachman, Kahn, Mednick, Davidson, and Johnston, 1969), conducted by Bachman since 1965 with 87 schools and 2,200 students sampled, deals with the effects of different high school environments, and the lose of such environments in the case of high school dropouts.

2. National Longitudinal Surveys of Labor Market Experience (NLS) (Center for Human Resource Research, 1973) with a sample of 5,200 male and 5,100 female students aged 14-24, conducted in 1966 (male) and 1968 (female), provides a comprehensive picture of a cross section of students and workers

at any given time (male 1966-71, 1973, 1975, and 1976; female 1968-73, 1975, 1977, and 1978).

3. National Longitudinal Study of the High School Class of 1972 (NLS 1972) (National Center for Education Statistics, 1974) with over 1,000 high schools and almost 18,000 seniors participating in the survey, makes possible comparisons of student educational experiences with later outcomes.

4. National Longitudinal Surveys of Young Americans (Center for Human Resource Research, 1980), conducted in 1979 with a sample of 12,700 young men and women aged 14-21, was a new version of the NLS.

5. High School and Beyond Surveys (National Center for Education Statistics, 1983), begun in 1980 with the collection of data on over 28,000 high school seniors and 30,000 sophomores, was designed to build on the NLS 1972 and expand its focus by collecting data on a broader range of lifecycle factors.

#### EFFECTS OF VOCATIONAL EDUCATION

The major outcomes addressed by most studies focusing on the effects of vocational education are the employment and unemployment experiences of vocational education students after training. Creech, Freeberg, Rock, Wilson, and Young (1977) analyzed the major longitudinal data bases and found strong correlations between high school curriculum and

postsecondary outcomes. Other studies comparing the unemployment/employment rates of vocational and nonvocational students also indicate that a higher percentage of vocational graduates entered the labor market upon graduation from high school. (Berryman 1980, Copa, Irvin, and Maurice 1976, Herrnstadt, Horowitz, and Sam 1979, Hu, Lee, Stromsdorfer, and Kaufman 1968, Katz, Morgan, and Drewes 1974. Kaufman and Lewis 1972, Swanson 1976)

Another type of educational effect that has been examined in some detail is extent of participation in postsecondary education across curricula. It has been widely believed that, because of the different goals of the vocational and nonvocational curricula, more nonvocational students continue their education than do vocational students. Conroy and Diamond (1976) found that in the state of Massachusetts, eighty-one percent of the nonvocational students continued their education compared to only forty-eight percent of the vocational students. Katz, et al. (1974), compared vocational and academic students in the Washington, D.C. area and found that fifty-four percent of male vocational students continued their education while seventy-four percent of male academic students continued their education following high school. Forty-four percent of the female vocational students continued their education compared to eighty-three percent of female academic students. Analysis of the data from the National Longitudinal Surveys and the Class of 1972 netted

similar results to those reported above (Creech, et al., 1977, Eckland and Bailey 1976, Feters 1975a, Grasso and Shea 1979, and Tabler 1976). Overall, research has determined that about one third of the vocational graduates continued their education beyond the secondary level.

However, these analyses fail to reveal whether postsecondary outcomes are independent of individual differences prior to high school curriculum placement. The actual curriculum effects upon postsecondary outcomes, net of initial differences, may be smaller than those suggested by research conducted to date. Studies concerned with such the effects of high school curriculum upon postsecondary outcomes which take initial differences into account are uncommon.

Alexander, Cook, and McDill (1978) examined data which have no direct measures of postsecondary outcomes but did include measures of outcomes proximate to postsecondary outcomes such as plans to attend college, application to a college, and acceptance by a college. They found an effect of curriculum placement on all three outcomes, independent of pre-curriculum differences. Feters (1975b) studied another proximate outcome measure: students' post high school plans. He found that vocational students, relative to the nonvocational group, more often planned to work full time, become homemakers, and attend postsecondary vocational and trade schools. Many fewer expected to attend four-year colleges; somewhat fewer expected to attend junior colleges.

Mertens, et al. (1980) reviewed studies reported since 1968 concerning the effects of participating in vocational education. They discovered that most researchers attempted to measure employment/unemployment and other postsecondary outcomes by "posing a question on a survey instrument such as 'which of the following best describes your current status?' followed by such response options as employed full-time or part-time, not employed but seeking work, attending school, homemaker, serving in the military, or other" (p. 18). The "not employed but seeking work" category usually represents a measure of the unemployment rates. There were no significant differences in the unemployment rates between the vocational and nonvocational students (p. 23).

The "homemaker" and the "serving in the military" categories have remained largely untouched by researchers when dealing with the effects of vocational education. Reasons are, first, these two categories represent mixed effects which are hard to interpret. Students' involvement in the "homemaker" status could be the result of (a) a successful vocational education (homemaking) program, (b) insufficient training for a job or to continue education/training, or, (c) be unrelated to vocational education, simply the result of a personal decision, marriage, for example. In the same way, students involved in military services could be well prepared by vocational education and ready to expand their education/training in a specific field, or not well prepared

for any other job or education so the military services meant a new start, or, simply electing the military services as a career choice which has nothing to do with their past vocational education background.

Second, the numbers of students who have been involved in these two categories have been relatively small. For that reason, researchers have generally disregarded these groups. In the recent High School and Beyond Survey first follow-up (National Center for Education Statistics, 1983) only 4.5 percent of the surveyed students reported that they were "going into regular military" (3.7%) or as "being a full-time homemaker" (0.8%).

For the "serving in the military" category, there is a third reason. That is the difficulties involved in obtaining military service information, comparing military occupations to civilian occupations and obtaining timely responses from persons in the military. Researchers, with no special access, have therefore tended to report only the measured proportion of graduates who were involved in this category, no more.

In Condition of Vocational Education, Golladay and Wulfsberg (1980) found that, four and one half years after high school, a higher proportion of females who had been in vocational programs in high school identified themselves as homemakers than did females from academic programs. They attempted to explain that phenomenon by stating that "females

who were in academic programs were more likely to be continuing educational enrollments and hence were postponing homemaking or childbearing" (ch. 10).

#### STUDENTS CHARACTERISTICS AND OTHER FACTORS

Creech, Echternacht, Freeberg, and Rock (1975) studied the base year data of the NSL72, with the objective of identifying the differences between vocational/technical students and others. They stated that:

The vocational education literature is extremely limited with regard to specific characteristics of high school vocational students. Much of this literature presents a stereotypical view of the vocational student. He is described as one who has little academic ability and who either chooses or is assigned to vocational courses because he cannot compete with other students (p. 33).

More than 150 student questionnaire items were analyzed and sixty independent variables were considered. They found that (a) academic curriculum students were substantially higher in measured academic ability than were both general and vocational curriculum students, and (b) that no significant differences existed between general and vocational students. The findings were strong and reliable holding for both sexes and black and white students. They also found none of the remaining variables investigated, distinguished academic students from general or vocational students.

Based on the data from the same NLS72 survey, Fetters (1975b) also found that, when contrasted with academic stu-

dents, vocational-technical and general students tended to be relatively similar with regard to many of the characteristics studied. However, the findings indicate that some other characteristics define differences between vocational-technical students and academic students in addition to those reported by Creech et al.. Some of the differences are:

1. The parents of vocational-technical students had lower annual incomes (39 versus 19 percent thought parents had low incomes).

2. Fathers of vocational-technical students had less formal education than fathers of academic students (42 versus 19 percent did not complete high school).

3. More vocational-technical students belonged to minority groups (21 versus 12 percent).

4. The mean scores of vocational-technical students in survey mathematics tests were over 1 standard deviation lower than those of academic students.

5. Many fewer vocational-technical students (36 versus 69 percent) reported that they had a high school grade average of "B" or better.

6. More vocational-technical students (37 versus 21 percent) said they spent at least 20 hours a week working at jobs.

7. Vocational-technical students with jobs tended to work mostly during the week while academic students worked mostly during weekends. (p. 13)

Similarly, in the Condition of Vocational Education (Golladay and Wulfsberg, 1980), students in high school vocational-technical programs were reported to differ from those in academic programs, although they differed little from those in general programs. Specifically, the characteristics found to distinguish between academic and vocational students were: (a) More academic than vocational students reported that their fathers had completed college or received additional training (29.1 versus 6.4 percent). (b) Vocational-technical students had lower scores on a series of standardized survey tests measuring skills in several areas (one-half to one standard deviation lower than those of academic students). (c) More than twice as many vocational-technical than academic students (15.4 versus 6.4 percent) worked over 30 hours every week. And (d) The jobs held by students were more likely to be related to their studies for the vocational-technical students than for academic students (33.3 versus 11.3 percent).

In summary, the differences between vocational students and academic students identified by research can be divided into two categories. The first category is initial differences, those which exist prior to students entering a curriculum. Characteristics such as race, sex, and family socioeconomic status, and the students' natural abilities belong to this group. The second category is in-school differences, those which are a result of, or associated with,

curriculum participation. Examples are high school performance (grade average or class rank) and extent and type of work experience while in school.

The initial differences may affect students' probable postsecondary educational and occupational outcomes directly or indirectly through interaction with curriculum participation. Berryman (1980) found that status characteristics do not heavily affect track placement.

The data show that sex has a small, but statistically significant and independent, effect on track placement. Race and family socioeconomic status affect track placement only indirectly, through having influenced the students' abilities and preferences. In fact, if ability is controlled, blacks are more likely to enter the academic track than whites, for example.

When relating these findings to the outcomes effects,

Berryman stated:

Track placement affects students' postsecondary educational and occupational outcomes, even when students' preplacement characteristics are controlled. These postsecondary effects are much weaker, however, than earlier studies without such controls had indicated. (p. vi)

The effects of in-school work experience upon postsecondary outcomes were examined by Dinger (1973) and Herrnstadt, et al. (1979). The findings were consistent that in-school work experience was associated with significantly less unemployment in the post-graduation follow-up period, when the effects of work experience were investigated independent of curricula.

The effects of grade average upon postsecondary activities were indirectly studied by Copa and Forsbery (1981). Instead

of grade average, they used class rank as an independent variable and controlled for variance of amount of time in vocational courses. The findings were summarized as "in general, a higher proportion of the students in the upper quartile go on to school and a lower proportion are in paid employment when contrasted to students in the lower quartile" (p. 14).

Desy, Mertens, and Gardner (1984) studied the long-term effects of vocational education upon earnings, employment, education, and aspirations provided evidences of factors other than vocational education curriculum affecting post high school outcomes. They suggested:

Some of these factors affect outcomes in ways that are unrelated to high school curriculum. Others affect curriculum choice or are themselves affected by curriculum or by a third variable that also influences curriculum choice. (p. 34)

Ability, motivation, sex, race, family socioeconomic status, physical limitations, marital status, and age were the factors mentioned in the study. Among them, age was investigated almost solely for the long-term effects while the others were effective for both long-term and short-term effects. It was stated:

There are substantial differences across curriculum groups with respect to at least several factors that affect labor market experiences and postsecondary education patterns. Thus, comparison of labor market experiences or educational attainment by curriculum group must control for the impact of these other factors if accurate conclusions are to be drawn about the effects of curriculum. (p. 37)

So the study used two principal techniques: cross tabulations and multiple regression analysis to make the control of many factors possible.

After examining 1,268 former students, the conclusion was drawn that vocational graduates in most program areas have greater long-range earnings and less unemployment than general curriculum graduates and vocational education influences other significant outcomes, including post secondary educational and occupational choices.

#### RESEARCH PROBLEMS AND APPROACHES

The Vocational Education Study (National Institute of Education, 1980) recognized that:

The task of determining the effects of schooling in general, or of vocational education in particular, on students' subsequent occupational and educational attainment is fraught with obstacles. Many factors other than school curriculum affect the economic and noneconomic experiences of learners after their years in school. (p. vii-1)

The study specified the first obstacle as "the difficulties in ascertaining curricular effects". The same problem was also recognized by Mertens, et al. (1980) and Taylor (1980) as one of several major problems evaluators of vocational education may face. Mertens, et al. identified the problem as contextual factors. They stated "the vocational education legislation places emphasis on students obtaining occupations related to their training. However, employment

is affected by other factors such as the state of the economy and the labor market." (p. 17) Taylor identified the problem as external program factors. He stated that "there are many external program factors (e.g. family and economic conditions) that influence student success (placement) during and after program completion" (p. 257). Researchers must be aware of this problem when conducting research into the effects of schooling and drawing conclusions from the findings of such research if those conclusions are to be valid.

The second problem in determining the effects of vocational education upon post high school activities was identified as "self-selection bias" (Mertens, et al., 1980). Students self-select, they are not randomly assigned to, vocational education programs. As a result, systematic differences in the types of persons enrolled in curricula, as well as programs within the vocational curriculum, may account for more of the variance in effects than do the curricula or programs themselves. Grasso and Shea (1979) present selected demographic characteristics, such as socioeconomic status, race, sex, and ability, as the empirical differences between vocational students and others.

This self-selection procedure also makes it impossible to identify a group of students identical to vocational students which could be used in comparing program effects, that is no natural control group, in the experimental sense, exists. In other words, the self-selection situation has moved the

effects studies out of the realm of true experimental research. In response to this problem, researchers need to adopt techniques, causal inference models, for example, which can deal with the less than perfect experimental situations to test the effects of possible variables and to draw conclusions about the relationships among them (Abramson, Tittle, and Cohen, 1979).

The third problem was identified as the vocational education definition problem (Grasso and Shea, 1979, Mertens et al., 1980). Vocational education systems are not uniform across states and localities. What is called vocational education often varies from program to program. People involved in vocational education research also have different ideas about what vocational education should be and which programs ought be classified as vocational education. Researchers need to define vocational education and describe how programs were classified if results are to be interpretable and comparable across studies.

Another problem closely related to the definition problem is that of identifying vocational students (Grasso and Shea, 1979, Mertens et al., 1980, National Institute of Education, 1980). Many students cannot be identified as being solely engaged in either the vocational, general, or academic curriculum. Students' self-reports, administrator's classifications, and researchers' use of student transcripts are the three main methods that have been used to determine

students' curriculum concentration or emphasis. Disagreement exists among the three methods. Researchers need also to describe the classification methods used to identify students' curriculum in order to make the interpretation of finding meaningful and to allow the comparison of findings among studies.

The last problem is the identification of programs (Mertens et al., 1980, Pillemer and Light, 1980, National Institute of Education, 1980). Programs with the same labels may not be identical. They can vary in many ways, such as purpose, content, quality, etc.. Researchers need, if possible, to describe the characteristics of the programs included in their studies.

#### SUMMARY

Studies of the effects of education were originally initiated by sociologists. Blau and Duncan (1967) established a model to study the influence of social origins upon educational and occupational attainments. Sewell, Hauser, and Featherman (1976) expanded that model to include more social structural and social psychological variables and their effects upon educational and occupational attainments and earnings. The final model was proved powerful in explaining status attainments.

The effects of vocational education upon students' post high school activities were usually found as a part of the results of outcome evaluations. A higher percentage of vocational students than nonvocational students entered labor market but less continued education. Information concerning other activities were not sufficient to allow definitive conclusions.

Sex, race, socioeconomic status, ability, student performance, peer and other persons' influences, and aspiration have been found to have a relationship with curriculum placement and may affect the effects of curriculum upon post high school employment and/or education. Other potentially influential variables are in-school work experience and marital status.

Still many other factors may exist which affect the economic and noneconomic experiences of students after high school. Researchers must find ways to deal with the problems of (a) difficulties in ascertaining curricular effects, (b) bias caused by students self-selecting programs, (c) defining vocational education, (5) identifying vocational students, and (6) variation among programs with same label.

### CHAPTER III: RESEARCH METHODOLOGY

The primary objective of this study was to investigate the effects of participation in vocational education, combined with student background and in-school factors upon post high school activities. This study used the information from an existing data bank and focused on the analysis of causal relations among the selected variables. The nature of the data and the research design will be described in this chapter.

#### HIGH SCHOOL AND BEYOND DATA

An important responsibility of the National Center for Education Statistics (NCES) has been to "collect and disseminate statistics and other data related to education in the United States" (Education Amendments of 1974 - Public Law 93-380). In response to the need for policy-relevant, time-series data on a nationally representative sample of high school students, NCES instituted the National Longitudinal Studies (NLS) program. The program consists of two major studies: The National Longitudinal Study of the High School Class of 1972 and High School and Beyond. The latter was designed to provide federal and state policy makers with information useful in formulating vocational education policy in the decade of the 1980s. It was begun in 1980 with the

collection of base year data on high school seniors and sophomores. The first follow-up study was conducted in the spring of 1982. This study involved both the base year and the first follow-up senior data which are described by the sampling and survey instruments developed by NCES.

### SAMPLING

The Base Year survey design of High School and Beyond included a stratified national probability sample of over 1,100 secondary schools. Thirty-six seniors were selected per school. Over 28,000 seniors enrolled in 1,015 public and private high schools across the country participated in the Base Year survey.

In the first follow-up, the sample consists of approximately 12,000 1980 seniors. All students selected during the Base Year, including nonrespondents, had a probability of inclusion in the first follow-up. Unequal probabilities were compensated by weighting. A subsample of 11,500 students was selected from among the senior cohort Base Year participants. This subsampling was carried out so as to insure the analytic power to address policy issues in areas such as excellence in education, access to postsecondary education, and the impact of education on career choices.

## SURVEY INSTRUMENTS

The survey instruments for the Base Year seniors included a school questionnaire, student identification pages, a senior questionnaire, a series of cognitive tests, teacher comment checklist, and parent questionnaires. The senior questionnaire focused on individual and family background, high school experiences, work experiences, and plans for the future. The cognitive tests administered to seniors measured both verbal and quantitative abilities as well as abstract and nonverbal abilities. The school questionnaires gathered information about enrollment, staff, educational programs, facilities and services, dropout rates, and special programs for handicapped and disadvantaged students. The teacher comment checklist solicited teacher observations on students participating in the survey. The parent questionnaire elicited information about how family attitudes and financial planning affect postsecondary educational goals.

In the first follow-up, senior cohort members received mailed questionnaires. Nonrespondents were followed up by trained telephone interviewers. Approximately 75 percent of the seniors completed and returned questionnaires by mail, and an additional 20 percent of the senior questionnaires were completed during either in-person or telephone interviews. The senior follow-up questionnaire emphasized postsecondary school and work experiences; other content

areas included educational and work aspirations, financial status, marital status, and demographics (Frankel, Kohnke, Buonanno, and Tourangeau, 1981, and National Center for Education Statistics, 1983).

#### APPLICATIONS TO PRESENT STUDY

For the following reasons it was decided that the High School and Beyond data would be appropriate for the study of the effects of participation in vocational education and other factors upon post high school activities. First, the general aim of the NLS program as described by Jones, et al. (1983) was "to study longitudinally the educational, vocational, and personal development of high school students and the personal, family, social, institutional, and cultural factors that may affect that development" (p. 1). That purpose matches the main concern of this study and therefore the data collected by the High School and Beyond survey provides sufficient information for the conduct of this study. Second, compared with other available data, the High School and Beyond was the most contemporary, nationally representative data available that was focused on high school students. Finally, there were many closely related research efforts based on the early version of this data -- the NLS72, which would allow the results of this study to be compared to those previous studies.

## RESEARCH DESIGN

This study is an ex post facto research design (Kerlinger, 1973). It starts with observation of the dependent variable, post high school activities, and then studies independent variables to determine their possible effects on the dependent variable. Causal models (Asher, 1977; Blalock, 1961; Heise, 1975) will be used to outline the causality among the variables.

## DEPENDENT VARIABLES

According to the first follow-up senior cohort questionnaire, the 1980 high school graduates, at the time of the first week of October 1981, were engaged in one, or a combination of the following post high school activities: work, continuing education, taking vocational or technical courses, in apprenticeship or government training, military services, homemaker, looking for work, layoff, taking a break from working, and others. Each meaningful activity or combination of activities is an observable dependent variable. Naturally, activity or activities which involved a relatively large number of high school graduates were used for the causal model study. However, some other activities in which a relatively small numbers of graduates were involved are

also significant, such as military service and homemaker, and were also studied.

Public high school graduates reported to be engaging in a studied activity (or activities) were assigned a value of 1 on the dependent variable and those not engaged in such activity were assigned a value of 0. This form (1 and 0) of a dichotomous dependent variable could be treated as a ratio-level variable in the causal study (Nie, Hull, Jenkins, Steinbrenner, and Bent, 1975).

The types of activities studied and the actual dependent variables used have been explained in detail in the beginning of reporting the findings in Chapter 4.

#### CAUSAL MODEL

The causal model used in this study was based on the original model created by Blau and Duncan (1967) and expanded by Sewell, Hauser, and Featherman (1976). However, since the primary concern of the study was to determine the effects of participation in vocational education upon various dependent variables, it was essential to include the participation in vocational education in the model. Another variable suggested by the research literature as having a significant effect upon some important dependent variables is the work experiences students had while in high school, the number of

hours worked per week on a current or most recent job was used as the values for this variable.

The final model of the study included composite socioeconomic status, sex, and race on one side as the background variables, with ability scores, grades, influences of others, work experience, vocational education participation, occupational aspiration, and educational plan as the in-school variables, and finally marital status and post high school activity (activities) as the out of school variables, where the activity variable was as the ultimate dependent variable to be explained (see Figure 2 on page 52). Marital status was studied by Coleman (1961) and Marini (1978) and was found to have a close relationship with educational attainment especially for women. For that reason, it was included as a non-in-school descriptive variable.

#### IN-SCHOOL VARIABLES

Vocational education participation. To avoid the confusion often encountered when attempting to classify students according to vocational, academic, or general curriculum labels, this study used the total semester hours completed in high school in all vocational education areas: business, office or sales, trade and industry, technical, and others as the indication of extent of participation.

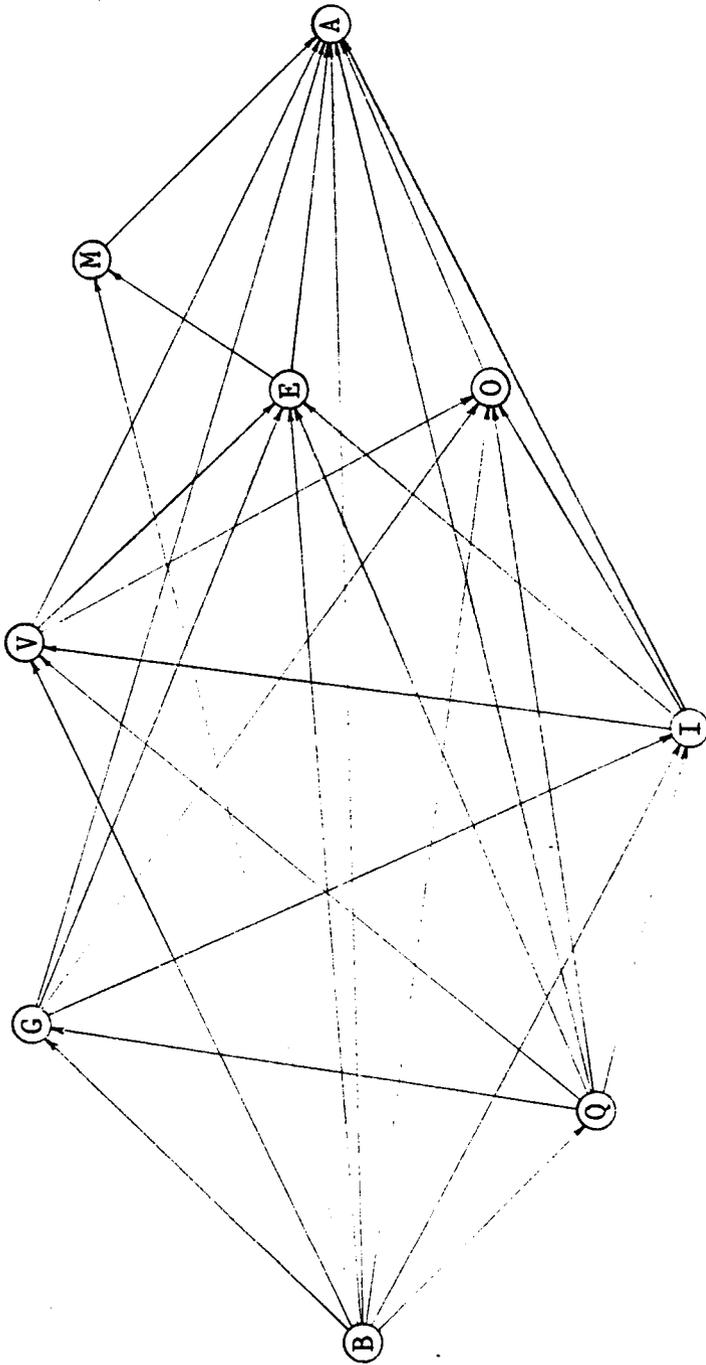


Figure 2. Proposed Model. Variables: B = sex, race, SES; Q = reading, math (ability); G = grade; I = INFL-W, INFL-AE, INFL-VE, INFL-ML (significant others' influence); V = work experience, vocational education participation; O = occupational aspiration; E = educational plan; M = marital status; A = post high school activities.

Work experience. Work experience was defined as work "for pay, not counting work around the house" (High School and Beyond, 1980). Hours worked per week on a current or most recent job while in high school were arranged into seven categories: 0 hour (never worked for pay), 1-4, 5-14, 15-21, 22-29, 30-34, and 35 hours or more. Jordaan and Heyde (1979) suggested that individuals who had work experience while in high school become more mature (vocationally) than those who do not. So it was assumed that work experience would have a positive effect upon work related activities and therefore was included in this study.

High school grade and ability scores. Previous research has shown in-school achievement and academic ability to be related to subsequent educational aspirations and achievement. Thus these two variables were assumed to have positive effects upon the education related activities included as dependent variables in this study. High school grade average was self-reported by students using eight levels: below D, D, D-C, C, C-B, B, B-A, and A. Ability scores were the standardized scores on reading and math tests collected from students' cognitive test instruments of 1980 High School and Beyond survey. Three variables were involved here: grade, reading ability, and math ability.

Significant others influences. Sewell and Hauser (1972) found that parents, teacher, and peers have indirect influences through students' educational plans and occupational

aspirations, upon students' occupational achievement. And the influences of parents and peers through educational plans and occupational aspirations upon educational attainment are about equal and about twice that of teachers. In this study, the main focus was concentrated on the influences of significant others upon students' post high school activities. So the sum of the influences of father, mother, guidance counselor, teacher, and peers upon each activity such as go to college, get a full-time job, enter a trade school or an apprenticeship, and enter military service would become one test variable for each matching post high school activity and its related activities. Four variables were created: others' influences toward work (INFL-W), others' influences toward academic education (INFL-AE), others' influences toward vocational education (INFL-VE), and others' influences toward military service (INFL-ML).

#### DESCRIPTIVE VARIABLES

Socioeconomic status. When combined with ability and other variables, socioeconomic status has both direct and indirect influences upon post high school educational and occupational attainments (Sewell, Hauser and Featherman, 1976). So it was assumed to have some kind of influences upon post high school activities of concern in this study. Five traditional indicators of socioeconomic status were used to

create a composite SES variable: (a) father's education, (b) mother's education, (c) father's occupation, (d) family income, and (e) house hold items. The composite SES was included in the HSB data bank.

Sex and race. In general, previous research has found mixed relationships between sex and race and the other variables included in this study depending upon the situation variables involved in the particular study and the designs of the research. It is always worthwhile to make more observations. The variable sex was coded 1 for male and 0 for female and, race was coded 1 for black and 0 for non black.

Marital status. This was coded 1 as having been married or married at the time of first follow-up and 0 as never married.

## ASPIRATIONS

Two remaining variables, educational plan and occupational aspirations, needed to be treated with extra caution because at the time of conducting the Base Year High School and Beyond survey (Spring, 1980), most of the senior students already knew whether they were accepted by colleges. This fact could have strongly affected their response to the educational plan and occupational aspiration questions.

Educational plan. Students were asked how far in school they thought they would get. The coding was 1 as less than

high school graduation, 2 as high school graduation only, 3 as less than two year vocational, trade, or business school after high school, 4 as two or more year vocational, trade, or business school, 5 as less than two years of college, 6 as two or more years of college, 7 as college graduation, 8 as master's degree or equivalent, and 9 as Ph.D., M.D., or other advanced professional degree. The coding 1 and 2 were treated as the same level, and 4, 5, 6, and 7 were treated as the same level. Educational plan, though usually not thought to be as influential as ability and academic performance (grades), has been found to have a significant influence upon actual educational attainment (Alwin, 1976). In the case of this study, the influence of educational plan upon education related post high school activities was a concern.

Occupational aspiration. The coding of this variable was 1 as clerical, 2 as craftsman, 3 as farmer, 4 as homemaker, 5 as laborer, 6 as manager or administrator, 7 as military, 8 as operative, 9 and 10 as professional, 11 as proprietor or owner, 12 as protective service, 13 as sales, 14 as school teacher, 15 as service, and 16 as technical. The Duncan Socioeconomic Index scale was used for the purpose of recoding to make this variable workable for the study (except for coding 4, homemaker, and 7, military, they were treated separately for each own predicting of activity). Alwin's (1976) study also shows a significant influence of occupational as-

piration upon actual occupational attainment. This study was seeking to determine the influence of occupational aspiration upon various work related post high school activities.

### ANALYSIS

Path analysis was used in this study as the main statistical method. It is a generalization of multiple linear regression procedures to systems of causally related variables. According to its developer Wright (1921, 1960), path analysis is primarily a method of working out the logical consequences of two assumptions (a) a causal order among test variables is known, and (b) the relationships among these variables are causally closed.

The theoretical assumptions must be met to insure the validity of the analysis. For path analysis, the assumptions are the same as those of multiple regression analysis. According to Kerlinger and Pedhazur (1973), two assumptions are important: (a) the scores of the dependent variable are normally distributed at each value of independent variable (there is no assumption of normality about the independent variables), and (b) the scores of the dependent variable have equal variances at each point of independent variable. (p. 47)

Duncan (1966) used an illustration drawn from Turner (1964) introducing path analysis models to the application

in social science. A part of the illustration can be shown with path diagram as Figure 3.

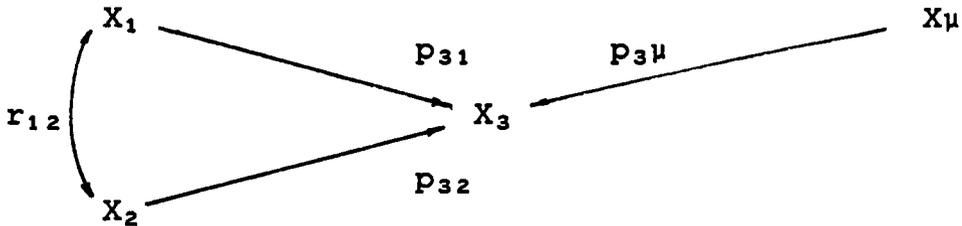


Figure 3. Example of Path Diagram

Where  $X_1$  and  $X_2$  are exogenous variables,  $X_3$  is an endogenous variable which in this case is also the dependent variable.

The model can also be rendered algebraically as a linear equations:

$$X_3 = p_{32}X_2 + p_{31}X_1 + p_{3\mu}X_\mu$$

The equation is supplemented with the specification,  $r_{1\mu} = r_{2\mu} = 0$ , which indicates the assumption that the residuals of  $X_3$  are uncorrelated with the other variables  $X_1$  and  $X_2$ .

Suppose the equation is multiplied on both sides by  $X_2$  to obtain

$$X_2X_3 = p_{32}X_2^2 + p_{31}X_1X_2 + p_{3\mu}X_\mu X_2$$

Then, summing both sides of the equation over sample observations:

$$\Sigma X_2X_3 = p_{32}\Sigma X_2^2 + p_{31}\Sigma X_1X_2 + p_{3\mu}\Sigma X_\mu X_2$$

and dividing both sides by  $N$  -- number of cases in the sample:

$$\Sigma X_2X_3/N = p_{32}\Sigma X_2^2/N + p_{31}\Sigma X_1X_2/N + p_{3\mu}\Sigma X_\mu X_2/N$$

Since  $\Sigma X_2 X_3 / N = r_{23}$ ,  $\Sigma X_2^2 / N = 1$ , and  $\Sigma X_\mu X_2 / N = r_{2\mu} = 0$ , the final result is:

$$r_{23} = p_{32} + p_{31}r_{12}$$

With the same procedure multiply the equation by  $X_1$ , another result obtained:

$$r_{13} = p_{32}r_{12} + p_{31}$$

$r_{ij}$  can be obtained from the correlation matrix generated by raw data. With the two linear equations and two unknowns, the solution of  $p_{32}$  and  $p_{31}$  can be easily computed.

$p_{ij}$  then is the path coefficient for the relationship of  $X_i$  and  $X_j$ .

To find  $p_{3\mu}$ , multiply the first equation through by  $X_\mu$  and to obtain

$$r_{3\mu} = p_{32}r_{2\mu} + p_{31}r_{1\mu} + p_{3\mu}r_{\mu\mu}$$

since  $r_{2\mu} = r_{1\mu} = 0$  and  $r_{\mu\mu} = 1$ ,  $r_{3\mu} = p_{3\mu}$

With the same procedure multiply the first equation by  $X_3$ , to obtain

$$r_{33} = 1 = p_{32}r_{23} + p_{31}r_{13} + p_{3\mu}r_{3\mu}$$

Replace  $r_{3\mu}$  with  $p_{3\mu}$  the result is

$$p_{3\mu}^2 = 1 - p_{32}r_{23} - p_{31}r_{13}$$

so:

$$p_{3\mu} = (1 - p_{32}r_{23} - p_{31}r_{13})^{1/2}$$

Take equation  $r_{23} = p_{32} + p_{31}r_{12}$  as an example,  $r_{23}$  is a composite path which sums up the direct effect of  $X_2$  on  $X_3$  as  $p_{32}$  and the indirect effect via  $X_1$  as  $p_{31}r_{12}$  (Duncan, Featherman, and Duncan, 1972, p.18-32).

A more complicated composite path can be expanded step by step when including more variables into the model.

To simplify the calculation of the effects, GEMINI -- a program for analysis of structural equations with standard errors of indirect effects (Wolfle and Ethington, 1985) was used for the multiple computer runs.

### SUMMARY

High School and Beyond Data was used for this study because the aim of the NLS program matched well with the main concern of this study and the data were the most contemporary, national in scope, data available which focused on high school students and were comparable to the NLS72 data.

This study is an ex post facto research design with a general causal model including the dependent variable, an activity, and independent variables, participation in vocational education and other factors. Path analysis was used to determine the effects, direct and indirect, of each independent variables upon the dependent variable and to determine the relationship among independent variables.

## CHAPTER IV: FINDINGS

Findings reported in this chapter include the investigations of basic activities which were originally outlined by the HSB questionnaires. In addition to these basic activities, this chapter also presents the findings of some other selected activities and combinations of activities.

All the direct and indirect effects between dependent and independent variables and among independent variables in each tested causal model for the studied activities were computed and are reported. Only those effects pertinent to the study are discussed. The causal explanation is not included in this but rather in Chapter 5.

### ACTIVITIES INVESTIGATED

#### BASIC ACTIVITIES

Six basic post high school activities from HSB questionnaires were:

1. Work -- high school graduates involved in working for pay. Two levels of the variable were created to investigate work activity: (a) work, included all graduates involved in work even though they could be involved in other activities,

and (b) work only, included only those graduates involved solely in working for pay.

2. Academic education -- graduates involved in taking academic college courses. Here also two levels of the variable were created using the same criteria discussed above: (a) academic education, and (b) academic education only.

3. Vocational education -- graduates involved in taking vocational or technical courses, or serving in apprenticeship or government training program. The two levels of the variable for the investigation of vocational education were: (a) vocational education, and (b) vocational education only.

4. Military service -- graduates involved in active duty in the Armed Forces. Since the overlap of this activity with other activities was so infrequent, only one level of variable was used: military service.

5. Homemaking -- graduates reported being a homemaker. In the study, this activity and the following unemployment activity could not be isolated from other activities. So only one level of the variable was used: homemaking.

6. Unemployment -- graduates who were in temporary layoff from work or looking for work. The variable was unemployment.

## COMPOSITE ACTIVITIES

Five composite activities that were determined to be relevant to the study were created by combining basic activities.

1. Work and study -- graduates engaged in work and education (academic or vocational) at the same time. One level of the variable was available: work and study.

2. Vocational -- graduates involved in work or vocational education. Two levels of the variable were used: (a) vocational, included all graduates involved in work or vocational education although they might be involved in other activities also, and (b) vocational only, included graduates involved solely in work or vocational education.

3. Different education -- graduates involved in vocational education, who were then studied in contrast with the graduates involved in academic education. The variable was different education.

4. Employability -- contrasting graduates involved in work with those who were unemployed. Two levels of the variable were (a) work vs. unemployment, and (b) work only vs. unemployment.

5. Work vs. academic education -- contrasting graduates involved solely in working for pay with those solely taking academic college courses. One level of the variable was used: work vs. college.

## ADJUSTMENT IN THE MODEL

Fifteen independent variables were proposed for constructing the causal models; they are: sex, race, SES, reading ability, math ability, grade, others' influences toward work(INFL-W), others' influences toward academic education(INFL-AE), others' influences toward vocational education(INFL-VE), others' influences toward military service(INFL-ML), vocational education(VE) participation, work experience, occupational aspiration, educational plan, and marital status. After careful examination, others' influences toward military service was dropped from all of the models except for that model testing the military service activity and work experience was dropped from the model testing the military service. Those two adjustments in the basic model were made to accommodate the limitation of that only 14 independent variables could be used in the GEMINI program. No damage to the study was made due to the adjustments.

## EFFECTS UPON ACTIVITIES

Six activities, work, academic education, vocational education, unemployment, work and study, and vocational, shared a common set of independent variables and a common group of study cases. For the convenience of reporting the findings,

these activities are presented first. Table 1, 2, and 3 provide descriptive statistics for the ten activity variables and fourteen independent variables of these six activities. Table 1 on page 66 displays the means, standard deviations, and the number of cases studied. Table 2 on page 67 shows the correlations between dependent and independent variables. Table 3 on page 68 reports the correlations among independent variables. The direct and indirect effects of these independent variables upon the activities (actually, the activity variables) are discussed in the following six sections. Findings concerning other activities follow those discussions.

#### ACTIVITY 'WORK'

Means of the dichotomies, such as all the dependent variables, sex, race, and marital status, are the ratios of the portions coded 1. As an example, Table 1 indicates that 54% of the total 6685 cases studied were involved in work and 31% were in work only. Thus the proportion of the sample engaged in an activity can be readily determined.

Table 4 on page 71 displays the direct effect (b), standard error (SE), significance (p) of b (\* at .05 level and \*\* at .01 level), and the percentage of the variation ( $R^2$ ) in each dependent variable explained by the 14 independent variables in combination. Regressions for both work and work

Table 1

The Means, Standard Deviation, and the Number of Cases of Six Activities

Independent Variables	Mean	Standard Deviation
1. Sex	.455	.498
2. SES	-.250	.763
3. Race	.228	.420
4. Reading	51.446	10.318
5. Math	50.951	10.334
6. Grade	5.774	1.415
7. INFL-W	.331	.781
8. INFL-AE	2.905	1.777
9. INFL-VE	.290	.814
10. Work Experience	3.080	1.936
11. VE Participation	4.809	4.021
12. Occup. Aspiration	53.154	21.748
13. Educational Plan	2.589	1.001
14. Marital Status	.077	.267
<hr/>		
Dependent Variables		
<hr/>		
(a) Work	.540	.498
(b) Work Only	.310	.463
(c) Academic Education	.484	.500
(d) Academic Education Only	.280	.449
(e) Vocational Education	.089	.284
(f) Vocational Education Only	.037	.188
(g) Unemployment	.086	.281
(h) Work and Study	.228	.419
(i) Vocational	.586	.493
(j) Vocational Only	.347	.476
<hr/>		
Number of Cases	6685	
<hr/>		

Table 2

## Correlation Coefficients among Independent Variables of Six Activities

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Sex														
2. SES	.080													
3. Race	-.061	-.200												
4. Reading	.042	.276	-.224											
5. Math	.141	.348	-.281	.620										
6. Grade	-.144	.160	-.120	.407	.468									
7. INFLW	.017	-.160	-.033	-.198	-.241	-.205								
8. INFLAE	-.111	.242	.011	.266	.323	.366	-.429							
9. INFLVE	.106	-.086	.000	-.115	-.154	-.156	-.018	-.441						
10. Work Experience	.195	.000	-.044	-.071	-.065	-.104	.069	-.113	.082					
11. VE Participation	.099	-.056	.027	-.127	-.140	-.095	.102	-.165	.139	.117				
12. Occup. Aspiration	-.200	.126	.048	.182	.178	.243	-.192	.343	-.231	-.098	-.173			
13. Educational Plan	-.037	.316	.055	.330	.395	.396	-.401	.544	-.229	-.108	-.169	.393		
14. Marital Status	-.098	-.092	-.062	-.059	-.099	-.016	.086	-.090	.045	.044	.012	-.047	-.140	

Table 3

Correlation Coefficients between Ten Variables of Six Activities and Independent Variables

Variables	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)
1. Sex	.010	.023	-.018	.004	.022	-.009	-.060	-.019	.008	.019
2. SES	-.057	-.158	.299	.222	-.045	-.065	-.114	.107	-.083	-.179
3. Race	-.122	-.043	-.033	.041	.002	.027	.124	-.097	-.110	-.031
4. Reading	-.054	-.198	.303	.191	-.041	-.067	-.107	.155	-.082	-.219
5. Math	-.080	-.251	.365	.252	-.059	-.091	-.128	.181	-.116	-.279
6. Grade	-.106	-.253	.366	.256	-.021	-.057	-.106	.153	-.123	-.268
7. INFL-W	.136	.278	-.316	-.214	-.015	.013	.062	-.145	.138	.275
8. INFL-PE	-.157	-.325	.470	.339	-.074	-.080	-.074	.174	-.188	-.347
9. INFL-VE	.073	.144	-.245	-.173	.137	.118	.036	-.070	.119	.186
10. Work Experience	.136	.131	-.115	-.117	.005	-.029	-.038	.015	.122	.116
11. VE Participation	.073	.106	-.148	-.119	.091	.035	.017	-.029	.095	.117
12. Coop. Aspiration	-.104	-.204	.302	.212	-.079	-.051	-.038	.101	-.125	-.218
13. Educational Plan	-.201	-.386	.537	.396	-.081	-.089	-.084	.189	-.234	-.410
14. Marital Status	.039	.129	-.210	-.146	-.037	-.018	-.021	-.097	.029	.118

Note. (a) Work (b) Work Only (c) Academic Education (d) Academic Education Only  
 (e) Vocational Education (f) Vocational Education Only (g) Unemployment (h) Work and  
 Study (i) Vocational (j) Vocational Only.

only were significant. For the variable work, only 7.3% of the variation could be explained. The direct effects of sex, race, grade, INFL-W, work experience, vocational education participation, and educational plan were statistically significant in the model.

For the variable work only, the model's explanation of variation in the activity has been improved a great deal to 20.3%. The direct effects of race, math ability, grade, INFL-AE, work experience, occupational aspiration, educational plan, and marital status were significant.

A negative (-) effect sign indicates that a lower score on the independent variable was associated with a higher score on the dependent variable or vice versa. For example, race (coded 1 as black and 0 as non black) had a negative and significant effect upon both work and work only. Thus it was concluded that non blacks tend to be working after graduation from public high school. Other significant independent variables with negative direct effects were sex, grade, and educational plan for the activity work, and math, grade, INFL-AE, occupational aspiration, and educational plan for the activity work only.

The indirect effects (IE) of independent variables upon the dependent variables work and work only are shown in Table 5 on page 72, where only educational plan had a non-significant indirect effect upon the activity work. All

other independent variables had significant indirect effects upon both work and work only.

Independent variables with statistically significant negative indirect effects were: SES, race, reading and math abilities, grade, and INFL-AE, for both work and work only.

Path coefficients (Beta weights) between independent and dependent variables of the six activities are presented in Table 6 on page 73. It shows that race, work experience, and educational plan were the most important predictors of the variable work. Educational plan and INFL-W were the most important when explaining variability of work only. And that educational plan was dominant in the work only model.

The independent variable of primary concern in this study, vocational education participation, had a significant direct effect upon work and significant indirect effects upon both work and work only.

#### ACTIVITY 'ACADEMIC EDUCATION'

Two levels of this activity variable, academic education and academic education only, were tested. There was 48.4% of the 6685 cases involved in academic education and 28% in academic education only. In Table 7 on page 76, 39.9% of the variation of academic education could be explained by the model. The explained variance dropped to 21.3% when the dependent variable was replaced by academic education only.

Table 4

Direct Effects upon Two Variables of Activity Work by Independent Variables

Independent Variables	Work		Work Only	
	b	SE	b	SE
1. Sex	-.037**	.013	-.014	.011
2. SES	-.011	.009	-.012	.007
3. Race	-.141**	.015	-.059**	.013
4. Reading	.001	.001	-.000	.001
5. Math	-.001	.001	-.003**	.001
6. Grade	-.013**	.005	-.025**	.004
7. INFL-W	.033**	.009	.066**	.008
8. INFL-AE	-.009	.005	-.021**	.004
9. INFL-VE	.009	.008	.015*	.007
10. Work Experience	.028**	.003	.017**	.003
11. VE Participation	.004*	.002	.002	.001
12. Occup. Aspiration	-.000	.000	-.001*	.000
13. Educational Plan	-.057**	.008	-.091**	.007
14. Marital Status	-.008	.022	.112**	.019
$R^2 =$	.073		.203	

Note.  $\pm .000$  has an absolute value less than .0005.

\*  $p < .05$ . \*\*  $p < .01$ .

Table 5

Indirect Effects upon Two Variables of Activity Work by Independent Variables

Independent Variables	Work		Work Only	
	IE	SE	IE	SE
1. Sex	.046**	.006	.044**	.006
2. SES	-.045**	.004	-.095**	.004
3. Race	-.024**	.006	-.025**	.007
4. Reading	-.002**	.000	-.003**	.000
5. Math	-.004**	.000	-.007**	.000
6. Grade	-.016**	.002	-.029**	.002
7. INFL-W	.016**	.002	.023**	.002
8. INFL-AE	-.012**	.002	-.018**	.001
9. INFL-VE	.007**	.002	.008**	.002
10. Work Experience	.001*	.000	.001*	.001
11. VE Participation	.001**	.000	.002**	.000
12. Occup. Aspiration				
13. Educational Plan	.000	.001	.004**	.001
14. Marital Status				

Note.  $\pm .000$  has an absolute value less than .0005.

\*  $p < .05$ . \*\*  $p < .01$ .

Table 6

## Path Coefficient between Dependent and Independent Variables of Six Activities

Variables	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)
1. Sex	-.037	-.015	.018	.045	.007	-.008	-.057	-.034	-.038	-.018
2. SES	-.016	-.019	.093	.093	-.019	-.025	-.057	.002	-.027	-.029
3. Race	-.119	-.053	-.003	.063	-.010	.004	.091	-.082	-.117	-.050
4. Reading	.022	-.006	.008	-.012	.001	-.007	-.019	.034	.015	-.009
5. Math	-.015	-.067	.092	.049	-.041	-.049	-.018	.055	-.036	-.083
6. Grade	-.038	-.075	.106	.088	.040	.001	-.060	.035	-.030	-.072
7. INFLW	.052	.111	-.064	-.022	-.045	-.018	.029	-.059	.041	.101
8. INFLAE	-.031	-.079	.143	.111	.004	.003	-.006	.055	-.032	-.076
9. INFLVE	.015	.026	-.060	-.034	.110	.100	.018	-.006	.052	.065
10. Work Experience	.110	.072	-.033	-.062	-.015	-.043	-.037	.050	.089	.053
11. VE Participation	.029	.016	-.022	-.033	.065	.011	-.001	.019	.042	.020
12. Occup. Aspiration	-.011	-.026	.059	.034	-.033	-.005	-.010	.014	-.014	-.027
13. Educational Plan	-.116	-.196	.262	.201	-.054	-.052	-.022	.082	-.134	-.211
14. Marital Status	-.004	.064	-.126	-.077	-.052	-.035	-.036	-.077	-.020	.049

Note. (a) Work (b) Work Only (c) Academic Education (d) Academic Education Only  
 (e) Vocational Education (f) Vocational Education Only (g) Unemployment (h) Work and  
 Study (i) Vocational (j) Vocational Only.

However, the regression which included all the 14 independent variables was significant for each level of the activity variable.

Table 7 also presents the nature of the direct effects upon the activity academic education. It shows that the effects of sex, race, and reading ability were not significant in predicting the variable academic education. Also, reading ability and INFL-W were not significant in predicting academic education only. The remaining independent variables in each model were significant.

Negative significant direct effects were associated with INFL-W, INFL-VE, work experience, vocational education participation, and marital status for the dependent variable academic education, and with INFL-VE, work experience, vocational education participation, and marital status for academic education only.

Indirect effects upon the activity academic education are presented in Table 8 on page 77. All indirect effects were significant in each model.

Negative indirect effects were associated with sex, INFL-W, INFL-VE, work experience, and vocational education participation for both level of this activity variable.

Path coefficients in Table 6 show that educational plan and INFL-AE were the two most important predictors of both academic education and academic education only.

Vocational education participation had significant negative direct and indirect effects upon both levels of the variable.

#### ACTIVITY 'VOCATIONAL EDUCATION'

Two variables are involved in this activity: Vocational education and vocational education only. Eight point nine percent of the total cases were involved in vocational education and just 3.7% in vocational education only. The model explained only a small amount of the variance in these variables, 3.3% in vocational education and just 2.5% in vocational education only. In spite of that, the regression was still statistically significant.

Direct effects in Table 9 on page 79 show that grade, math ability, INFL-W, INFL-VE, vocational education participation, occupational aspiration, educational plan, and marital status were significant in explaining vocational education. For those engaged in vocational education only, math ability, INFL-VE, work experience, educational plan, and marital status were significant.

Significant negative direct effects were found to be associated with math ability, educational plan, and marital status for both activity variables. Also, INFL-W and occupational aspiration had significant negative direct effects

Table 7

Direct Effects upon Two Variables of Activity Academic Education  
by Independent Variables

Independent Variables	Academic Education		Academic Education Only	
	b	SE	b	SE
1. Sex	.018	.010	.041**	.011
2. SES	.061**	.007	.055**	.007
3. Race	-.003	.012	.067**	.013
4. Reading	.000	.001	-.001	.001
5. Math	.004**	.001	.002**	.001
6. Grade	.038**	.004	.028**	.004
7. INFL-W	-.041**	.007	-.013	.007
8. INFL-AE	.040**	.004	.028**	.004
9. INFL-VE	-.037**	.007	-.019**	.007
10. Work Experience	-.009**	.003	-.014**	.003
11. VE Participation	-.003*	.001	-.004**	.001
12. Occup. Aspiration	.001**	.000	.001**	.000
13. Educational Plan	.131**	.006	.090**	.007
14. Marital Status	-.237**	.018	-.130**	.019
$R^2$	.399		.213	

Note.  $\pm .000$  has an absolute value less than .0005.

\*  $p < .05$ . \*\*  $p < .01$ .

Table 8

Indirect Effects upon Two Variables of Activity Academic Education  
by Independent Variables

Independent Variables	Academic Education		Academic Education Only	
	IE	SE	IE	SE
1. Sex	-.059**	.007	-.049**	.006
2. SES	.141**	.005	.087**	.004
3. Race	.034**	.009	.028**	.007
4. Reading	.004**	.000	.003**	.000
5. Math	.010**	.000	.007**	.000
6. Grade	.043**	.002	.028**	.002
7. INFL-W	-.033**	.002	-.023**	.002
8. INFL-AE	.027**	.002	.019**	.001
9. INFL-VE	-.011**	.002	-.009**	.002
10. Work Experience	-.002*	.001	-.001*	.001
11. VE Participation	-.003**	.000	-.002**	.000
12. Occup. Aspiration				
13. Educational Plan	.008**	.001	.004**	.001
14. Marital Status				

Note.  $\pm .000$  has an absolute value less than .0005.

\*  $p < .05$ . \*\*  $p < .01$ .

upon vocational education. Additionally, work experience had a significant negative effect upon vocational education only.

The indirect effects (Table 10 on page 80) of sex, SES, math ability, grade, INFL-W, INFL-AE, INFL-VE, vocational education participation, and educational plan were found to be significant when predicting the variable vocational education. For the vocational education only, race, SES, math ability, grade, INFL-W and INFL-AE, vocational education participation, and educational plan were significant. These indirect effects were negative for SES, math ability, grade, and INFL-AE in both cases.

Path coefficients in Table 6 show that others' influences toward vocational education was the most important predictor in both variable levels.

Vocational education participation had a significant direct effect upon vocational education but not vocational education only. Its indirect effects were significant upon both dependent variables.

#### ACTIVITY 'UNEMPLOYMENT'

Eight point six percent of the total cases were classified as unemployed even though some of these cases also may have been involved in other activities such as homemaking and pursuing some kind of education. Close to 4% of the vari-

Table 9

Direct Effects upon Two Variables of Activity Vocational Education  
by Independent Variables

Independent Variables	Vocational Education		Vocational Education Only	
	b	SE	b	SE
1. Sex	.004	.008	-.003	.005
2. SES	-.007	.005	-.006	.003
3. Race	-.007	.009	.002	.006
4. Reading	.000	.000	-.000	.000
5. Math	-.001*	.001	-.001**	.000
6. Grade	.008**	.003	.000	.002
7. INFL-W	-.017**	.005	-.004	.003
8. INFL-AE	.001	.003	.000	.002
9. INFL-VE	.038**	.005	.023**	.003
10. Work Experience	-.002	.002	-.004**	.001
11. VE Participation	.005**	.001	.001	.001
12. Occup. Aspiration	-.000*	.000	-.000	.000
13. Educational Plan	-.015**	.005	-.010**	.003
14. Marital Status	-.055**	.013	-.024**	.009
$R^2$	.033		.025	

Note.  $\pm .000$  has an absolute value less than .0005.

\*  $p < .05$ . \*\*  $p < .01$ .

Table 10

Indirect Effects upon Two Variables of Activity Vocational Education  
by Independent Variables

Independent Variables	Vocational Education		Vocational Education Only	
	IE	SE	IE	SE
1. Sex	.011**	.003	.002	.002
2. SES	-.011**	.002	-.009**	.002
3. Race	.003	.003	.005*	.002
4. Reading	-.000	.000	-.000	.000
5. Math	-.001*	.000	-.000**	.000
6. Grade	-.004**	.001	-.002**	.001
7. INFL-W	.005**	.001	.002**	.001
8. INFL-AE	-.004**	.001	-.002**	.001
9. INFL-VE	.004**	.001	.000	.000
10. Work Experience	.000	.000	.000	.000
11. VE Participation	.000**	.000	.000*	.000
12. Occup. Aspiration				
13. Educational Plan	.002**	.001	.001**	.000
14. Marital Status				

Note.  $\pm .000$  has an absolute value less than .0005.

\*  $p < .05$ . \*\*  $p < .01$ .

ation in the activity unemployment was explained by the model and the regression was significant.

Direct and indirect effects of independent variables upon unemployment are shown in Table 11 on page 82. Significant direct effects were found for sex, SES, race, grade, INFL-W, work experience, and marital status. Negative signs were attached to the effects of sex, SES, grade, work experience, and marital status. Significant indirect effects were also found for sex, SES, race, reading ability, math ability, grade, and educational plan. The indirect effects of SES, reading and math ability, and grade upon the activity unemployment were negative.

Path coefficients between unemployment and independent variables are presented in Table 6. Race was the most important predictor in the unemployment model. Vocational education participation did not have a significant direct or indirect effect upon this activity.

#### ACTIVITY 'WORK AND STUDY'

Twenty-two point eight percent of the total cases were engaged in both work and some kind of education. Seven point three percent of the variation of work and study could be explained by the model, the regression was significant.

Table 12 on page 84 presents the direct and indirect effects of the independent variables upon the dependent vari-

Table 11

Direct and Indirect Effects upon Activity Unemployment by Independent Variables

Independent Variables	Direct Effect		Indirect Effect	
	b	SE	IE	SE
1. Sex	-.032**	.007	.006*	.003
2. SES	-.021**	.005	-.012**	.002
3. Race	.061**	.009	.008**	.003
4. Reading	-.001	.000	-.000**	.000
5. Math	-.001	.000	-.001**	.000
6. Grade	-.012**	.003	-.002**	.001
7. INFL-W	.010*	.005	.001	.001
8. INFL-AE	-.001	.003	-.001	.001
9. INFL-VE	.006	.005	.000	.001
10. Work Experience	-.005**	.002	.000	.000
11. VE Participation	-.000	.001	.000	.000
12. Occup. Aspiration	-.000	.000		
13. Educational Plan	-.006	.005	.001**	.000
14. Marital Status	-.038**	.013		
$R^2 =$	.039			

Note.  $\pm .000$  has an absolute value less than .0005.

\*  $p < .05$ . \*\*  $p < .01$ .

able. Significant direct effects were associated with sex, race, reading and math abilities, grade, INFL-W, INFL-AE, work experience, educational plan, and marital status. The direct effects of sex, race, INFL-W, and marital were negative. Significant indirect effects were found for SES, reading ability, math ability, grade, INFL-W, INFL-AE, vocational education participation, work experience, and educational plan. The indirect effects of INFL-W, work experience, and vocational education participation were negative.

Path coefficients in Table 6 indicate that race, educational plan, and marital status were the most important predictors. Vocational education participation had only a significant indirect effect upon the activity.

#### ACTIVITY 'VOCATIONAL'

Fifty-eight point six percent of the total cases were involved either in work or in vocational education(vocational). Eight point seven of the variation of this vocational activity variable could be explained by the model. If replaced the dependent variable with work only and vocational education only (vocational only). The percentage of cases involved dropped to 34.7% but the  $R^2$  were increased to 22.4%. The regression for both models was significant.

The direct effects upon the two variables of the activity vocational are presented in Table 13 on page 86. The sig-

Table 12

Direct and Indirect Effects upon Activity Work and Study by Independent Variables

Independent Variables	Direct Effect		Indirect Effect	
	b	SE	IE	SE
1. Sex	-.028**	.011	.002	.005
2. SES	.001	.007	.050**	.003
3. Race	-.082**	.013	.002	.005
4. Reading	.001*	.001	.001**	.000
5. Math	.002**	.001	.003**	.000
6. Grade	.010*	.004	.013**	.001
7. INFL-W	-.032**	.007	-.007**	.002
8. INFL-AE	.013**	.004	.006**	.001
9. INFL-VE	-.003	.007	-.001	.001
10. Work Experience	.010**	.003	-.001*	.000
11. VE Participation	.002	.001	-.001**	.000
12. Occup. Aspiration	.000	.000		
13. Educational Plan	.034**	.007	.004**	.001
14. Marital Status	-.121**	.019		
$R^2 =$	.073			

Note.  $\pm .000$  has an absolute value less than .0005.

\*  $p < .05$ . \*\*  $p < .01$ .

nificant direct effects were associated with sex, SES, race, math ability, grade, INFL-W, INFL-AE, INFL-VE, work experience, vocational education participation, and educational plan for the variable vocational. For the other variable, vocational only, SES, race, math ability, grade, INFL-W, INFL-AE, INFL-VE, work experience, educational plan, and marital status were significant. The direct effects of SES, race, math ability, grade, INFL-AE, and educational plan were negative for both dependent variables. In addition, sex had a negative direct effect upon vocational, and occupational aspiration a negative direct effect upon vocational only.

Table 14 on page 87 shows the indirect effects between independent and dependent variables. Except that educational plan had no significant indirect effect upon the variable vocational, all other indirect effects were significant. In the case of the variable vocational, SES, race, reading and math abilities, grade, and INFL-AE all had negative indirect effects. One additional variable, educational plan, had a significant negative indirect effect upon vocational only.

Path coefficients in Table 6 show that race and educational plan were the most important predictors of vocational. Educational plan was dominant in the vocational only model. Vocational education participation had significant indirect effects upon both variables but only had a significant direct effect upon the more general variable vocational.

Table 13

Direct Effects upon Two Variables of Activity Vocational by Independent Variables

Independent Variables	Vocational		Vocational Only	
	b	SE	b	SE
1. Sex	-.038**	.013	-.017	.011
2. SES	-.017*	.008	-.018*	.007
3. Race	-.137**	.015	-.057**	.013
4. Reading	.001	.001	-.000	.001
5. Math	-.002*	.001	-.004**	.001
6. Grade	-.010*	.005	-.024**	.001
7. INFL-W	.026**	.009	.062**	.008
8. INFL-AE	-.009*	.005	-.020**	.004
9. INFL-VE	.032**	.008	.038**	.007
10. Work Experience	.023**	.003	.013**	.003
11. VE Participation	.005**	.001	.002	.001
12. Occup. Aspiration	-.000	.000	-.001*	.000
13. Educational Plan	-.066**	.008	-.100**	.007
14. Marital Status	-.037	.022	.087**	.020
$R^2$	.087		.224	

Note.  $\pm .000$  has an absolute value less than .0005.

\*  $p < .05$ . \*\*  $p < .01$ .

Table 14

Indirect Effects upon Two Variables of Activity Vocational by Independent Variables

Independent Variables	Vocational		Vocational Only	
	IE	SE	IE	SE
1. Sex	.046**	.006	.046**	.006
2. SES	-.054**	.004	-.104**	.004
3. Race	-.017**	.006	-.021**	.007
4. Reading	-.002**	.000	-.003**	.000
5. Math	-.004**	.000	-.007**	.000
6. Grade	-.018**	.002	-.031**	.002
7. INFL-W	.017**	.002	.025**	.002
8. INFL-AE	-.014**	.002	-.020**	.001
9. INFL-VE	.008**	.002	.008**	.002
10. Work Experience	.001*	.000	.001*	.001
11. VE Participation	.001**	.000	.002**	.000
12. Occup. Aspiration				
13. Educational Plan	.001	.001	-.003**	.001
14. Marital Status				

Note.  $\pm .000$  has an absolute value less than .0005.

\*  $p < .05$ . \*\*  $p < .01$ .

## EFFECTS AMONG INDEPENDENT VARIABLES

The direct effects, indirect effects, and path coefficients among independent variables in the above models are presented with matrices in Table 15 on page 89, Table 16 on page 90, and Table 17 on page 91.

In the model, vocational education participation was designed to have direct paths to educational plan and occupational aspiration and have indirect path through educational plan to marital status. It appears that the direct effects of vocational education participation upon occupational aspiration and educational plan were significant and negative. The indirect effect through educational plan to marital status was significant.

Variables affecting vocational education participation were sex, SES, race, both abilities, and all three others' influences. It was found that 5% of the variation of vocational education participation could be explained by this set of variables, and the regression was significant. Among them, all but race and SES have significant direct effects, INFL-AE and the two abilities having negative effects. Sex, INFL-VE, and math ability were the most important predictors of vocational education participation.

Variables found to have significant indirect effects upon vocational education participation were sex, SES, race, the two abilities, and grade.

Table 15

## Direct Effects among Independent Variables of Six Activities

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Sex														
2. SES														
3. Race														
4. Reading	.251	3.245**	-4.30**											
5. Math	2.161**	4.017**	-5.29**											
6. Grade	-.584**	-.012	.056	.024**	.054**									
7. INFLW	.044*	-.100**	-.226**	-.004**	-.012**	-.055**								
8. INFLAE	-.389**	.381**	.532**	.008**	.030**	.298**								
9. INFLVE	.187**	-.049**	-.095**	-.001	-.010	-.043**								
10. Work Experience	.750**	.062	-.246**	-.007*	-.013**		.070*	-.042*	.077*					
11. VE Participation	.773**	.041	.030	-.018**	-.032**		.255**	-.131**	.429**					
12. Occup. Aspiration	-6.67**	1.392**	4.057**	.123**	.065	1.299**	1.70**	2.104**	-2.62**	-.087	-.478**			
13. Educational Plan	.021	.206**	.344**	.005**	.012**	.109**	-.210**	.169**	-.035**	-.011*	-.013**			
14. Marital Status	-.055**	-.021**	-.047**											-.032**

\*  $p < .05$ . \*\*  $p < .01$ .

Table 16

## Indirect Effects among Independent Variables of Six Activities

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Sex														
2. SES														
3. Race														
4. Reading														
5. Math														
6. Grade	.123**	.296**	-.390**											
7. INFL-W	-.002	-.079**	.102**	-.001**	-.003**									
8. INFL-AE	-.070**	.233**	-.296**	.007**	.016**									
9. INFL-VE	-.002	-.055**	.070**	-.001**	-.002**									
10. Work Experience	.007	-.120**	.077**	-.001**	-.004**	-.020**								
11. VE Participation	.076**	-.358**	.175**	-.004**	-.015**	-.072**								
12. Occup. Aspiration	-2.42**	3.053**	-.615*	.090**	.250**	.871**	-.128**	.066**	-.212**					
13. Educational Plan	-.136**	.247**	-.057**	.007**	.018**	.065**	-.004**	.002**	-.007**					
14. Marital Status	.004**	-.015**	-.009**	-.000**	-.001**	-.006**	.007**	-.006**	.001**	.000*	.000**			

Note.  $\pm$ .000 has an absolute value less than .0005.

\*  $p < .05$ . \*\*  $p < .01$ .

Table 17

## Path Coefficients among Independent Variables of Six Activities

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	R <sup>2</sup>
1. Sex															.106
2. SES															.178
3. Race															.283
4. Reading	.012	.240	-.175												.091
5. Math	.104	.297	-.215												.210
6. Grade	-.206	-.006	.017	.177	.394										.048
7. INFL-W	.028	-.098	-.121	-.058	-.162	-.100									.056
8. INFL-AE	-.109	.163	.126	.048	.176	.237									.053
9. INFL-VE	.114	-.046	-.049	-.008	-.127	-.075									.187
10. Work Experience	.193	.024	-.053	-.035	-.070		.028	-.039	.032						.432
11. VE Participation	.096	.008	.003	-.046	-.083		.049	-.058	.087						.037
12. Occup. Aspiration	-.153	.049	.078	.058	.031	.085	-.061	.172	-.098	-.008	-.088				.037
13. Educational Plan	.010	.157	.144	.056	.123	.154	-.164	.301	-.028	-.022	-.053				.037
14. Marital Status	-.121	-.074	-.060										-.102		.037

## ACTIVITY 'HOMEMAKING'

Table 18 on page 94 displays the variables, means, standard deviation, and number of cases in the model for the investigation of the activity homemaking. Table 19 on page 95 is the correlation matrix. The variable occupational aspiration was not coded using Duncan's scale, it was simply a response to 'expected to be a homemaker (coded 1) or not (0)'. The remaining independent variables were coded as previously discussed. From Table 18, three point four percent of the total 7074 cases were involved in homemaking.

The direct and indirect effects of independent variables upon homemaking are presented in Table 20 on page 96. Twelve point nine percent of the variation could be explained by the model and the regression was significant. The direct effects of sex, SES, reading ability, grade, work experience, occupational aspiration, and marital status were significant. All of the significant direct effects were negative except occupational aspiration and marital status. As for the indirect effects, sex, SES, race, reading and math abilities, grade, INFL-W, INFL-AE, and educational plan were significant. Except INFL-W, all the significant indirect effects were negative.

Path coefficients in Table 21 on page 97 indicate that marital status was a most important predictor of this activity. Vocational education participation had neither signif-

icant direct or indirect effects upon the activity homemaking.

Path coefficients among independent variables are also presented in Table 21. The direct and indirect effects among independent variables are in Table 22 on page 98 and Table 23 on page 99.

#### ACTIVITY 'MILITARY SERVICE'

Table 24 on page 101 and Table 25 on page 102 provide descriptive statistics for the investigation of the activity military service. Work experience was dropped from the independent variable list and others' influences toward military service (INFL-ML) was added to the model. Occupational aspiration now was coded as 'expected to be in military service (coded 1), or not (0)'.

Four point two percent of the total 7117 cases in the sample were engaged in military service. The portion of variation that could be explained was 14.3% and the regression was significant. Direct and indirect effects upon military service are shown in Table 26 on page 103. The direct effect of sex, SES, race, reading ability, all four others' influences, occupational aspiration, and marital status were significant. Among these significant direct effects, SES, INFL-W, INFL-AE, and INFL-VE were negative. The indirect effect of sex, SES, math ability, grade, INFL-AE,

Table 18

Means, Standard Deviation, and Number of Cases  
of Activity Homemaking

Variables	Mean	Standard Deviation
1. Sex	.450	.498
2. SES	-.262	.761
3. Race	.230	.421
4. Reading	51.312	10.320
5. Math	50.707	10.365
6. Grade	5.753	1.419
7. INFL-W	.346	.799
8. INFL-AE	2.842	1.791
9. INFL-VE	.287	.805
10. Work Experience	3.081	1.943
11. VE Participation	4.800	4.031
12. Occup. Aspiration	.024	.153
13. Educational Plan	2.547	1.013
14. Marital Status	.082	.274
Homemaking	.034	.180
Number of Cases	7074	

Table 19

## Correlation Matrix of Activity Homemaking

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Sex														
2. SES	.081													
3. Race	-.047	-.201												
4. Reading	.041	.277	-.227											
5. Math	.141	.350	-.279	.622										
6. Grade	-.139	.159	-.123	.405	.469									
7. INFL-W	.000	-.166	-.032	-.198	-.242	-.198								
8. INFL-AE	-.098	.248	.008	.264	.328	.363	-.423							
9. INFL-VE	.102	-.083	.002	-.112	-.152	-.157	-.019	-.425						
10. Work Experience	.191	-.001	-.041	-.069	-.065	-.101	.068	-.108	.080					
11. VE Participation	.092	-.052	.026	-.119	-.133	-.089	.095	-.155	.136	.116				
12. Occup. Aspiration	-.134	-.049	-.050	-.020	-.051	-.003	.093	-.072	-.019	-.016	-.003			
13. Educational Plan	-.015	.323	.055	.328	.401	.389	-.398	.546	-.215	-.101	-.155	-.146		
14. Marital Status	-.107	-.096	-.070	-.060	-.104	-.017	.096	-.099	.040	.048	.012	.088	-.153	
Homemaking	-.155	-.177	.017	-.084	-.096	-.050	.068	-.065	.022	-.037	.006	.135	-.101	.307

Table 20

Direct and Indirect Effects upon Activity Homemaking by Independent Variables

Independent Variables	Direct Effect		Indirect Effect	
	b	SE	IE	SE
1. Sex	-.040**	.004	-.013**	.002
2. SES	-.014**	.003	-.011**	.002
3. Race	.007	.005	-.012**	.002
4. Reading	-.001*	.000	-.000**	.000
5. Math	.000	.000	-.001**	.000
6. Grade	-.006**	.002	-.002**	.001
7. INFL-W	.003	.003	.002**	.001
8. INFL-AE	.000	.002	-.002**	.001
9. INFL-VE	.003	.003	-.001	.000
10. Work Experience	-.003**	.001	.000	.000
11. VE Participation	.000	.001	.000	.000
12. Occup. Aspiration	.108**	.013		
13. Educational Plan	-.001	.003	-.007**	.001
14. Marital Status	.185**	.007		
<hr/>				
$R^2$	.129			

Note.  $\pm .000$  has an absolute value less than .0005.

\*  $p < .05$ . \*\*  $p < .01$ .

Table 21

Path Coefficients among Independent Variables of Activity Homemaking

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	$R^2$
1. Sex															.107
2. SES															.179
3. Race															.281
4. Reading	.013	.240	-.178												.091
5. Math	.107	.298	-.214												.209
6. Grade	-.201	-.008	.016	.172	.398										.047
7. INFLW	.014	-.104	-.122	-.059	-.160	-.095									.054
8. INFLAE	-.100	.169	.126	.041	.182	.236									.048
9. INFLVE	.110	-.044	-.047	-.005	-.125	-.080									.034
10. Work Experience	.191	.023	-.053	-.032	-.070		.033	-.035	.034						.034
11. VE Participation	.090	.009	.002	-.042	-.080		.048	-.053	.089						.034
12. Occup. Aspiration	-.133	-.024	-.061	.014	-.024	.011	.056	-.071	-.036	-.001	-.002				.433
13. Educational Plan	.020	.160	.147	.053	.130	.148	-.157	.314	-.017	-.020	-.047				.043
14. Marital Status	-.108	-.061	-.080									-.130			.129
Homemaking	-.110	-.061	.017	-.036	.028	-.044	.015	.002	.014	-.035	.005	.092	-.005	.282	

Table 22

## Direct Effects among Independent Variables of Activity Homemaking

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Sex														
2. SES														
3. Race														
4. Reading	.273	3.256**	-4.37**											
5. Math	2.222**	4.063**	-5.27**											
6. Grade	-.572**	-.016	.054	.024**	.055**									
7. INFLW	.023	-.109**	-.232**	-.005**	-.012**	-.054**								
8. INFLAE	-.361**	.398**	.538**	.007**	.032**	.297**								
9. INFLVE	.178**	-.046**	-.091**	-.000	-.010**	-.045**								
10. Work Experience	.745**	.059	-.245**	-.006*	-.013**		.080*	-.038*	.082**					
11. VE Participation	.729**	.049	.021	-.016**	-.031**		.244**	-.119**	.447**					
12. Occup. Aspiration	-.041**	-.005	-.022**	.000	-.000	.001	.011**	-.006**	-.007**	-.000	-.000			
13. Educational Plan	.040*	.212**	.355**	.005**	.013**	.106**	-.200**	.177**	-.021	-.011*	-.012**			
14. Marital Status	-.059**	-.022**	-.052**											-.035**

Note. ±.000 has an absolute value less than .0005.

\*  $p < .05$ . \*\*  $p < .01$ .

Table 23

## Indirect Effects among Independent Variables of Activity Homemaking

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Sex														
2. SES														
3. Race														
4. Reading														
5. Math														
6. Grade	.128**	.298**	-.390**											
7. INFLW	-.005	-.080**	.103**	-.001**	-.003**									
8. INFLAE	-.060**	.235**	-.297**	.007**	.016**									
9. INFLVE	-.002	-.054**	.068**	-.001**	-.003**									
10. Work Experience	.001	-.120**	.075**	-.001**	-.004**	-.019**								
11. VE Participation	.060*	-.345**	.164**	-.004**	-.015**	-.057**								
12. Occup. Aspiration	.000	-.006**	-.002	-.000*	-.000**	-.002**	.000	.000	.000					
13. Educational Plan	-.117**	.255**	-.057**	.007**	.018**	.065**	-.004**	.002**	-.006**					
14. Marital Status	.003**	-.012**	-.011**	-.000**	-.001**	-.006**	.007**	-.006**	.001*	.000*	.000**			

Note.  $\pm .000$  has an absolute value less than .0005.

\*  $p < .05$ . \*\*  $p < .01$ .

INFL-VE, INFL-ML, and educational plan were significant. Negative indirect effects were associated with SES, math ability, grade, INFL-AE, INFL-VE, and educational plan.

Path coefficients in Table 27 on page 104 indicate that others' influences toward military service, occupational aspiration, and sex were the most important predictors. Vocational education participation had no significant direct or indirect effects upon military service.

Path coefficients, direct effects, and indirect effects among independent variables of military service are shown in Table 27, Table 28 on page 105, and Table 29 on page 106.

#### ACTIVITY 'DIFFERENT EDUCATION'

Public high school graduates who engaged in academic or vocational education were selected into this model. As shown in Table 30 on page 109, the number of cases involved was 3710. Sixteen percent of the cases were engaged in vocational education. Table 31 on page 110 is the correlation matrix of all variables in the model. Twenty-two point two percent of the variation in the different educational activities could be explained by the model. The regression was significant.

Direct and indirect effects of independent variables upon dependent variable were shown in Table 32 on page 111. SES, math ability, INFL-W, INFL-AE, INFL-VE, vocational education

Table 24

Means, Standard Deviation, and Number of Cases  
of Activity Military Service

Variables	Mean	Standard Deviation
1. Sex	.450	.498
2. SES	-.263	.762
3. Race	.231	.421
4. Reading	51.279	10.317
5. Math	50.684	10.368
6. Grade	5.751	1.419
7. INFL-W	.345	.797
8. INFL-AE	2.839	1.792
9. INFL-VE	.287	.804
10. INFL-ML	.090	.409
11. VE Participation	4.798	4.025
12. Occup. Aspiration	.021	.145
13. Educational Plan	2.547	1.012
14. Marital Status	.082	.274
Military Service	.042	.201
Number of Cases	7117	

Table 25

Correlation Matrix of Activity Military Service

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Sex														
2. SES	.081													
3. Race	-.046	-.202												
4. Reading	.040	.278	-.228											
5. Math	.140	.352	-.282	.622										
6. Grade	-.139	.160	-.123	.406	.468									
7. INFLW	.000	-.166	-.032	-.197	-.241	-.197								
8. INFLAE	-.099	.248	.006	.264	.328	.364	-.421							
9. INFLVE	.100	-.084	.003	-.112	-.152	-.155	-.018	-.424						
10. INFLWL	.122	-.076	.076	-.086	-.103	-.100	-.012	-.227	-.006					
11. VE Participation	.091	-.052	.026	-.119	-.132	-.088	.096	-.154	.135	.052				
12. Occup. Aspiration	.077	-.029	.067	-.034	-.061	-.060	-.002	-.104	-.010	.272	-.001			
13. Educational Plan	-.015	.322	.054	.327	.400	.389	-.397	.545	-.215	-.131	-.156	-.062		
14. Marital Status	-.107	-.096	-.069	-.059	-.103	-.017	.096	-.099	.039	-.009	.012	-.001	-.154	
Military Service	.168	-.050	.046	.006	-.007	-.050	-.028	-.126	.009	.310	.019	.225	-.057	.012

Table 26

Direct and Indirect Effects upon Activity Military Service by Independent Variables

Independent Variables	Direct Effect		Indirect Effect	
	b	SE	IE	SE
1. Sex	.051**	.005	.019**	.002
2. SES	-.010**	.003	-.005**	.002
3. Race	.016**	.006	.005	.003
4. Reading	.001**	.000	-.000	.000
5. Math	.000	.000	-.000	.000
6. Grade	.000	.002	-.004**	.001
7. INFL-W	-.015**	.003	-.001	.001
8. INFL-AE	-.010**	.002	-.002**	.001
9. INFL-VE	-.009**	.003	-.002**	.001
10. INFL-ML	.115**	.006	.017**	.002
11. VE Participation	-.000	.001	-.000	.000
12. Occup. Aspiration	.195**	.016		
13. Educational Plan	-.001	.003	-.001*	.000
14. Marital Status	.021*	.008		
<hr/>				
$R^2$	.143			

Note.  $\pm .000$  has an absolute value less than .0005.

\*  $p < .05$ . \*\*  $p < .01$ .

Table 27

Path Coefficients among Independent Variables of Activity Military Service

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	R <sup>2</sup>
1. Sex															.108
2. SES															.181
3. Race															.280
4. Reading	.012	.241	-.179												.090
5. Math	.106	.300	-.217												.209
6. Grade	-.200	-.008	.017	.174	.395										.046
7. INFLW	.014	-.104	-.123	-.058	-.160	-.095									.035
8. INFLAE	-.101	.168	.125	.040	.182	.237									.048
9. INFLVE	.108	-.044	-.047	-.005	-.125	-.078									.083
10. INFLVL	.134	-.044	.047	-.012	-.072	-.030									.432
11. VE Participation	.086	.009	.001	-.043	-.077		.054	-.044	.093	.022					.043
12. Occup. Aspiration	.052	.011	.047	.025	-.041	-.004	-.031	-.075	-.046	.244	-.024				.140
13. Educational Plan	.020	.158	.150	.052	.130	.150	-.164	.303	-.024	-.031	-.050				.007
14. Marital Status	-.108	-.061	-.079									-.132			.028
Military Service	.127	-.036	.033	.044	.016	.002	-.060	-.090	-.038	.235	-.004	.140	-.007	.028	.143

Table 28

## Direct Effects among Independent Variables of Activity Military Service

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Sex														
2. SES														
3. Race														
4. Reading	.254	3.262**	-4.38**											
5. Math	2.202**	4.078**	-4.38**											
6. Grade	-.570**	-.015	.059	.024**	.054**									
7. INEL-W	.023	-.109**	-.232**	-.005**	-.012**	-.053**								
8. INEL-AE	-.364**	.396**	.532**	.007**	.032**	.299**								
9. INEL-VE	.175**	-.047**	-.090**	-.000	-.010**	-.044**								
10. INEL-VL	.110**	-.024**	.045**	-.001	-.003**	-.009*								
11. VE Participation	.698**	.050	.005	-.017**	-.030**		.273**	-.099**	.466**	.214				
12. Occup. Aspiration	.015**	.002	.016**	.000	-.001*	-.000	-.006*	-.006**	-.003**	.087**	-.001*			
13. Educational Plan	.042*	.209**	.361**	.005**	.013**	.107**	-.208**	.171**	-.030*	-.077**	-.013**			
14. Marital Status	-.059**	-.022**	-.052**											-.036**

Note.  $\pm .000$  has an absolute value less than .0005.

\*  $p < .05$ . \*\*  $p < .01$ .

Table 29

Indirect Effects among Independent Variables of Activity by Military Service

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Sex														
2. SES														
3. Race														
4. Reading														
5. Math														
6. Grade	.125**	.299**	-.394**											
7. INFLW	-.005	-.080**	.103**	-.001**	-.003**									
8. INFLAE	-.062**	.236**	-.299**	.007**	.016**									
9. INFLVE	-.002	-.053**	.068**	-.001**	-.002**									
10. INFLML	-.003	-.016**	.020**	-.000*	-.001*									
11. VE Participation	.081**	-.345**	.178**	-.004**	-.015**	-.067**								
12. Occup. Aspiration	.009**	-.006**	.007**	-.000	-.000**	-.002**	-.000	.000	-.000*	-.000				
13. Educational Plan	-.118**	.256**	-.066**	.007**	.018**	.065**	-.003**	.001*	-.006**	-.003				
14. Marital Status	.003**	-.017**	-.011**	-.000**	-.001**	-.006**	.008**	-.006**	.001**	.003**	.000**			

Note. †.000 has an absolute value less than .0005.

\* p < .05. \*\* p < .01.

participation, occupational aspiration, educational plan and marital status had significant direct effects. Among the significant direct effects SES, math ability, INFL-AE, occupational aspiration, and educational plan were negative. Except race, work experience, and educational plan, all other independent variables with indirect paths had significant indirect effects; those of SES, reading and math abilities, grade, and INFL-AE being negative.

Path coefficients in Table 33 on page 112 show that educational plan and others' influences toward vocational education were the most important predictors. Vocational education participation had significant direct and indirect effects upon the activity different educational.

Effects among independent variables are shown in matrices in Table 34 on page 113 and Table 35 on page 114. Vocational education participation had significant negative direct effects upon educational plan and occupational aspiration. But the indirect effect of vocational education participation through educational plan upon marital status were not significant. Sex, SES, reading and math abilities, and the three types of others' influences had significant effects upon vocational education participation. SES, the two abilities, and others' influences toward academic education were found to have negative effects. SES, race, the two abilities, and grade had significant indirect effects upon voca-

tional education participation, all but race had negative effects.

### ACTIVITY 'EMPLOYABILITY'

Graduates who were involved in (a) work or unemployment, and (b) work only or unemployment were included in the investigation the activity employability. Table 36 on page 116 presents means, standard deviation, and numbers of cases of the two levels of the variable, work vs. unemployment and work only vs. unemployment. It shows that there were 4127 cases in (a) with 87.5% engaged in work, and 2607 cases in (b) with 79.6% in work only. Table 37 on page 117 and Table 38 on page 118 are the correlation matrices.

Five point two percent of the variation in work vs. unemployment could be explained, while 7% was explained for work only vs. unemployment. Both regressions were significant. Table 39 on page 119 displays the direct effects of the two models. Independent variables in work vs. unemployment with significant direct effects were sex, SES, race, grade, and work experience. Only race had a negative effect. In work only vs. unemployment, the direct effects of sex, SES, race, work experience, educational plan, and marital status were significant. Race and educational plan had negative effects.

The indirect effects are shown in Table 40 on page 120. In work vs. unemployment, the indirect effects of sex and

Table 30

Means, Standard Deviation, and Number of Cases  
of Activity Different Education

Variables	Mean	Standard Deviation
1. Sex	.451	.498
2. SES	-.066	.775
3. Race	.217	.412
4. Reading	54.013	9.965
5. Math	54.179	9.913
6. Grade	6.213	1.302
7. INFL-W	.110	.434
8. INFL-AE	3.582	1.482
9. INFL-VE	.166	.651
10. Work Experience	2.891	1.840
11. VE Participation	4.404	3.901
12. Occup. Aspiration	58.186	19.868
13. Educational Plan	3.027	.850
14. Marital Status	.024	.152
Different Education	.160	.366
Number of Cases	3710	

Table 31

## Correlation Matrix of Activity Different Education

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Sex														
2. SES	.069													
3. Race	-.066	-.227												
4. Reading	.060	.245	-.281											
5. Math	.183	.323	-.341	.593										
6. Grade	-.122	.133	-.170	.409	.461									
7. INFLW	.013	-.121	.012	-.147	-.171	-.133								
8. INFLAE	-.062	.199	-.023	.204	.247	.277	-.301							
9. INFLVE	.103	-.096	.014	-.121	-.153	-.133	.036	-.465						
10. Work Experience	.166	.021	-.049	-.051	-.023	-.084	.049	-.067	.087					
11. VE Participation	.071	-.119	.079	-.186	-.196	-.111	.124	-.184	.158	.110				
12. Occup. Aspiration	-.155	.077	.016	.148	.116	.195	-.112	.244	-.225	-.070	-.174			
13. Educational Plan	-.007	.249	.065	.260	.315	.326	-.245	.391	-.263	-.049	-.200	.331		
14. Marital Status	-.038	-.047	-.018	-.020	-.044	.055	.038	-.011	-.012	-.017	.012	-.008	-.032	
Different Education	.034	-.166	.016	-.172	-.227	-.179	.185	-.323	.322	.052	.176	-.231	-.358	.063

Table 32

Direct and Indirect Effects upon Activity Different Education  
by Independent Variables

Independent Variables	Direct Effect		Indirect Effect	
	b	SE	IE	SE
1. Sex	.006	.012	.026**	.006
2. SES	-.019*	.008	-.063**	.004
3. Race	-.013	.014	-.005	.008
4. Reading	.000	.001	-.002**	.000
5. Math	-.003**	.001	-.005**	.000
6. Grade	-.001	.005	-.022**	.002
7. INFL-W	.061**	.013	.024**	.003
8. INFL-AE	-.021**	.005	-.012**	.001
9. INFL-VE	.107**	.009	.020**	.003
10. Work Experience	.001	.003	-.000	.001
11. VE Participation	.005**	.001	.002**	.000
12. Occup. Aspiration	-.001**	.000		
13. Educational Plan	-.079**	.008	-.000	.000
14. Marital Status	.119**	.035		
$R^2$	.222			

Note.  $\pm .000$  has an absolute value less than .0005.

\*  $p < .05$ . \*\*  $p < .01$ .

Table 33

## Path Coefficients among Independent Variables Activity Different Education

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	R <sup>2</sup>
1. Sex															.115
2. SES															.202
3. Race															.282
4. Reading	.031	.189	-.236												.045
5. Math	.148	.251	-.274												.125
6. Grade	-.203	-.027	-.001	.196	.390										.048
7. INFL-W	.032	-.080	-.069	-.059	-.115	-.053									.041
8. INFL-AE	-.070	.147	.095	.044	.133	.186									.082
9. INFL-VE	.125	-.059	-.054	-.030	-.137	-.043									.125
10. Work Experience	.163	.032	-.059	-.049	-.037		.033	-.009	.057						.041
11. VE Participation	.085	-.038	.014	-.082	-.105		.064	-.069	.085						.082
12. Occup. Aspiration	-.115	.021	.059	.069	-.009	.102	-.037	.106	-.124	-.006	-.101				.125
13. Educational Plan	.019	.147	.201	.053	.124	.177	-.109	.181	-.104	.011	-.084				.301
14. Marital Status	-.037	-.047	-.030												.005
Different Education	.009	-.041	-.015	.002	-.079	-.003	.073	-.084	.190	.004	.051	-.075	-.184	.049	.222

Table 34

## Direct Effects among Independent Variables of Activity Different Education

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Sex														
2. SES														
3. Race														
4. Reading	.628*	2.434**	-5.71**											
5. Math	2.938**	3.205**	-6.60**											
6. Grade	-.532**	-.046	-.005	.026**	.061**									
7. INFL-W	.028	-.045**	-.073**	-.003**	-.005**	-.018**								
8. INFL-AE	-.209**	.281**	.342**	.007*	.020**	.211**								
9. INFL-VE	.164**	-.050**	-.086**	-.002	-.009**	-.022*								
10. Work Experience	.602**	.075	-.264**	-.009*	-.007		.140	-.011	.162**					
11. VE Participation	.664**	-.192*	.129	-.032**	-.041**		.577**	-.183**	.509**					
12. Occup. Aspiration	-4.57**	.549	2.854**	.137**	-.018	1.551**	-1.71*	1.420**	-3.80**	-.063	-.516**			
13. Educational Plan	.033	.162**	.415**	.005**	.011**	.116**	-.214**	.104**	-.136**	.005	-.018**			
14. Marital Status	-.011*	-.009**	-.011											-.003

\*  $p < .05$ . \*\*  $p < .01$ .

Table 35

## Indirect Effects among Independent Variables of Activity Different Education

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Sex														
2. SES														
3. Pece														
4. Reading														
5. Math														
6. Grade	.167**	.227**	-.485**											
7. INFL-W	-.101*	-.026**	.057**	-.001**	-.001**									
8. INFL-AE	-.015	.118**	-.272**	.005**	.011**									
9. INFL-VE	-.020**	-.038**	.081**	-.001*	-.001*									
10. Work Experience	.002	-.073**	.094**	-.001*	-.003**	-.008								
11. VE Participation	-.017	-.368**	.432**	-.005**	-.014**	-.060**								
12. Coop. Aspiration	-1.80**	1.864**	-1.56**	.091**	.201**	.444**	-.306**	.095**	-.272**					
13. Educational Plan	-.064**	.145**	-.152**	.006**	.013**	.030**	-.010**	.003**	-.009**					
14. Marital Status	.000	-.001	-.001	.000	-.000	-.001	.001	-.000	.001	.000	.000	.000	.000	.000

Note. ±.000 has an absolute value less than .0005.

\*  $p < .05$ . \*\*  $p < .01$ .

race were significant. The latter had a negative effect. In work only vs. unemployment, sex, SES, race, reading and math abilities, grade, INFL-W, INFL-AE, and work experience had significant indirect effects. Negative effects were associated with SES, race, reading and math abilities, grade, and INFL-AE.

According to the path coefficients in Table 41 on page 121 and Table 42 on page 122, race was the most important predictor for both work and work only vs. unemployment. Vocational education participation did not have any significant effect upon the two employability variable levels.

The direct and indirect effects among independent variables of employability (a) and (b) are shown in Table 43 on page 123, Table 44 on page 124, Table 45 on page 125, and Table 46 on page 126.

#### ACTIVITY 'WORK VS. ACADEMIC EDUCATION'

The last contrast investigated in the study involved public high school graduates who were engaged solely in working for pay or solely in taking academic courses. Table 47 on page 128 shows that 3944 cases were studied. Among them, 52.6% were solely working for pay. The correlation matrix is in Table 48 on page 129.

The total variation of work vs. academic education which could be explained by the model was 45.1% and the regression

Table 36

Mean, Standard Deviation, and Number of Cases of Activity Emolvability

Variables	Work vs. Unemployment		Work Only vs. Unemployment	
	Mean	SD	Mean	SD
1. Sex	.448	.497	.450	.498
2. SES	-.321	.718	-.448	.684
3. Race	.208	.406	.241	.428
4. Reading	50.560	10.215	48.347	9.851
5. Math	49.743	10.038	47.037	9.392
6. Grade	5.594	1.410	5.254	1.370
7. INFL-W	.438	.882	.620	1.012
8. INFL-AE	2.625	1.798	2.138	1.768
9. INFL-VE	.351	.889	.447	.972
10. Work Experience	3.259	1.951	3.326	2.007
11. VE Participation	5.070	4.070	5.356	4.127
12. Occup. Aspiration	51.001	22.166	47.417	22.301
13. Educational Plan	2.393	.990	2.080	.918
14. Marital Status	.084	.278	.115	.319
Dependent Variable	.875	.331	.796	.403
Number of Cases	4127		2607	

Table 37

## Correlation Matrix of Activity Employability (a) Work vs. Unemployment

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Sex														
2. SES	.098													
3. Race	-.079	-.182												
4. Reading	.016	.242	-.204											
5. Math	.107	.300	-.269	.608										
6. Grade	-.175	.113	-.114	.377	.435									
7. INFL-W	.032	-.146	-.034	-.192	-.228	-.187								
8. INFL-AE	-.147	.192	.018	.240	.297	.344	-.434							
9. INFL-VE	.142	-.049	.003	-.087	-.127	-.143	-.058	-.433						
10. Work Experience	.226	.022	-.057	-.055	-.038	-.086	.051	-.100	.065					
11. VE Participation	.114	-.002	-.010	-.095	-.100	-.056	.093	-.149	.150	.098				
12. Occup. Aspiration	-.227	.101	.071	.165	.159	.226	-.185	.337	-.218	-.087	-.153			
13. Educational Plan	-.065	.279	.048	.311	.358	.355	-.394	.525	-.187	-.087	-.151	.376		
14. Marital Status	-.065	-.058	-.065	-.017	-.057	.028	.066	-.058	.037	.042	.006	-.035	-.101	
Employability (a)	.066	.115	-.178	.097	.117	.080	-.027	.032	-.017	.088	.007	.008	.027	.030

Table 38

## Correlation Matrix of Activity Employability (b) Work Only vs. Unemployment

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Sex														
2. SES	.104													
3. Race	-.086	-.175												
4. Reading	.013	.190	-.178											
5. Math	.015	.237	-.245	.566										
6. Grade	-.187	.015	-.058	.281	.330									
7. INELW	.040	-.084	-.085	-.131	-.154	-.118								
8. INELAE	-.170	.111	.092	.141	.183	.255	-.410							
9. INELVE	.133	-.007	-.020	-.027	-.063	-.086	-.122	-.396						
10. Work Experience	.242	.039	-.049	.044	-.036	-.073	.037	-.087	.045					
11. VE Participation	.124	.086	-.042	-.023	-.019	.003	.055	-.093	.123	.087				
12. Occup. Aspiration	-.266	.045	.126	.082	.068	.152	-.148	.295	-.181	-.094	-.120			
13. Educational Plan	-.093	.194	.112	.209	.233	.245	-.369	.474	-.100	-.092	-.079	.312		
14. Marital Status	-.086	-.014	-.099	.030	-.005	.074	.023	-.008	.026	.060	-.010	.001	-.054	
Employability (b)	.090	.053	-.184	.009	.011	-.019	.068	-.104	.035	.130	.042	-.076	-.145	.087

Table 39

Direct Effects upon Two Variables of Activity Employability by Independent Variables

Independent Variables	Work		Work Only	
	b	SE	b	SE
1. Sex	.028*	.011	.037*	.017
2. SES	.031**	.008	.027*	.012
3. Race	-.114**	.013	-.139**	.019
4. Reading	.001	.001	.000	.001
5. Math	.001	.001	-.001	.001
6. Grade	.012**	.004	.006	.006
7. INFL-W	-.006	.007	-.000	.009
8. INFL-AE	.000	.004	-.007	.006
9. INFL-VE	-.006	.007	-.001	.009
10. Work Experience	.013**	.003	.019**	.004
11. VE Participation	.000	.001	.001	.002
12. Occup. Aspiration	.000	.000	.000	.000
13. Educational Plan	-.007	.007	-.048**	.010
14. Marital Status	.029	.018	.080**	.024
$R^2 =$	.052		.070	

Note.  $\pm .000$  has an absolute value less than .0005.

\*  $p < .05$ . \*\*  $p < .01$ .

Table 40

Indirect Effects upon Two Variables of Activity Employability  
by Independent Variables

Independent Variables	Work		Work Only	
	IE	SE	IE	SE
1. Sex	.002	.005	.023**	.008
2. SES	.006*	.003	-.018**	.004
3. Race	-.016**	.004	-.026**	.007
4. Reading	.000	.000	-.001*	.000
5. Math	.001	.000	-.001**	.000
6. Grade	-.000	.001	-.007**	.002
7. INFL-W	.002	.001	.008**	.002
8. INFL-AE	-.002	.001	-.009**	.002
9. INFL-VE	.000	.001	-.002	.002
10. Work Experience	.000	.000	.001*	.000
11. VE Participation	.000	.000	.000	.000
12. Occup. Aspiration				
13. Educational Plan	-.001	.001	-.001	.001
14. Marital Status				

Note.  $\pm .000$  has an absolute value less than .0005.

\*  $p < .05$ . \*\*  $p < .01$ .

Table 41

## Path Coefficients of Activity Employability (a) Work vs. Unemployment

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	R <sup>2</sup>
1. Sex															.085
2. SES															.142
3. Race															.255
4. Reading	-.018	.213	-.167												.084
5. Math	.065	.254	-.218												.188
6. Grade	-.215	-.015	-.003	.163	.363										.046
7. INFL-W	.034	-.098	-.114	-.064	-.154	-.092									.062
8. INFL-AE	-.132	.137	.114	.038	.179	.226									.049
9. INFL-VE	.142	-.027	-.028	.010	-.116	-.071									.183
10. Work Experience	.217	.023	-.054	-.034	-.046		.012	-.040	.010						.397
11. VE Participation	.092	.036	-.018	-.041	-.051		.064	-.036	.115						.021
12. Occup. Aspiration	-.167	.055	.091	.055	.034	.077	-.057	.176	-.087	-.001	-.075				.052
13. Educational Plan	.005	.153	.121	.070	.105	.136	-.161	.317	-.003	-.019	-.061				
14. Marital Status	-.073	-.039	-.073										-.091		
Employability (a)	.043	.068	-.140	.023	.022	.050	-.017	.000	-.016	.075	.003	.011	-.020	.025	

Table 42

## Path Coefficients of Activity Employability (b) Work Only vs. Unemployment

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	R <sup>2</sup>
1. Sex															.058
2. SES															.103
3. Race															.172
4. Reading	-.017	.165	-.151												.053
5. Math	.067	.194	-.205												.126
6. Grade	-.213	-.056	.009	.129	.295										.026
7. INFLW	.038	-.071	-.138	-.055	-.123	-.062									.066
8. INFLAE	-.149	.114	.146	.019	.137	.184									.039
9. INFLVE	.132	-.011	-.028	.027	-.082	-.043									.161
10. Work Experience	.237	.029	-.039	-.021	-.059		-.000	-.035	-.005						.322
11. VE Participation	.098	.089	-.020	-.017	-.028		.061	-.007	.113						.022
12. Occup. Aspiration	-.206	.056	.108	.032	.025	.046	-.050	.165	-.077	-.010	-.065				.070
13. Educational Plan	-.014	.140	.123	.062	.076	.100	-.168	.336	.040	-.038	-.043				
14. Marital Status	-.098	-.012	-.104												
Employability (b)	.045	.046	-.148	.006	-.016	.020	-.000	-.032	-.003	.094	.008	.003	-.049	-.109	.063

Table 43

## Direct Effects among Independent Variables of Activity Employability (a) Work vs. Unemployment

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Sex														
2. SES														
3. Race														
4. Reading	-0.372	3.037**	-4.19**											
5. Math	1.311**	3.551**	-5.38**											
6. Grade	-0.611**	-0.029	-0.010	0.022**	0.051**									
7. INFLW	0.050*	-0.120**	-0.248**	-0.005**	-0.014**	-0.057**								
8. INFLAE	-0.476**	0.344**	0.506**	0.007*	0.032**	0.288**								
9. INFLVE	0.255**	-0.034	-0.062	0.001	-0.010**	-0.045**								
10. Work Experience	0.853**	0.062	-0.259**	-0.007	-0.009*		0.026	-0.044*	0.022					
11. VE Participation	0.757**	0.202*	-0.184	-0.016*	-0.025**		0.294**	-0.083	0.528**					
12. Occup. Aspiration	-7.46**	1.703**	4.980**	0.120*	0.074	1.215**	-1.44**	2.175**	-2.18**	-0.007	-0.410**			
13. Educational Plan	0.009	0.211**	0.295**	0.007**	0.010**	0.095**	-0.181**	0.175**	-0.004	-0.010	-0.015**			
14. Marital Status	-0.041**	-0.015*	-0.050**											-0.026**

\*  $p < .05$ . \*\*  $p < .01$ .

Table 44

## Indirect Effects among Independent Variables of Activity Emoloability (a) Work vs. Unemployment

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Sex														
2. SES														
3. Race														
4. Reading														
5. Math														
6. Grade	.058**	.249**	-.368**											
7. INFL-W	.016	-.078**	.118**	-.001**	-.003**									
8. INFL-AE	-.120**	.200**	-.310**	.007**	.015**									
9. INFL-VE	.011	-.044**	.069**	-.001**	-.002**									
10. Work Experience	.025	-.082**	.064**	-.001*	-.003**	-.015**								
11. VE Participation	.186**	-.281**	.150**	-.003**	-.015**	-.064**								
12. Occup. Aspiration	-2.99**	2.560**	-.747*	.074**	.231**	.894**	-.121**	.034	-.216**					
13. Educational Plan	-.183**	.210**	-.060**	.006**	.017**	.062**	-.005**	.002*	-.008**					
14. Marital Status	.005**	-.011**	-.006**	-.000**	-.001**	-.004**	.005**	-.005**	.000	.000	.000**			

Note.  $\pm .000$  has an absolute value less than .0005.

\*  $p < .05$ . \*\*  $p < .01$ .

Table 45

## Direct Effects among Independent Variables of Activity Employability (b) Work Only vs. Unemployment

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Sex														
2. SES														
3. Race	-.339	2.383**	-3.46**											
4. Reading	1.267**	2.665**	-4.50**											
5. Math	-.586**	-.111**	.029	.018**	.043**									
6. Grade	.077	-.106**	-.326**	-.006*	-.013**	-.046**								
7. INFL+W	-.531**	.293**	.605**	.003	.026**	.237**								
8. INFL+AE	.257**	-.015	-.064	.003	-.009**	-.031*								
9. INFL+VE	.955**	.087	-.181	-.004	-.013*		-.000	-.039	-.011					
10. Work Experience	.808**	.537**	-.190	-.007	-.012		.249**	-.017	.478**					
11. VE Participation	-9.23**	1.811**	5.648**	.073	.659	.756*	-1.10*	2.030**	-1.77**	-.110	-.352**			
12. Occup. Aspiration	-.026	.187**	.263**	.006**	.007**	.067**	-.152**	.175**	.038*	-.017*	-.009**			
13. Educational Plan	-.063**	-.006	-.078**									-.017*		
14. Marital Status	.037*	.027*	-.139**	.000	-.001	.006	-.000	-.007	-.001	.019**	.001	.000	-.048**	.030**

Note. ±.000 has an absolute value less than .0005.

\*  $p < .05$ . \*\*  $p < .01$ .

Table 4c

## Indirect Effects among Independent Variables of Activity Employability (b) Work Only vs. Unemployment

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Sex														
2. SES														
3. Race														
4. Reading														
5. Math														
6. Grade	.048**	.157**	-.256**											
7. INFLW	.010	-.051**	.090**	-.001**	-.002**									
8. INFLAE	-.096**	.087**	-.181**	.004**	.010**									
9. INFLVE	.005	-.018**	.036**	-.001	-.001*									
10. Work Experience	.007	-.059**	.056*	-.000	-.001	-.009								
11. VE Participation	.145**	-.111**	-.000	-.001	-.009**	-.030*								
12. Occup. Aspiration	-2.66**	1.238**	.581	.036**	.150**	.609**	-.088*	.010	-.167**					
13. Educational Plan	-.167**	.121**	.044*	.004**	.016**	.048**	-.002	.001	-.004*					
14. Marital Status	.003*	-.005*	-.005*	-.000*	-.000*	-.002*	.003*	-.003*	-.001	.000	.000			

Note.  $\pm$ .000 has an absolute value less than .0005.

\*  $p < .05$ . \*\*  $p < .01$ .

was significant. Table 49 on page 130 shows that except reading ability, all of the independent variables had significant direct effects. The effects of sex, SES, race, math ability, grade, INFL-AE, occupational aspiration, and educational plan were negative. Moreover, the indirect effects of all the independent variables upon the dependent variable were significant. Negative effects were associated with SES, race, reading and math ability, grade, INFL-AE, and educational plan.

The path coefficients among variables are presented in Table 50 on page 131. It shows that educational plan was the dominant variable in predicting work vs. academic education. Vocational education participation had significant direct and indirect effects upon the activity.

The direct and indirect effects among independent variables of work vs. academic education are presented in the matrices in Table 51 on page 132 and Table 52 on page 133.

#### SUMMARY

Eleven activities with a total 16 dependent variables were investigated. A common path model was applied to all except two of the investigations. The model was modified slightly when dealing with the activities military service and homemaking. Discussions concerning the causal effects of

Table 47

Means, Standard Deviation, and Number of Cases of Activity Work vs.  
Academic Education

Variables	Mean	Standard Deviation
1. Sex	.466	.499
2. SES	-.216	.767
3. Race	.227	.419
4. Reading	51.341	10.391
5. Math	50.905	10.318
6. Grade	5.769	1.435
7. INFL-W	.374	.838
8. INFL-AE	2.911	1.801
9. INFL-VE	.274	.789
10. Work Experience	3.106	1.942
11. VE Participation	4.778	3.996
12. Occup. Aspiration	53.199	21.613
13. Educational Plan	2.587	1.017
14. Marital Status	.075	.263
Work vs. Academic Education	.526	.499
Number of Cases	3944	

Table 48

## Correlation Matrix of Activity Work vs. Academic Education

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Sex														
2. SES	.050													
3. Race	-.055	-.189												
4. Reading	.020	.284	-.211											
5. Math	.127	.355	-.257	.620										
6. Grade	-.156	.162	-.088	.418	.480									
7. INELW	.031	-.175	-.074	-.197	-.237	-.204								
8. INELAE	-.101	.258	.071	.272	.335	.380	-.468							
9. INELVE	.104	-.087	-.025	-.104	-.160	-.166	-.017	-.434						
10. Work Experience	.186	-.046	-.021	-.119	-.126	-.160	.092	-.151	.085					
11. VE Participation	.091	-.075	.017	-.146	-.158	-.106	.116	-.179	.136	.120				
12. Occup. Aspiration	-.197	.134	.084	.184	.190	.254	-.213	.351	-.221	-.126	-.187			
13. Educational Plan	-.048	.331	.104	.338	.414	.424	-.432	.572	-.227	-.166	-.195	.410		
14. Marital Status	-.065	-.075	-.080	-.050	-.097	-.026	.101	-.114	.076	.080	.043	-.064	-.159	
Work vs. Academic Ed.	.014	-.294	-.065	-.299	-.389	-.388	.353	-.507	.254	.191	.175	-.324	-.596	.216

Table 49

Direct and Indirect Effects upon Activity Work vs. Academic Education  
by Independent Variables

Independent Variables	Direct Effect		Indirect Effect	
	b	SE	IE	SE
1. Sex	-.047**	.013	.070**	.010
2. SES	-.051**	.009	-.156**	.007
3. Race	-.061**	.015	-.087**	.012
4. Reading	-.000	.001	-.004**	.000
5. Math	-.004**	.001	-.012**	.001
6. Grade	-.038**	.005	-.049**	.003
7. INFL-W	.039**	.009	.037**	.003
8. INFL-AE	-.038**	.005	-.031**	.002
9. INFL-VE	.038**	.005	.011**	.003
10. Work Experience	.017**	.003	.004**	.001
11. VE Participation	.003*	.002	.003**	.001
12. Occup. Aspiration	-.001**	.000		
13. Educational Plan	.152**	.008	-.007**	.001
14. Marital Status	.201**	.023		
<hr/>				
$R^2 =$	.451			

Note.  $\pm .000$  has an absolute value less than .0005.

\*  $p < .05$ . \*\*  $p < .01$ .

Table 50

## Path Coefficients of Activity Work vs. Academic Education

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	R <sup>2</sup>
1. Sex															.106
2. SES															.174
3. Race															.299
4. Reading	-.002	.253	-.163												.101
5. Math	.101	.314	-.192												.234
6. Grade	-.209	-.017	.041	.181	.411										.052
7. INFL-W	.035	-.118	-.156	-.061	-.158	-.092									.068
8. INFL-AE	-.086	.179	.178	.044	.182	.248									.059
9. INFL-VE	.107	-.045	-.069	.018	-.145	-.086									.195
10. Work Experience	.188	.010	-.038	-.044	-.105		.023	-.062	.027						.475
11. VE Participation	.086	.001	-.002	-.058	-.086		.051	-.067	.079						.036
12. Occup. Aspiration	-.146	.046	.095	.047	.042	.087	-.066	.169	-.086	-.018	-.097				
13. Educational Plan	.012	.160	.159	.044	.130	.170	-.169	.296	-.019	-.039	-.062				
14. Marital Status	-.074	-.039	-.077									-.142			
Work vs. Academic Ed.	-.047	-.079	-.051	-.001	-.082	-.110	.066	-.139	.061	.064	.026	-.051	-.310	.106	.451

Table 51

## Direct Effects among Independent Variables of Activity Work vs. Academic Education

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Sex														
2. SES														
3. Race														
4. Reading	-.034	3.431**	-.405**											
5. Math	2.083**	4.219**	-4.73**											
6. Grade	-.600**	-.032	.141**	.025**	.067**									
7. INFL-W	.059*	-.129**	-.312**	-.005**	-.013**	-.054**								
8. INFL-AE	-.309**	.420**	.765**	.008*	.032**	.311**								
9. INFL-VE	.170**	-.046**	-.129**	.001	-.011**	-.047**								
10. Work Experience	.731**	.024	-.178*	-.008*	-.020**		.053	-.067**	.068					
11. VE Participation	.692**	.004	-.020	-.022**	-.033**		.244**	-.150**	.399**					
12. Occup. Aspiration	-6.34**	1.300**	4.916**	.098*	.088*	1.309**	-1.69**	2.034**	-2.35**	-.205	-.526**			
13. Educational Plan	.024	.212**	.386**	.004**	.013**	.120**	-.206**	.167**	-.025	-.021**	-.016**			
14. Marital Status	-.039**	-.013*	-.048**											-.037**

\*  $p < .05$ . \*\*  $p < .01$ .

Table 52

## Indirect Effects among Independent Variables of Activity Work vs. Academic Education

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Sex														
2. SES														
3. Race														
4. Reading														
5. Math														
6. Grade	.118**	.327**	-.372**											
7. INFLW	-.001	-.087**	.093**	-.001**	-.003**									
8. INFLAE	-.084**	.252**	-.253**	.008**	.018**									
9. INFLVE	-.000	-.056**	.058**	-.001**	-.003**									
10. Work Experience	-.000	-.175**	.077**	-.001**	-.005**	-.027**								
11. VE Participation	.072*	-.412**	.091	-.004**	-.017**	-.078**								
12. Occup. Aspiration	-2.30**	3.311**	.446	.090**	.266**	.881**	-.139**	.092**	-.224**					
13. Educational Plan	-.140**	.273**	.027	.008**	.020**	.066**	-.005**	.004**	-.008**					
14. Marital Status	.004**	-.018**	-.015**	-.000**	-.001**	-.007**	.003**	-.006**	.001	.001**	.001**			

Note. †.000 has an absolute value less than .0005.

\*  $p < .05$ . \*\*  $p < .01$ .

participation in vocational education upon activities are be  
in the following chapter.

## CHAPTER V: SUMMARY, DISCUSSION, AND RECOMMENDATIONS

This chapter provides a summary of the study, followed by discussion and conclusions, and recommendations based on the findings of the study.

### SUMMARY

#### INTRODUCTION

Initiated from family crafts and apprenticeship, the modern form of vocational education has been developing in the United States for almost a century. With joined federal, state, and local efforts, vocational education has become a huge enterprise and can not be perfectly described by any single definition. In recent decades, federal involvement has increased and so has the emphasis on the evaluation of vocational education. Researchers have found many positive effects of vocational education by conducting outcome evaluations.

Research indicates that a higher percentage of vocational students than nonvocational students enter the labor market while a lower percentage continue their education. Information concerning other post high school activities are either incomplete, incompatible, or in conflict.

Since many factors other than the vocational education program itself may affect the effects of vocational education, studies which give consideration to those factors are needed. Sex, race, socioeconomic status, ability, student performance, peer and other persons' influences, and aspirations have been found to have a relationship with curriculum placement and may affect the effects of curriculum upon post high school employment and/or education. Other potentially influential variables are in-school work experience and marital status.

Still many other factors may exist which affect the economic and noneconomic experiences of students after high school. Researchers must find ways to deal with the problems of (a) difficulties in ascertaining curricular effects, (b) bias caused by students self-selecting programs, (c) defining vocational education, (d) identifying vocational students, and (e) variation among vocational programs.

#### STATEMENT OF THE PROBLEM

The problem of this study was to determine the relative and combined effects of participation in public school vocational education, along with student characteristics and selected in-school factors, upon post high school activities.

## PROCEDURE

This study was an ex post facto research design which used the information from an existing data bank -- High School and Beyond surveys, and focused upon the analysis of causal relations among the selected variables. The general causal model used included the dependent variable, an activity or a combination of activities, and independent variables, vocational education participation and other factors. Path analysis was used to determine the direct and indirect effects of each independent variable upon each dependent variable and the relationships among independent variables.

## FINDINGS

Activity groups, basic or composite, investigated in the study were work, academic education, vocational education, military service, homemaking, unemployment, vocational, work and study, different education (vocational education vs. academic education), employability (work or work only vs. unemployment), and work vs. academic education.

Total number of cases involved in each activity group and the percentage of the cases coded 1 for each group are shown in Table 53 on page 138. Profiles for former public high school students involved in different post high school activities were compiled based upon the findings.

Table 53

Number of Cases and Percentage of Cases Coded 1 by Activity Groups

Group	Number of Cases	% of Cases Coded 1
<b>Work</b>		
Work	6685	54.0
Work Only	6685	31.0
<b>Academic Education</b>		
Academic Education	6685	48.4
Academic Education Only	6685	28.0
<b>Vocational Education</b>		
Vocational Education	6685	8.9
Vocational Education Only	6685	3.7
Unemployment	6685	8.6
Work and Study	6685	22.8
<b>Vocational</b>		
Vocational	6685	58.6
Vocational Only	6685	34.7
Homemaking	7074	3.4
Military Service	7117	4.2
Different Education	3701	16.0
		(Vocational Education)
<b>Employability</b>		
Work vs. Unemployment	4127	87.5
		(Work)
Work Only vs. Unemployment	2607	79.6
		(Work Only)
Work vs. Academic Education	3944	52.6
		(Work Only)

Work. Two categories of working for pay were investigated by this study. The first was working for pay in conjunction with other activities such as continuing education. The second category was solely working for pay. Graduates who working but also engaged in other activities, tended to have the following characteristics: (a) female, (b) non-black, (c) lower high school grades, (d) more semesters of participation in public high school vocational education, (e) more work experiences while in high school, (f) lower educational plans, and (g) expected by significant others to work following high school. Graduates who only working, not engaged in other activities, were most likely to be or have: (a) married, (b) non-black, (c) lower math ability score, (d) lower grades, (e) more work experience while in high school, (f) lower educational plans, (g) lower occupational aspiration, and (h) expected by significant others to work, to continue vocational courses, and not to continue academic courses following high school.

Academic education. Graduates involved in academic education in conjunction with other activities and graduates involved solely in academic education were investigated separately. For graduates in the first group, compared to those who were not in the group, the distinguishing characteristics were: (a) unmarried, (b) higher family SES, (c) higher math ability scores, (d) higher grades, (e) fewer semesters of participation in vocational education, (f) less work experi-

ence while in high school, (g) higher educational plans, (h) higher occupational aspirations, and (i) expected by significant others to continue academic education and not to work or continue vocational education. The characteristics of graduates involved solely in academic education which separated them from all others were: (a) unmarried, (b) male, (c) black, (d) higher family SES, (e) higher math ability score, (f) higher grades, (g) fewer semesters of high school vocational courses, (h) less work experience while in high school, (i) higher educational plans, (j) higher occupational aspirations, and (k) expected by significant others to continue academic, not vocational, education.

Vocational education. Graduates could also be in either or both of the two categories of this activity. Both those involved in vocational education as well as other activities and those solely continuing vocational education were studied. The discriminating characteristics for the former were: (a) unmarried, (b) lower math ability scores, (c) lower grades, (d) more semesters in high school vocational courses, (e) lower educational plans, (f) lower occupational aspirations, and (g) expected by significant others to continue vocational education but not to work. For the latter, they were: (a) unmarried, (b) lower math ability scores, (c) more work experiences while in high school, (d) lower educational plans, (e) lower occupational aspirations, and (f)

expected by significant others to continue vocational education.

Unemployment. Graduates who were unemployed were as a group best described by the following characteristics: (a) female, (b) black, (c) lower family SES, (d) lower grades, (e) less work experience while in high school, and (f) expected by significant others to work following high school.

Work and study. For those graduates who were working and pursuing some kind of education at the same time, the distinguishing characteristics were: (a) unmarried, (b) female, (c) non-black, (d) higher reading and math ability scores, (e) higher grades, (f) more work experiences while in high school, (g) higher educational plans, and (h) expected by significant others not to work but to continue academic education.

Vocational. Graduates who were engaged in work for pay or vocational education were studied as a group and the activity was named vocational. Those engaged in the activity vocational in conjunction with other activities can best be described by the characteristics: (a) female, (b) non-black, (c) lower family SES, (d) lower math ability scores, (e) lower grades, (f) more semesters in high school vocational courses, (g) more work experience while in high school, (h) lower educational plans, and (i) expected by significant others to work, to continue vocational education, and not to continue academic education following high school. Those

engaged solely in the activity vocational only were found to have the following characteristics: (a) married, (b) non-black, (c) lower family SES, (d) lower math ability scores, (e) lower grades, (f) more work experience while in high school, (g) lower educational plans, (h) lower occupational aspirations, and (i) expected by significant others to work, to continue vocational education and not to continue academic education.

Homemaking. Public high school graduates reported to be homemakers after leaving high school were found to have the following characteristics: (a) married, (b) female, (c) lower family SES, (d) lower reading ability scores, (e) lower grades, (f) less work experience while in high school, and (g) planned to become homemakers.

Military Service. Graduates who were in the Armed Forces were most likely to have the characteristics: (a) married, (b) male, (c) black, (d) lower family SES, (e) higher reading ability scores, (f) planned to be in military service, and (g) expected by significant others not to work or have more education but join the Armed Forces.

Different education. Graduates who engaged in vocational education following high school were found to differ from those in academic education because the former had the following characteristics: (a) married, (b) lower family SES, (c) lower math ability scores, (d) more semesters in high school vocational education, (e) lower educational plans, (f)

lower occupational aspirations, and (g) expected by significant others to continue vocational education, to work, and not to continue academic education.

Employability. A comparison of graduates who were working for pay in conjunction with other activities with those unemployed indicated that the former tended to have the following characteristics: (a) non-black, (b) higher family SES, (c) higher high school grades, and (d) more work experience while in high school. When graduates who were engaged solely in working for pay were compared with those unemployed, the discriminating characteristics were: (a) married, (b) male, (c) non-black, (d) higher family SES, (e) more work experience while in high school, and (f) lower educational plans.

Work vs. academic education. When graduates engaged solely in working for pay were contrasted with those solely pursuing academic education, the former tended to have the following distinguishing characteristics: (a) married, (b) female, (c) non-black, (d) lower family SES, (e) lower math ability scores, (f) lower high school grades, (g) more semesters of participation in high school vocational courses, (h) more work experience while in high school, (i) lower educational plans, (j) lower occupational aspirations, and (k) expected by significant others to work, to continue vocational education, and not to continue academic education.

Educational plan was found to be the most important predictor of six post high school activities, namely, work only, pursuing academic education in conjunction with other activities, only pursuing academic education, engaged in working or continuing vocational education in addition to other activities, only working or continuing vocational education, and the contrast of working versus continuing academic education. Race was the most important predictor of which graduates were working, unemployed, working and studying, and working and engaged in other activities or working only versus unemployment. Significant others' influences toward continuing vocational education was the most important in predicting the contrast of vocational versus academic education, and whether graduates would continue their vocational education. Marital status was the most important predictor of homemaking. And expectation of entering the military service was the most important in predicting activity military service.

Many activities appeared to have a low proportion of variation could be explained by the model. The findings of these activities should be interpreted with caution.

#### DISCUSSION AND CONCLUSION

Vocational education participation in public high school was found to be a weak predictor of post high school activ-

ities. In this study, the variable did not appear as a powerful predictor of any of the post high school activities. The discussion of the effects of participation in vocational education upon activities has been divided into three groups. The first group consists of activities upon which vocational education participation was found to have no effects at all. The second group consists of activities which vocational education participation seemed to have some effects upon, but when examined carefully, the effects were weak. Vocational education participation did have an effect upon the activities of the third group, although the effect was smaller than the effects associated with some other variables in the model.

As shown in Table 54 on page 149, participation in vocational education had no significant direct or indirect effects upon the post high school activities unemployment, homemaking, military service, and employability. This fact indicates that participation in vocational education does not increase or decrease the likelihood that public school graduates will be unemployed, homemakers, or in the military service. Similarly, having participated in vocational education in public high school does not increase or decrease the likelihood that a graduates would be working or unemployed.

In vocational types of activities such as work, vocational education, and vocational, two categories of the activity

variables were studied. One was a general or broad form of the activities such as work, vocational education, and vocational. Graduates involved in this form may also be involved in other activities. The other was a specific or narrow form of the activities such as work only, vocational education only, and vocational only. Graduates included in this form of the activity were not involved in other activities. In this study, the model explained the variations in the specific form of the activities much better than the general form of the activities. The  $R^2$  associated with these general forms of the vocational types of activities were less than .10, indicating that the findings concerning the variables work, vocational education, and vocational should be interpreted with caution. Vocational education participation happened to have significant direct and indirect effects upon the variables work, vocational education, and vocational, and only significant indirect effects upon the variables work only, vocational education only, and vocational only. In other words, participation in public high school vocational education does not directly affect students to be solely involved in any vocational type of post high school activity. Another activity, work and study, was also found to be only indirectly affected by vocational education participation. That means that participation in vocational education did not directly increase or decrease the likelihood that a public high school graduate would work and study at the same time.

Participation in vocational education was found to have its strongest effects upon academic education related activities, such as academic education itself, different education, and work vs. academic education. The activity academic education included two categories of the activity variable: continuing academic education in conjunction with other activities and continuing academic education only. The  $R^2$  associated with these two variables and the other two activities were over .20 and the direct and indirect effects of vocational education participation, though relatively smaller than many of the other independent variables, were significant in all cases. The effects of participation in vocational education were found to be negative. Thus as previous research has indicated, students who take vocational education in high school are less likely to pursue academic types of activities following graduation.

Table 54 on page 149 also shows the indirect effects of vocational education participation upon activities through each of the three possible paths, the path through occupational aspiration, the path through educational plan, and the path through educational plan then through marital status. It was found that except for the indirect effect upon the general form of vocational education, most of the indirect effects were through the path of educational plan. For the general form of vocational education, the path through occupational aspiration was as important as the path through ed-

ucational plan. Findings presented in Chapter IV clearly stated that vocational education participation always produced significant but negative direct effects upon educational plan and occupational aspiration. Thus public high school students who had more semesters in vocational courses have lower educational plans and occupational aspirations which will affect their post high school activities (except for those who become unemployed, homemakers, or in military service). What is not known as a result of this study however is whether those student chose to take vocational education because of lower educational or occupational aspirations or whether taking vocational education causes them to lower their aspirations.

This study has identified that vocational education participation was a significant factor in determining whether high school graduates would continue vocational or academic education if they aspired to more schooling and whether they went to work or to college following high school if they did not have other plans. It has also shown, although further investigation is needed, that participation in vocational education may affect vocational types of post high school activities. However, this study has not shown any effect of vocational education participation upon homemaking, military service, and unemployment related activities.

The model predicted academic education related activities best partially possibly because the model was originally de-

Table 54

Effects of Vocational Education Participation upon Activity Variables in Standardized form

Variables	Direct	Indirect	Indirect Effect			R <sup>2</sup>
	Effects	Effects	through each path			
	P	TI	( IO	IE	IEM )	
Work	.029*	.007**	( .0009	.0061	-.0000 )	.073
Work Only	.016	.013**	( .0023	.0104	.0003 )	.203
Academic Education	-.022*	-.020**	( -.0052	-.0139	-.0007 )	.399
Academic Education Only	-.033**	-.014**	( -.0030	-.0110	-.0004 )	.213
Vocational Education	.065**	.006**	( .0029	.0029	-.0003 )	.033
Vocational Education Only	.011	.003*	( .0004	.0027	-.0002 )	.025
Unemployment	-.001	.002	( .0009	.0012	-.0002 )	.039
Work and Study	.019	-.006**	( -.0012	-.0043	-.0004 )	.073
Vocational	.042**	.008**	( .0012	.0071	-.0001 )	.087
Vocational Only	.020	.014**	( .0024	.0112	.0003 )	.224
Homemaking	.005	.002	( -.0002	.0002	.0017 )	.129
Military Service	-.004	-.003	( -.0034	.0003	.0002 )	.143
Different Education	.051**	.023**	( .0076	.0154	.0001 )	.222
Employability (a)	.003	.000	( -.0008	.0011	.0001 )	.052
Employability (b)	.008	.004	( -.0002	.0046	.0000 )	.070
Work vs. Academic Education	.026*	.025**	( .0049	.0192	.0009 )	.451

Note. TI = IO + IE + IEM where IO: effect through path occupational aspiration, IE: effect through path educational plan, and IEM: effect through path educational plan and marital status.

\*  $p < .05$ . \*\*  $p < .01$ .

signed for the investigation of educational types of outcomes. Another reason might be that the education system in the United States is intended to allow more schooling following high school graduation, so serious career choices can be postponed.

As to the fact that participation in vocational education was found to have weak effects upon vocational type of activities and no effects upon unemployment related activities, the best judgement would be that the complicated economic situation nowadays has blurred the links between public school vocational training and its designated outcomes.

Finally, as mentioned in the beginning Chapters, vocational education in the United States has never been unified nor been aimed on a simple purpose; the programs vary, the settings vary, and the clientele served vary. This fact is especially true in the public school system. With this in mind, the mixed results of this study seem more understandable.

### RECOMMENDATIONS

Based on the study, the following recommendations are made:

1. Further research needs to be done to determine the reasons why vocational education participation does not affect certain types of vocational activities. A better

understanding of the true relationship between vocational education and military service or homemaking, and how vocational education can be of benefit to those engaged in these activities would be helpful.

2. The study has shown some evidence that a causal model with dichotomies dependent variables is workable, further applications toward different research problems and a search for theoretical bases to expand the model are necessary to substantiate the findings of this study.

3. Since much previous research discovered that the long term effects of vocational education may be very much different from the immediate effects, the proposed models should be expanded for long term purposes to complete the whole picture of the effects of participation in vocational education.

4. If possible, the study should be replicated using data collected solely for the purposes this type of study to assure true causal relations and avoid uncontrolled defects in the data.

5. Vocational education viewed in a smaller scope, such as state or local, may have more similar programs, settings, and purposes. If this is true, the effects of vocational education participation should then be stronger upon post high school activities. It is recommended that the model be applied to data collected from state or local samples.

6. Path analysis should be adopted more often as a useful tool for the complicated social science studies. Using the GEMINI program for recursive models make it practical to investigate larger and more complicated models which may more accurately describe reality.

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