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A COMPARATIVE ANALYSIS OF THE ACHIEVEMENT AND TRAINING
SUCCESS OF HIGH SCHOOL DROPOUTS

A DISSERTATION
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degree of
DOCTOR OF EDUCATION

BY
TOMMY LEE ROBERTS
Norman, Oklahoma

1965

A COMPARATIVE ANALYSIS OF THE ACHIEVEMENT AND TRAINING
SUCCESS OF HIGH SCHOOL DROPOUTS

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A COMPARATIVE ANALYSIS OF THE ACHIEVEMENT AND TRAINING SUCCESS OF HIGH SCHOOL DROPOUTS

CHAPTER I

INTRODUCTION

The problem of the high school dropout has been with us since the beginning of American schools. Our nation continues to record increased numbers of boys and girls who drop out of school prior to graduation, even though our schools are today educating a higher percentage of all the nation's youth than at any other point in our history.

During the 1960's over seven million youngsters, most of them capable of finishing high school, will probably leave before earning their diplomas. Each of these dropouts will undoubtedly contribute to one of the most alarming problems of the United States economy--the growth of the unskilled, underemployed, and unemployable. These young people without complete high school training will undoubtedly lack the basic education needed to learn specialized trades in today's and tomorrow's world.

"The present national high school dropout rate is about 35 per cent. Fourteen years ago it was more than 50

per cent; and in 1950, only thirteen years ago, for the first time in American educational history, more students graduated from high school than dropped out."¹ Even though the percentages are obviously on the decrease, an exploding population has resulted in increased numbers of students who drop out.

Population increases, automation, and increased migration have resulted in trends toward fewer employment opportunities for unskilled workers. With increased numbers of unemployed people have come tremendous social repercussions resulting in increased crime rates and moral decay that are national in scope. This national problem poses its severest threat at the local level--placing heavy burdens on individual communities. In fact, the problem has mushroomed to such extensive bounds in terms of increased numbers during the past decade that it is now difficult to attach the proper degree of urgency and need for action.

These young people who are out of school and not regularly employed are a potential source of trouble--to themselves and to their community. Practically all of their support must come from local taxation, and dropouts are usually unemployed more than twice as often as high school graduates. When unemployment does occur, it is usually for extended lengths of time. This unemployment poses a serious

¹American Personnel and Guidance Association, Guidance and the School Dropout (Washington, D. C.: National Education Association, 1964), p. 3.

economic problem to the local community. There is seemingly no doubt that a community without an expanding supply of well-educated manpower is in serious economic danger. The extent of this danger is determined largely in terms of what action the local citizenry is willing to take.

When one observes the tremendous social powder keg that is building up in the metropolitan and heavily industrialized areas, it becomes obvious that action must be taken. This action must be started and implemented at the local level, for it is here that the needs are the greatest. New and better educational programs must be developed because of the trends in employment opportunities toward fewer and fewer completely unskilled workers, the failure of many of the nation's youth to pass entrance requirements for the armed services, and the demands of industry and business for the high school diploma as a prerequisite for employment.

The improvement of the physical facilities, curriculum, and the mere identification of dropout characteristics by the local schools will not be enough. Progressive action in terms of programmatic research, public concern, and general financial support is a must at the local level if changes are to be expected in this national dilemma.

We must focus our attention upon a multitude of factors, such as cultural background, aspiration, home experiences, socio-economic status, aptitudes, racial barriers, mobility, and any other factors which tend to influence

achievement and training success or the holding power of our public high schools. Through a planned program of research, we must formulate and develop new educational programs which are designed to better meet the needs of the potential dropout in hopes of averting the burden that extensive retraining programs will place on our people.

In 1963, one of the new federally-supported programs was started at Central High School in Oklahoma City, Oklahoma. Under the auspices of the Manpower Development Training Act, an effort was made to train a group of students identified as high school dropouts. Through the joint efforts of local, state, and federal agencies, an attempt was made to construct an accelerated, nongraded, team taught, vocational, and academic curriculum designed to aid returning dropouts in securing a salable skill or trade while completing the requirements for high school graduation. These agencies--Oklahoma Employment Security Commission, Oklahoma State Board for Vocational Education, and the Oklahoma City Public Schools--attempted to recapture 205 of these types of students and place them in this specially designed program for training.

The Problem and Hypotheses

Because of the urgent need for a new and better educational program to meet the needs of potential high school dropouts in the greater Oklahoma City metropolitan area and to determine if the new methods, techniques, approaches, and

courses of study used in the Manpower Program were successfully getting the job done in terms of achievement and holding power, the writer investigated the problem: To what extent will high school dropouts differ in terms of academic and vocational class achievement and training success in the Manpower Development Training Program at Central High School when cultural background, home background, mobility, sex, age, and race are statistically controlled? To what extent will the proportions of dropouts completing the program differ from re-dropouts in terms of the previously stated variables?

Four general null hypotheses were formulated to investigate academic and vocational achievement, training success, and the re-dropout rate. These null hypotheses were:

Ho₁: There is no significant difference in the proportions of re-dropouts as compared to those completing the program when compared on the basis of cultural background, home background, mobility, sex, age, and race.

Ho₂: There is no significant difference in the proportions of rural and nonrural students rated successful in training as compared to those rated unsuccessful.

Ho₃: There is no significant difference in the academic achievement of high school dropouts in the Manpower Development Training Program at Central High School as measured by the Sequential Tests of Educational Progress post-test scores when S T E P pretest scores, aptitude, cultural

background, home background, mobility, sex, age, and race are statistically controlled.

Ho4: There is no significant difference in the vocational achievement of high school dropouts in the Manpower Development Training Program at Central High School when cultural background, home background, mobility, age, and race are statistically controlled.

Operational Definitions

Definitions pertaining to the following terms seemed both necessary and practical:

1. Rural Background--as used in this study, means that more than 50 per cent of the subject's life prior to dropping out of school was spent in highly rural areas, including small rural communities under 2500 population.
2. Nonrural Background--refers to a student's background in which more than 50 per cent of the student's life was spent in urbanized areas that exceed 2500 population.
3. Academic Achievement--shall mean the achievement as measured by the Sequential Tests of Educational Progress.
4. Vocational Achievement--shall refer to the achievement as measured by standardized tests in each of the vocational areas.
5. Training Success--as used in this study, means

that degree of over-all success in the Manpower Training Program academically, vocationally, and socially, as evaluated by teachers.

6. Mobility--shall refer to the number of moves a subject has made, both within and across the cultural areas.
7. Re-dropouts--as used in this study, refers to those students who enrolled in the Manpower Training Program, took all pretests, and dropped out prior to completion of the program.
8. Aptitude--will refer to the "G" score on the General Aptitude Test Battery, Form B-1002 (which measures nine different aptitudes) as administered by the Oklahoma Employment Security Commission.
9. Abbreviations
 - a) G A T B General Aptitude Test Battery
 - b) M D T A Manpower Development Training Act
 - c) O E S C Oklahoma Employment Security Commission
 - d) S T E P Sequential Tests of Educational Progress
10. Terms Used Synonymously--M D T A trainees, subjects, participants, students, and dropouts.

Research Design and Procedures

A brief description of the population, test administration, and the data collection procedures is presented to

provide the reader with an overview of the general design of the study.

The population included 168 individuals who met the initial criteria of selection as determined by the O E S C and who took all or part of the S T E P, Form 3-B, during first administration. These 168 subjects made up the active student body of the Manpower Development Training Program.

Administration of the measuring instruments was carried out in the following order:

1. Administration of the G A T B was made to each of the 168 subjects upon entry into the program by O E S C.

2. The S T E P, Form 3-B, was administered during October, 1963, to 168 subjects who made up the entire active population.

3. During March, 1964, structured interviews were made with 94 active students, who remained to complete the entire program, and 48 of 74 who re-dropped out prior to completion.

4. Teachers' Checklists for evaluating student training success were completed during the month of May, 1964.

5. During the month of May, 1964, the second administration of the S T E P was made to 94 subjects who completed the program.

6. Administration of vocational measuring instruments was made during the first week of June, 1964.

The administration of all measuring instruments was made in well lighted and ventilated rooms under excellent

conditions. Trained proctors were used during all testing periods.

Following the administration of each separate instrument, all results were then recorded on individual accumulative data sheets. After all instruments were completed, the results were checked to verify complete data collection. Upon verification of completion of the collection of data, all results were then transferred to IBM cards and made ready for statistical computation.

Treatment of the Data

The chi-square test of significance was used to compare the proportions of subjects completing the program and those who re-dropped. This test was used to compare the subgroups on each of the independent variables. The same test was also used to determine if significant differences existed in the proportions of students rated successful and those rated unsuccessful by five instructors.

The Mann-Whitney U Test described by Barnes² was used to determine if differences existed in terms of aptitudes between subjects who re-dropped and were interviewed and those subjects who re-dropped but were not interviewed.

The primary statistical technique used to analyze the data in connection with academic achievement was the

²Fred P. Barnes, Practical Research Processes (Springfield: Illinois Curriculum Program, Office of the Superintendent of Public Instruction, 1958), pp. 87-90.

single classification analysis of covariance described by Wert, Neidt, and Ahmann.³ Typically, this technique provides tests of significance for stratified comparison groups where there is need to simultaneously include measurements other than the criterion in the tests of significance.

The Mann-Whitney U Test described by Seigel⁴ was used to provide tests of significance with regard to vocational achievement. This technique differed from the one described by Barnes only in terms of the correction for tie ranks and the computation of z values. This same technique was used to test whether the subgroups for each of the independent variables had been drawn from the same population.

Delimitations of the Study

1. The study included all the students enrolled in the Manpower Development Training Program at Central High School during the 1963-64 school year who maintained active attendance beyond the administration of pretests.

2. The identification of cultural background was limited to those students classified as rural or nonrural in origin.

³James E. Wert, Charles D. Neidt, and Stanley J. Ahmann, Statistical Methods in Education and Psychological Research (New York: Appleton-Century-Crofts, Inc., 1954), pp. 343-63.

⁴Sidney Seigel, Nonparametric Statistics for the Behavioral Sciences (New York: McGraw-Hill Book Co., Inc., 1956), pp. 116-27.

3. Home background, as used in this study, was limited to experiences with regard to parental marriage stability within the home. Students who came from homes where the parents had divorced were classified as coming from unstable homes, while students who came from homes where the parents had never divorced were classified as coming from stable homes.

4. The rate of mobility included only two classifications. The student who had experienced five or fewer moves from one cultural area to another or within area moves that necessitated school transfers was classified nonmobile. The student who had experienced more than five moves was classified as mobile.

5. Data on re-dropouts included only that which could be secured through pretesting and reasonably secured through follow-up interviews with students who lived within the Oklahoma City metropolitan area.

6. The study was limited in scope to the investigation of only those variables specifically mentioned in the statement of the problem.

CHAPTER II

REVIEW OF SELECTED RELATED LITERATURE

During the past sixty years, particularly in recent years, much research related to the present study has been done. During this period of rapid technological change one of the most important issues of education--that of finding ways to meet the needs of the youth so they will develop the desire and be encouraged to complete high school--has become the object of great national concern. Educational literature is replete with studies concerned with pupil elimination, holding power, and the identification of the causes of dropping out of school prior to graduation.

On the basis of these studies, a tentative general theory postulated is that a relationship exists between the cultural and home background, mobility, age, sex, and race of high school dropouts and their academic-vocational achievement, as well as their over-all training success in high school. From this theory is generated the problem in this study: To what extent will high school dropouts differ in terms of academic and vocational achievement and training success in the Manpower Training Program at Central High School when the above mentioned variables are statistically

controlled? To what extent will the proportions of dropouts completing the program differ from re-dropouts in terms of the previously stated variables?

Among the many early research projects, there was a notable lack of studies in which these types of students were investigated in terms of achievement while under the influence of special training programs. Most of the earliest studies dealt with the extent of the dropout problem. However, more recently there has been a trend toward the identification of the characteristics of potential dropouts and the causes of dropping out of school prior to graduation. Another recent trend has been toward state- and federally-sponsored projects which are very broad in scope.

An attempt to review all of the investigations related to this study would be impractical and serve little purpose. Many of the studies are overlapping and repetitious in their findings. For these reasons, this review will be selective in nature, and will feature only those studies that seem to be most comprehensive and pertinent to the present investigation.

To cope with the wide diversity of approaches employed and to help synthesize the vast array of findings, the writer classified the various pertinent studies into four categories. These categories include: (1) Literature Showing National Concern, (2) Related Survey Studies, (3) Related Experimental Studies, and (4) The Case Study.

It is hoped that reviewing the literature in accordance with the above order will result in better coherence and unity in the report. Categorizing the selected related literature should also result in better material organization and more complete coverage of pertinent studies.

Literature Showing National Concern

The school dropout--the individual who does not complete a high school education--has in recent years become the object of great national concern. This concern is a result of the serious economic problems that have been produced by the approximate one-third of American youth who drop out of school prior to graduation. Many unskilled jobs that were once available have been taken by older workers who have been displaced as a result of new technology. The jobs presently being created by technological changes require higher levels of intellectual, vocational, and personal competence than most dropouts have to offer. According to Wolfbein, "the most recent data show that for 1961, the unemployment rate among new high school dropouts was 27 per cent, more than five times that of the national average."¹ This situation is further summarized by Daniel Schreiber's 1962 statement:

Almost one million lost, bewildered, defeated, hopeless young men and women will leave our nation's schools this year before graduating from them. Although ill prepared and inadequately educated, many.

¹Seymour L. Wolfbein, "Expertness in Preparing Youth for Employment: The Need," California Journal of Secondary Education, XXXVIII (1963), 106-09.

will seek to enter the adult world. They will knock on the doors of employment offices, file applications, be interviewed, and then fifty per cent will be turned away.²

In the past decade numerous high-ranking government officials, leading educators, and leaders in industry have called attention to the magnitude of this problem which obviously crosscuts the nation's entire social and geographical structure. United States Senator Hubert Humphrey recently stated: "What matters is that there is this problem, that it is growing, and that it dangerously infects every area of our society and economy."³

Daniel Schreiber, the Director of the NEA Project on School Dropouts, has referred to early school leaving as a "criminal waste of human abilities and talents."⁴ Unemployed dropouts in our great city slum areas have been described by Conant, in his now famous phrase, as "social dynamite".⁵

The National Education Association considered the dropout situation so important that in September, 1961, the NEA Project on School Dropouts was established under a Ford Foundation Grant. It was planned to run for three years and

²Daniel Schreiber, "The School Dropout--Fugitive from Failure," Bulletin of the National Association of Secondary School Principals (May, 1963), p. 46.

³Hubert H. Humphrey, quoted in Daniel Schreiber, "School Dropouts," NEA Journal, LI (May, 1962), 51.

⁴Daniel Schreiber, "School Dropouts," NEA Journal, LI (May, 1962), 52.

⁵James B. Conant, Slums and Suburbs (New York: McGraw-Hill Book Co., Inc., 1961), p. 2.

to provide consultant, clearing house, and recommendation services to state and private agencies and groups. Through this project, an attempt was made to encourage the development of school programs which would decrease the number of dropouts, and would also provide for the large number of young people who drop out of school annually.

In 1962, the Educational Policies Commission described the changes in America which have resulted in the acceleration of this educational dilemma.

Today the United States, like the rest of the world, is remaking itself. It has changed radically before--when the Republic was founded, when the West was claimed, and when the agrarian-commercial society was urbanized and industrialized. Today, as the technological revolution continues to transform America, the prerequisites for a constructive and independent life are constantly raised. Among Americans of all backgrounds there are individuals who do not rise to the challenge. This inadaptability is most widespread in those areas of the United States that are technologically least developed, and most conspicuous among those who migrate from such areas to the cities.⁶

According to the 1960 census reports, 61.3 per cent of the nation's population lives in the 189 standard metropolitan areas. From 1950 to 1960, more than 80 per cent of the total population increment took place in these areas. In the United States during the calendar year of 1961, there were an estimated 1,926,070 cases of murder, forcible rape, robbery, aggravated assault, burglary, larceny, and auto

⁶Educational Policies Commission, Education and the Disadvantaged American (Washington, D. C.: National Education Association, 1962), p. 5.

theft. These crimes accounted for four serious law violations per minute, and represented an estimated 10 per cent increase when compared with the averages for 1958, 1959, and 1960. While the national population increased 7 per cent during 1958 to 1963, crime was increasing 34 per cent. "It is the depressed urban areas that the web of social problems is thickest; crime, alcoholism, drug addiction, poverty, illiteracy, disease, unemployment, and broken families are found in city slums in massively greater degree than in society as a whole."⁷ According to Passow:

Typically, the depressed area population tends to be a stratified group of predominantly unskilled or semi-skilled workers, largely immigrant, who have moved to the city from a rural region. The ethnic and social composition tends to be primarily from the so-called minority groups--Southern Negro, Puerto Rican, Appalachian White, American Indian, Mexican, and most recently Cuban.⁸

The Educational Policies Commission describes in further detail the conditions under which these people live, thus leaving little, if any, room to doubt the urgency of the problem.

In this migration the tragic inadequacy of old cultures for new needs continues to exact its toll. In the cities as on the farm, jobs are decreasing for the unskilled, and the immigrants are less able than are better educated persons to be trained for skilled positions. They have little of the understanding required of wise consumers. Often they

⁷Office of Education, The Impact of Urbanization on Education (Washington, D. C.: Government Printing Office, 1962), p. 6.

⁸A. Harry Passow, Education in Depressed Areas (New York: Teachers College, Columbia University, 1963), p. 1.

and their children reject schooling. Inferior and overpriced housing further handicaps their health, education, and ability to support themselves. By misuse of property, they may further impair their living conditions. Their residential concentration multiplies their problems and retards the learning of new ways. Mistrust of government and civic apathy compounds the difficulties of many. Poverty and disease continue to plague them; delinquency and crime rates rise; and the society at large appears remote and uninterested.⁹

Probably the greatest single indication of national concern for this educational dilemma was the passage of the Economic Opportunity Act by Congress. On August 20, 1964, President Johnson signed this Act into law.

Under the auspices of the President's Task Force on the War Against Poverty, the American Association of School Administrators has appealed to colleges and universities throughout the nation for personnel to staff the Job Corps--one of the major provisions of the Act. The Job Corps is one of several programs designed to serve the types of youth included in the present investigation. Within the Job Corps, Conservation Camps and Training Centers, established throughout the country, anticipated enrolling 40,000 volunteers during the first year of operation, and 100,000 by the end of the second year. These volunteers will be men and women between 16 (state compulsory age limits) and 21 years of age who have not completed high school and have not found satisfactory employment. It is anticipated that these participants

⁹Educational Policies Commission, loc. cit.

will come from both urban and rural backgrounds and will represent all racial and ethnic groups.

Related Survey Studies

The central problem of the current study deals with achievement and training success in terms of aptitudes, cultural background, home background, mobility, sex, age, and race. Even though only indirectly related, a brief review of some of the earlier studies seems warranted. Many of these studies were primarily concerned with the extent of the drop-out problem, economic factors, attendance, and retention rates. Others were concerned with occupations of parents, advantages in the home, family size, parent attitudes, race, and a host of other factors.

Some of these early studies, dating back to 1907, were concerned primarily with the extent of the problem. In 1907, Thorndike made a study that recognized the effects of population increases, mortality, patronage of non-public schools, and non-promotion as factors affecting enrollment in successive grades. He found that for every 100 students entering the first grade during the period 1900 to 1904, only 27 continued until the first year of senior high school and only 8 continued until the twelfth grade.¹⁰

In 1909, Ayres found that only 19 per cent of the first graders ultimately entered the ninth grade and that

¹⁰Edward L. Thorndike, Elimination of Pupils from School, Bureau of Education Bulletin No. 4 (Washington, D. C.: Government Printing Office, 1907), pp. 9-11.

only 5.6 per cent entered the twelfth grade.¹¹ Strayer found that only 39 of each 100 pupils entering the first grade entered the ninth grade, with only 14 remaining to enter grade twelve.¹²

In 1924, Phillips made a study and found that 34 per cent of school starters entered high school, but only 15 per cent continued until the last year of high school.¹³ Thus, on the basis of these early studies, it would seem fairly obvious that the holding power in the public high schools did not exemplify something to be desired. However, in 1936, Foster made a study and revealed an increase in the twelfth grade of approximately 92 per cent from 1926 to 1936. He showed about 74 per cent of the students continuing from grade one to nine, and about 42 per cent of them entering grade twelve.¹⁴ Although Foster did not expound the reasons for increased retention rates, it seems rather obvious that forces associated with the economic depression during this

¹¹Leonard P. Ayres, Laggards in Our Schools (New York: Charities Publishing Company, 1909), pp. 12-15.

¹²George D. Strayer, Age and Grade Census of Schools and Colleges: A Study of Retardation and Elimination, Bureau of Education Bulletin No. 5 (Washington, D. C.: Government Printing Office, 1911), pp. 135-37.

¹³Frank M. Phillips, cited in Stanley E. Hecker, Early School Leavers in Kentucky, Bulletin of the Bureau of School Service, XXV, No. 4 (Lexington: University of Kentucky, 1953), 23.

¹⁴E. M. Foster, "School Survival Rates," School Life, XXII (September, 1936), 13-14.

period of our history influenced students to remain in school for longer periods of time.

This trend toward increased holding power has continued to the present time. In fact, the retention rate from the fifth grade through high school has more than doubled during the past thirty years. On the basis of a recent study by Grant,¹⁵ the United States Office of Education disclosed that for every 100 students that entered the fifth grade in 1954, 92 of them entered the ninth grade and 63 of them completed high school in 1962.

During the past fifteen years many studies have been published that deal more directly with some of the variables included in the present investigation. The findings in many are conflicting, however, thus leading one to believe that additional research is needed in the general area. Some good examples of studies that show different findings are those of Lanier in 1948, Gragg and Hollingshead in 1949, Seymour in 1950, Sonstegard in 1952, and Snapp in 1956. Lanier, Gragg, Hollingshead, and Snapp showed significantly greater percentages of dropouts than graduates coming from broken homes, whereas Seymour and Sonstegard both reported these differences as nonsignificant.

Lanier's study involved 135 high school dropouts. He showed 45 per cent of them as coming from broken homes. He

¹⁵W. Vance Grant, "Holding Power of U. S. Schools Rises," School Life, XLV (November-December, 1962), 35.

indicated that only 28 per cent of the in-school students fell into this category. The difference was found significant at the .05 level of confidence.¹⁶

In three other studies similar findings were apparent when compared to those disclosed by Lanier. In two of these investigations, made by Gragg¹⁷ and Hollingshead,¹⁸ it was reported that significant relationships existed between broken homes and those students dropping out prior to graduation. Even as recently as 1956, Snapp discovered in his study that a significant relationship exists between home stability and early school leaving. In this study it was found that 24 per cent of the homes had been broken by divorce or the death of one parent.¹⁹

Even though there is some agreement in the findings just cited, it should be noted that several other studies contain different conclusions. Seymour reported in 1950 that 20 per cent of the dropouts and 14 per cent of the graduates were from broken homes. He also disclosed that the difference

¹⁶J. Armand Lanier, "A Guidance-Faculty Study of Student Withdrawals," Journal of Educational Research, XLIII (December, 1950), 664-66.

¹⁷William L. Gragg, "Some Factors Which Distinguish Dropouts from High School Graduates," Occupations, XXVII (April, 1949), 457-59.

¹⁸August B. Hollingshead, Elmtown's Youth (New York: John Wiley and Sons, 1949).

¹⁹Daniel W. Snapp, "Can We Salvage the Dropouts?" The Clearing House, XXXI (September, 1956), 51.

was not significant.²⁰ Sonstegard seemingly was in agreement with Seymour in his study made in 1952. He found that 23 per cent of the dropouts were from broken homes and that 20 per cent of his control group, made up of high school graduates, were also from homes of this type. The difference was found nonsignificant.²¹

Even though the findings differed in regard to home background and parental marriage stability, it should be noted that in all these studies differences did exist. These differences, even though in some instances not great enough to be considered statistically significant, lend support to the advisability of additional research in this area.

Numerous other studies, primarily survey type, have been made during the twentieth century. One of the earliest important state-wide studies of this type was made in Kentucky. Under the auspices of the Kentucky Association of Colleges, Secondary, and Elementary Schools and direction of Stanley E. Hecker, a random stratified sample of 1,381 dropouts was used to secure information concerning dropouts from the secondary schools in all sections of Kentucky.

It was revealed through an analysis of the data in this study that (1) 60 per cent of the dropouts studied had

²⁰Carleton H. Seymour, "The Characteristics of Pupils Who Leave School Early" (unpublished Doctoral dissertation, Harvard University, 1950).

²¹Manford A. Sonstegard, "A Study of Graduates and Dropouts of the Cedar Falls, Iowa, Secondary Schools" (unpublished Doctoral dissertation, Northwestern University, 1952).

repeated one or more grades in school; (2) 75 per cent of the grade repetitions had occurred during elementary school; (3) 46 per cent left school before age 16; (4) 27 per cent quit school while enrolled in the tenth grade; (5) 22 per cent quit while enrolled in the ninth grade; (6) 20 per cent withdrew after they had entered the eleventh grade; (7) 62 per cent of those who dropped out had not participated in extracurricular activities; (8) 73 per cent of the early school leavers possessed I. Q.'s above 85, 40 per cent above 95, 17 per cent above 105, and 6 per cent above 114; (9) 57 per cent of those whose I. Q. scores were below 85 dropped out before enrolling in the tenth grade; (10) 55 per cent of all dropouts in Kentucky were boys; (11) 78 per cent of the dropouts lived with both parents; (12) 20 per cent of them lived with one parent or another relative; (13) approximately two-thirds of the dropouts lacked skill in tool subjects, lacked initiative, had poor study habits, and were not interested in school; (14) there was a general decline in scholastic achievement of dropouts as they progressed from the elementary grades to senior high school; and (15) 75 per cent of the dropouts had conferred with no member of the school faculty prior to quitting school.²²

A number of characteristics common to high school dropouts have been identified in previous investigations. The

²²Stanley E. Hecker, Early School Leavers in Kentucky, Bulletin of the Bureau of School Service, XXV, No. 4 (Lexington, Kentucky: University of Kentucky, 1953).

literature lends support to the belief that many of these young people come from broken homes, low income families, and have been moved around from area to area on numerous occasions, possess feelings of not belonging, and are retarded both socially and culturally.

In a comprehensive study that was made in seventy secondary schools variously located in the principal regions of Illinois outside of Chicago, it was found that 72 per cent of all youth who dropped out of high school came from families who were low on the income scale.²³ Young found 84 per cent of a group that he studied to come from families of low income.²⁴ Brewer found the largest group of dropouts coming from the section of the city characterized by low income families, substandard housing, and mixed nationalities.²⁵

Snepp found that the scholastic aptitude of those who left school was below the average of students in high school as measured by the Otis Test of Mental Ability.²⁶ Through other dropout studies it has been found that pupils are low in scholastic aptitude; however, there is considerable variance in the extent of the difference found to exist between

²³Harold C. Hand, "Do School Costs Drive Out the Youth of the Poor?" Progressive Education, XXVIII (January, 1951), 89-93.

²⁴Joe M. Young, "Lost, Strayed, or Stolen," The Clearing House, XXIX (October, 1954), 89-92.

²⁵Weldon Brewer, "Why Did They Quit?" Education Digest, XV (September, 1949), 30-31.

²⁶Snepp, op. cit., pp. 49-64.

dropouts and high school graduates. McGee found that most dropouts are failing at the time of leaving school and possess I. Q.'s ranging from 65 to 95.²⁷ Cantoni found very little, if any, difference existing between the I. Q.'s of dropouts and graduates as measured by the Kuhlman-Anderson Intelligence Test.²⁸ Because of the obvious conflicting findings in many of these studies, it would seem that additional research in terms of aptitudes and intelligence is needed. However, regardless of the conflicts in the findings of these studies, there is much evidence to support the views of Huhlen in his statement: "Clearly, many of those who drop out of school have the intellectual capacity to profit from the high school educational program."²⁹

One of the best general survey type studies was conducted by the State Department of Education in Maryland in 1960-61. This study was made to determine the reasons for students dropping out of school and to identify some of the characteristics of these students in the hope of finding ways to prevent dropouts. In this investigation it was found that (1) four out of every five dropouts were living with their parents; (2) 72 per cent of the dropouts' parents were

²⁷George A. McGee, "We Increased Our Holding Power," NEA Journal, XLII (November, 1953), 482.

²⁸Louis J. Cantoni, "Stay-Ins Get Better Jobs," Personnel and Guidance Journal, XXXIII (May, 1955), 351-53.

²⁹Raymond G. Huhlen, The Psychology of Adolescent Development (New York: Harper & Brothers, 1952), p. 464.

living together at the time of their dropping out; (3) 50 per cent had abilities average or above; (4) 55 per cent of the dropouts were boys; and (5) 56.5 per cent were under-achievers.³⁰

The findings in this study were similar to those in the Kentucky study. Substantially, the same results have been reported in other studies involving Michigan, Ohio, Indiana, and New York. For example, Dillon found that boys made up 54 per cent of the dropouts in his study concerning dropouts in Michigan, Ohio, and Indiana.³¹ Echert and Marshall found that boys exceeded the girls by as much as 10 per cent in terms of school drops,³² and Nachman, Getson, and Odgers reported that 51 per cent of the dropouts in Ohio had I. Q.'s of 90 or more.³³

Seemingly, it makes no difference what investigation is referred to because in a majority of the studies the findings are similar. It seems that the dropouts included in many of these studies possessed a multitude of similar

³⁰Maryland State Department of Education, Our Dropouts: The Maryland Cooperative Study of Dropouts (Baltimore: The Department, 1963).

³¹Harold J. Dillon, Early School Leavers: A Major Educational Problem (New York: National Child Labor Committee, 1949), p. 26.

³²Ruth E. Echert and Thomas O. Marshall, When Youth Leave School (New York: McGraw-Hill Book Co., Inc., 1938), p. 52.

³³Leonard R. Nachman, Russell F. Getson, and John G. Odgers, Pilot Study of Ohio High School Dropouts, 1961-62 (Columbus: State Department of Education, 1963).

characteristics. Included among these were (1) broken homes; (2) mobile families; (3) low to average aptitudes; (4) more usually male than female; (5) low socio-economic background; (6) underachievers; (7) records of grade repetitions; and (8) lacked initiative, interest, and good study habits.

Related Experimental Studies

In recent years several experimental and "action type" investigations concerned with various aspects of the dropout problem have been made. Among the first of these studies was one that involved a comparison of non-withdrawing students with dropouts. This study, made by Cook in 1953, was completed at the University of Georgia in the form of a doctoral dissertation.³⁴

In the process of this investigation, a battery of standardized tests was administered to students who remained in school and to those dropouts who were willing to remain in school the additional time required for test completion. The instruments used included: (1) Bell Adjustment Inventory; (2) Bell School Adjustment Inventory; (3) California Short Form Test of Mental Maturity; (4) Science Research Associates Youth Inventory; and (5) Sims Social Class Identification Occupational Rating Scale. Other information items included sex, age, family, number of schools attended, amount

³⁴Edward S. Cook, Jr., "An Analysis of Factors Related to Withdrawal from High School Prior to Graduation," Journal of Educational Research, L (November, 1956), 191-96.

of educational retardation, average grades, average number of days absent per year, number of courses failing, activity participation, and for dropouts the stated reason for dropping out.

The data for each individual were consolidated, and the means for the dropout group and the non-dropout group were compared. Differences between the two groups were indicated by the differences in the mean scores and, where appropriate, by biserial correlation. Cook revealed in his findings that (1) significant differences existed between the dropout and non-dropout groups in terms of age for grade level, number of high school transfers, educational achievement, scholastic marks, attendance records, intelligence quotients, and personal adjustment toward school, home, and family; (2) the dropout group was older for grade level; (3) the dropout had attended a greater number of high schools; and (4) the dropout group ranked lower in educational achievement and scholastic marks, had poorer attendance records, lower intelligence quotients, and were less well-adjusted toward school, home, and family.

In another study made by Roessel in 1953, a comparison was made between dropouts and graduates on such factors as intelligence quotients, honor point averages, number of children in family, number of repeated grades, and personality characteristics as measured by the Minnesota Multiphasic Personality Inventory.

On the basis of evidence revealed by Roessel's analysis, dropouts were characterized in contrast to high school graduates. It was pointed out that the dropout tends to be more in search of sympathy, lower in morale, lacking in self-confidence, more psychologically immature, more rebellious, and more likely to ignore authority. The study further revealed that the dropout tends to be more sensitive, suffer more from delusions of persecution, have more compulsive behavior and unreasonable fears, and have a greater tendency toward a split personality.

According to the findings in this study, the dropout has more of a tendency toward overproductivity in thought and action, is one who has anti-social tendencies, and undertakes many things with a quick loss of interest. Roessel disclosed in his findings that significant differences existed between dropouts and high school graduates in (1) honor point averages, (2) intelligence quotients, and (3) number of children in the family. All comparisons showed higher grade point averages for the graduates, higher I. Q.'s for the graduates, and an average of one additional child per family among the dropouts.³⁵

The findings in this study were similar to Cook's findings in that both showed lower I. Q.'s and lower marks in school for dropouts. In another study that was made in

³⁵Fred P. Roessel, "Minnesota Multiphasic Inventory Results for High School Dropouts and Graduates" (unpublished Ph.D. dissertation, University of Minnesota, 1954).

1957 by Allen, similar findings were revealed. He compared dropouts with non-dropouts with respect to family-personal-school characteristics and opinions regarding school. The participants in this study included all of the students who dropped out in Oklahoma City during the 1954-55 school year. He also included a controlled phase which compared dropouts from grades nine and eleven with control groups of non-dropouts in the same grades.

From the findings in this study Allen revealed that (1) 44 per cent of the dropouts were not living with both parents; (2) mean I. Q.'s of the dropouts were 93.1 for boys, 96.9 for girls, and 94.2 for the entire group; (3) poor achievement, grades, and grade failure were prevalent among dropouts; and (4) the average number of schools that dropouts had attended was 3.7.

Allen compared the non-dropout group with the dropouts in the controlled phase of his investigation. By doing this, he found that dropouts had significantly poorer I. Q.'s, grades, and attendance records. He also found a significantly larger number of them coming from homes where both parents were not living together.³⁶ Although not completely experimental in design, this study makes a definite contribution in terms of dropout characteristics, and could well be described as "action research" with a semi-experimental design.

³⁶Deryle K. Allen, "A Study of Dropouts from the Public Secondary Schools of Oklahoma City for the Year 1954-1955," Dissertation Abstracts, XVII (August, 1957), 1703.

The Case Study

In 1954, under the auspices of the Scholarship and Guidance Association and with the financial support of the Wieboldt Foundation, a counseling agency of highly qualified members started an intensive casework study of dropouts.³⁷ This study, somewhat unique in its approach, undertook a study-in-depth about potential and actual dropouts, using casework procedures as the primary method of investigation and data collection.

The subjects studied consisted of 105 students who were intellectually capable of completing high school, but were considered to be potential dropouts by the public schools of Chicago, Illinois, and other social agencies in that city. Other selection criteria included a minimum age of 14.5 years, white racial origin, and middle-class background.

The research team in this project attempted to determine if relationships existed between emotional and familial problems at home, underachievement and behavioral problems at school, and dropping out of school. The primary hypothesis was that school problems generally and dropping out prior to graduation are often the results of emotional and personality disturbances in the student.

In design, the study was a systematic, clinical analysis in which social case histories were obtained through the

³⁷Solomon O. Lichter et al., The Dropouts (New York: The Free Press of Glencoe, 1962).

application of interviewing techniques. The data in this study were analyzed and 28 tables constructed to show the statistical evidence supporting relationships between the independent and dependent variables. The h index of order association and the p value, based on the chi-square distribution, were computed for each of the 28 tables.

The findings in this investigation, which were drawn from an analysis of a Treatment Group composed of 33 girls and 37 boys, include the following. The dropouts were found (1) to be heterogeneous in character; (2) to possess a wide array of individual differences; (3) to have had serious and multiple school problems; (4) to be underachievers and failing in course work; (5) to have records of poor attendance; (6) to be unable to adapt to school regulations; (7) to come from families where serious emotional problems existed; (8) to be unwilling to assume self-responsibility; (9) to possess indications of immaturity; and (10) to display signs of inhibition and rebellion.

In this study, no single factor could be isolated as the reason for students' dropping out prior to graduation. In fact, there was such a wide array of emotional disorders, environmental influences, socio-economic levels, attitudes, and problems in general displayed by the subjects in this study that the dropouts seemed to be a very heterogeneous group.

Summary

During the past sixty years the problem of the high school dropout has been the subject of numerous investigations. These studies--survey, experimental, and of the case study variety--have been directed toward finding the cause, extent, and identification of the characteristics of dropouts. As a result of these studies, some consistency has been found to exist with regard to the cause and extent of the problem, as well as the many characteristics that dropouts possess. From these studies has come a variety of agreements and disagreements on the part of educators, leaders in industry, and government officials as to why these young people drop and what should be done about the problem. Thus, special programs, financed by the federal government, have been initiated in various parts of the nation.

Up to the present time, very little research has been attempted in connection with special dropout programs. The Ford Foundation recently approved a grant to Oklahoma State University to carry on an extensive project in the M D T A Program in Oklahoma City. This investigation was made to serve as the pilot study for that project. It was hoped that, by taking several of the characteristics identified by previous studies and using them as controlled independent variables, pertinent findings might be found with reference to achievement in the classrooms of this special program.

Regardless of the existing overlap in the findings of previous investigations, each study made to date has made a definite contribution to the general knowledge available about dropouts. Seemingly, all previous investigations suggest that school dropouts and pupils who remain in school differ significantly in some aspect. This study is intended as another step in helping to develop educational programs that will help to meet the needs created by these individual differences.

CHAPTER III

THE MANPOWER DEVELOPMENT TRAINING PROGRAM

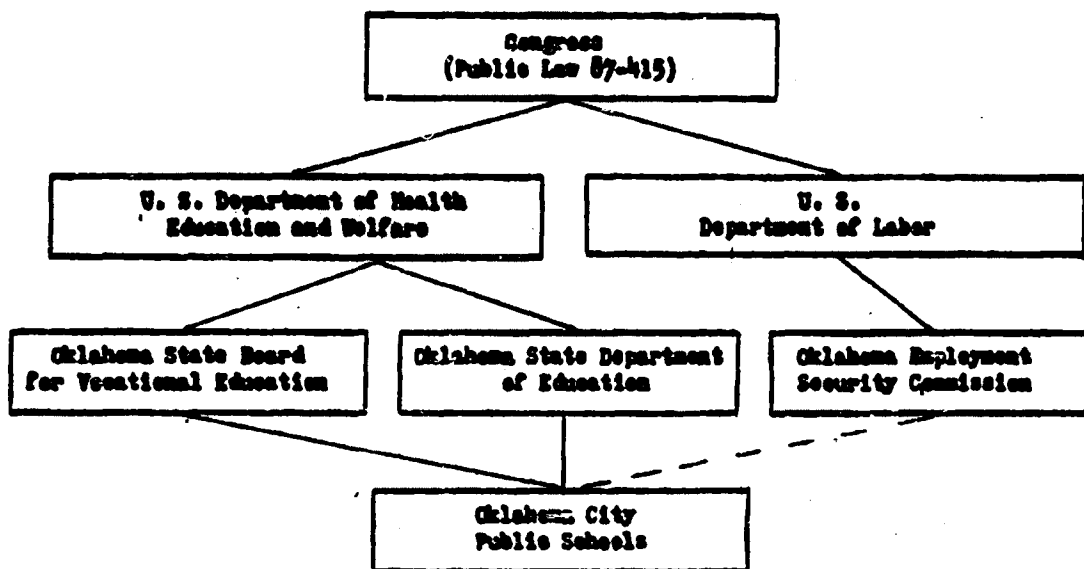
The Manpower Development Training Program at Central High School was an intensive effort to devise new and better methods and techniques of instruction and courses of study, which are tailored to the needs of high school dropouts. More specifically, it was an attempt to construct an accelerated, nongraded, team taught, vocational-academic curriculum designed to aid returning dropouts in securing a salable skill or trade, while simultaneously completing the requirements for high school graduation.

This effort was made through the joint efforts of state, local, and federal agencies and the hard work of a group of concerned, experimentally minded educators. The following description of this program is based upon information derived from staff committee meetings, as well as personal contact with the program. It reflects the organizational structure, objectives, curriculum, course content, and philosophy, as well as many of the problems dealt with in the course of implementation.

Organizational Structure

The program studied in this investigation included the utilization of both the services and cooperative efforts

of multiple governmental and community agencies. Agencies involved in the program included: (1) United States Department of Health, Education, and Welfare; (2) United States Department of Labor; (3) Oklahoma State Board for Vocational Education; (4) Oklahoma State Department of Education; (5) Oklahoma Employment Security Commission; and (6) Oklahoma City Public Schools. For the relationship of these agencies to one another, see Figure 1.



Authority _____

Cooperation - - -

Fig. 1 - External organizational structure of the Manpower Development Training Program.

Screening and selection of trainees was the responsibility of the Oklahoma Employment Security Commission as a result of prior agreements between the Oklahoma State Board for Vocational Education, Oklahoma City Public Schools, and O E S C. Upon selection, participants were sent to the Oklahoma City Public Schools for formal training. The

receiving point in the school system was Central High School. In this school, the actual training and research in connection with the M D T A Program was to take place. See Figure 2 for administrative organization.

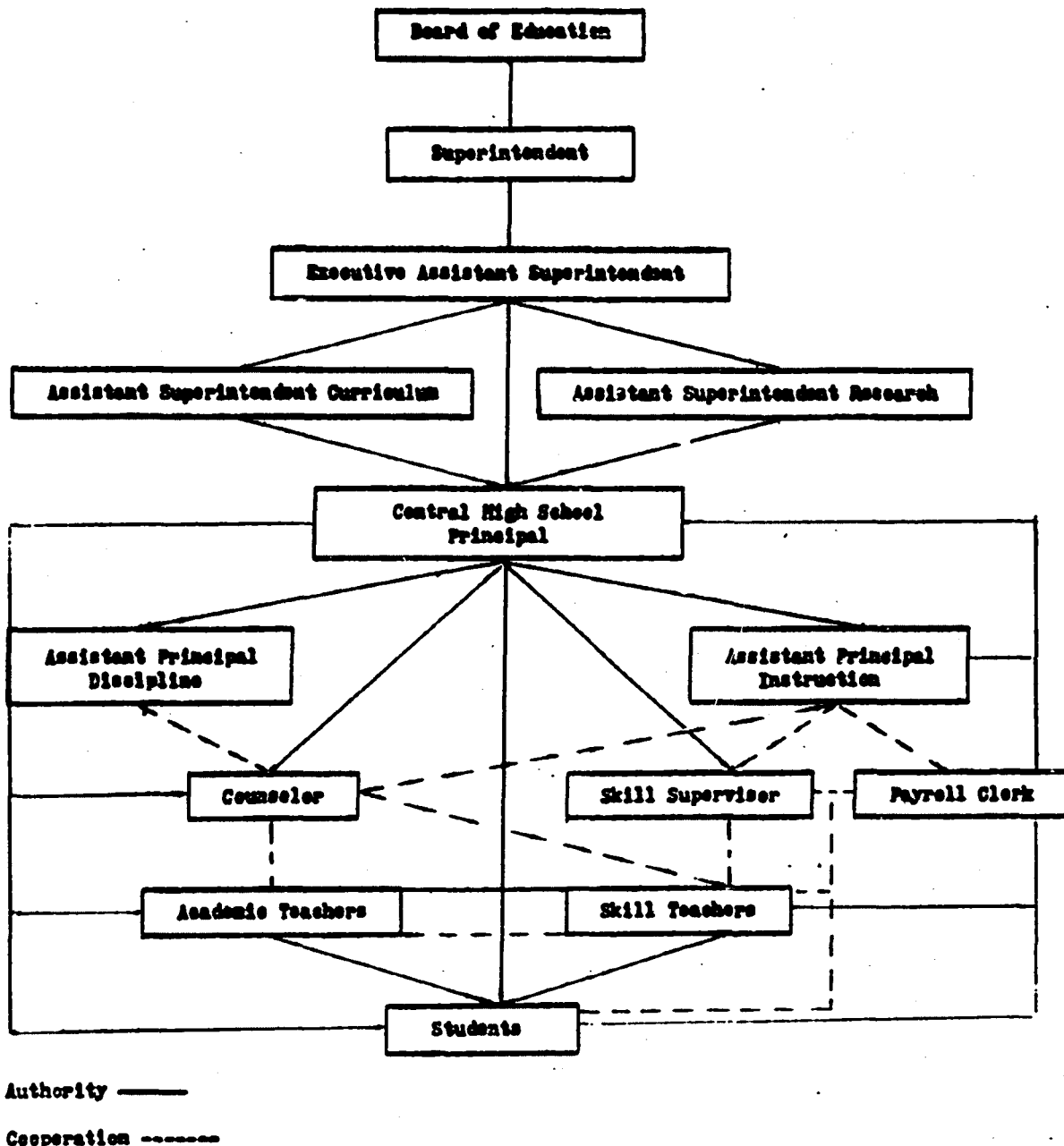
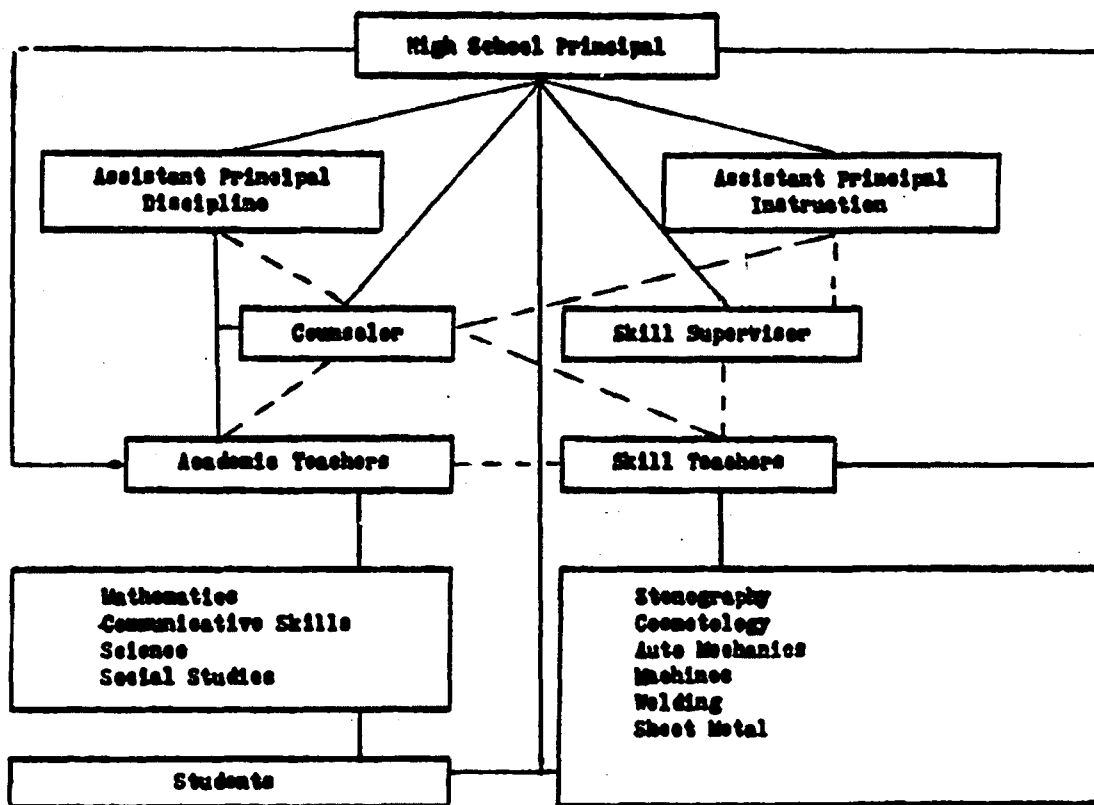


Fig. 2 - The internal administrative organizational structure of the Manpower Development Training Program.

After being selected for training and upon arrival at Central High School, the trainee was sent to an advisor

(counselor) to arrange for a study plan that would help him to meet state requirements for the high school diploma. Each trainee was enrolled into one of six skill areas. These areas were (1) Stenography, (2) Cosmetology, (3) Auto Mechanics, (4) Machines, (5) Welding, and (6) Sheet Metal. All trainees were scheduled to attend the academic courses on the basis of need. The four academic courses offered were (1) Mathematics, (2) Communicative Skills, (3) Science, and (4) Social Studies. The organizational structure as related to curriculum and instruction is illustrated in Figure 3.



Authority ———

Cooperation - - - - -

Fig. 3 - The organizational structure as related to curriculum and instruction in the Manpower Development Training Program.

Program Philosophy and Objectives

The Manpower Development Training Program was based upon a philosophy of "action" in its attempts to implement the following objectives and goals:

1. To recognize each student as an individual with unique interests and needs.
2. To free schedules, curriculums, and methods of instruction from the bondage of the past.
3. To build character and moral values.
4. To preserve and pass on the favorable aspects of our history, culture, and heritage.
5. To provide equality of opportunity for all students regardless of race, creed, or religion.
6. To take students where they are and guide them toward the achievement of their potential.
7. To improve our culture and society in general.
8. To use technological and cultural advances in carrying out the instructional program.
9. To guide toward the selection of a vocation and a readiness program for entering the work force.
10. To develop student understandings of himself with respect to abilities, self-discipline, responsibility, other persons, and citizenship.
11. To develop proficiency in the basic skills.
12. To develop the abilities of discrimination which enable students to select those avocational activities that satisfy their individual needs.
13. To acquaint students with the general areas of knowledge in order to develop intellectual curiosity.
14. To develop the understanding of habits and attitudes necessary to establish and maintain physical and mental health.
15. To emphasize the development of skills in communication, computation, and thinking.

16. To develop an understanding of the basic relationships between the principles of economics and the necessities of life.
17. To provide a wide variety of experiences to meet both the common and individual educational needs of these types of students.
18. To provide for relating subject matter fields to the life problems of individual students.
19. To provide for the evaluation of pupil achievement in terms of each individual's aptitudes and abilities.
20. To provide the necessary counseling and follow-up services in helping students obtain and maintain employment.

Being twofold in nature and dedicated to high standards of achievement, the M D T A Program was primarily for the development of both academic and vocational skills. Through the cooperation of academic and vocational personnel, a closer integration of subject matter was attempted.

Academic Program

The academic courses offered included Mathematics, Science, Communicative Skills, and Social Studies. All academic classes were nonsequential and were built around activities (related to the students' skill area) in an attempt to give experiences that dealt with concepts more meaningful to these types of students. Strong emphasis was placed upon the individual approach to meet the varied needs.

Mathematics

Students enrolled in the program possessed varied backgrounds in mathematics and abilities which had previously

been barriers to their educational progress. Being cognizant of these barriers, emphasis was placed upon the development of realistic classroom goals and objectives that were in keeping with individual needs and capacities. These goals and objectives included: (1) the development of a strong motivation for learning and improvement of individual skills in the four basic functions of arithmetic--addition, subtraction, multiplication, and division; (2) the development of a desire for self-improvement through the realization of individual weaknesses; (3) the accumulation of the necessary knowledge to solve mathematical problems in an organized and logical manner; and (4) the acquisition of both the desire and necessary training to apply mathematical knowledge to the practical solution of those problems which must be solved in order to maintain a respectable, as well as useful, place in society.

More specifically, these students were taught mathematics as it applies to the practical problems they would normally face in their work, at home, and in the maintenance of a reasonable amount of respect from their peer groups. Stenographic students were taught business mathematics as it relates to such things as costs, overhead, taxes, and profit. Both stenographic and cosmetology students were taught mathematics as it relates to business transactions. These included payrolls, trade and cash discounts, selling at retail, computing interest, installment buying and selling, insurance, property, and social security benefits.

Those students enrolled in shopwork such as Auto Mechanics, Welding, Sheet Metal, and Machines were taught mathematics as it applies to shopwork. The course involved instructions in measurements (tools and units of length), micrometer and decimal fractions, measuring surfaces, rectangular areas, volumes, angles, power and energy, as well as the steel square and its use.

Science

The objectives and goals in this area included:

(1) the development of the skill of scientific reasoning in solving problems; (2) the development of the ability of drawing generalizations from facts presented in subject matter and observations; (3) the building of a scientific vocabulary; (4) the promotion of original thinking; and (5) the development of those habits, skills, and attitudes which are helpful in everyday living.

It was hoped that these objectives could be accomplished by utilizing an individualized approach. Various levels of subject matter were made available. Numerous and varied experiments were attempted, personal projects encouraged, teaching machines utilized, reports assigned, lectures given, films and tapes used, and research projects carried on in the library. The students were not kept together as a group on one activity, nor even on the same unit of study. Capable students were given the opportunity to cover all the various units or areas of study if they desired. Slower

students were given individual help and allowed to cover only those areas of study needed in their specific skills or trades. Evaluations were made at the end of each unit of study as they were completed by the student. Individual help was emphasized and always available for those of lesser ability.

Several general areas or units of study in science were taught to all the six various skill areas. The content of these units was broken down into four major divisions:

(1) Space (the nature of science, earth, space, exploration, stars, planets, the universe, and weather); (2) Chemistry (the structure of matter, measurements, chemical change, properties of matter, chemical products, nuclear energy, petroleum, cosmetics, acids and bases, metals, hair dyes, electroplating, and blueprinting); (3) Physics (automobiles, simple machines, engines, electricity, heat, light, sound, and recent electronic devices); and (4) Biology (bacteriology, genetics, cells, anatomy, and physiology).

Students enrolled in Auto Mechanics, Machines, Sheet Metal, and Welding were taught all the previously mentioned units with the exception of cosmetics, dyes, and the general area of biology. Cosmetology students covered all except metals, engines, electroplating, recent electronic devices, and blueprinting. Those students enrolled in Stenography excluded metals, engines, acids and bases, solutions, and the entire biology section unless special interest was indicated.

Communicative Skills

The major objective in the communicative skills was to determine where the student was able to function in the various means of communicative skills. Attempts were then made to take him from this point, endeavoring to develop his skills to a level whereby he could successfully communicate with his associates on the job, in his leisure, and with society in general. Second, the opportunity was made available for those students with the necessary abilities and aspirations to develop an appreciation for the English language and those skills necessary to use it in the various ways.

The course of study was broken down into four basic disciplines: (1) Speaking, (2) Listening, (3) Reading, and (4) Writing. Attempts were made to develop each of these separate disciplines to the highest level attainable. A strong emphasis was placed on the development of these four areas in the hope that students upon completion would be able to receive, utilize, and reflect the necessary amount of both technical and nontechnical information to function successfully in all dimensions of life.

With the realization that many, if not most, of these types of students face tremendous problems of social adjustment, an attempt was made to acquaint each of them with literature, grammar, and speech. Emphasis was placed upon literature in the hope of creating an awareness on the part of

the student--that he functions within small societies which are parts of larger societies, and that he can function more easily and successfully if he can appreciate and respect some kind of ethical code or standard which will allow him as much freedom as possible, and at the same time allow others the same amount of freedom.

Social Studies

The major objective in social studies was to aid these young people in developing those skills, attitudes, aspirations, and appreciations necessary to live more happily and effectively in our society. Secondly, an attempt was made to help them develop a set of values which are acceptable by our social order.

The immediate and ultimate goals were (1) to develop a motivation for learning by encouraging an improvement in the communicative skills; (2) to develop a competence in independent learning and thinking that would carry beyond the classroom; and (3) to develop an awareness, evaluation, and appreciation of ideals that have proved to be worthy of striving for in the past.

Vocational Program

The six vocational skill areas offered in the program included: (1) Stenography, (2) Cosmetology, (3) Auto Mechanics, (4) Machines, (5) Welding, and (6) Sheet Metal. The basic objectives were (1) to provide learning experiences

which would enable students to significantly increase their capabilities for becoming and remaining economically productive; (2) to provide those experiences necessary in equipping the students to gain personal satisfaction from living; and (3) to help the students gain the necessary skills, attitudes, and values which would enable them to successfully contribute to the enhancement of their society.

The vocational program was aimed specifically toward aiding students who were either unemployed or underemployed prior to entry into the program. The development of salable skills was the basic objective; however, it was not the only purpose of the vocational classes. The vocational classes emphasized social and moral development in addition to the basic skills.

Stenography included a wide array of content. Included were (1) Typewriting, (2) Shorthand, (3) Office Machines, (4) Bookkeeping, (5) Business English, (6) Business Communications, (7) Human Relations, and (8) Practical Business Psychology. Emphasis was also placed upon dress, manners, ethics, and personality development.

Cosmetology included: (1) Shop Management, (2) Science of Cosmetology, (3) Practice in the Basic Skills, (4) Theory, and (5) Practical Experience with Live Subjects. Attempts were made to improve the dress, manners, ethics, personality, and personal hygiene of all the students enrolled in the area.

Auto Mechanics was probably one of the most comprehensive courses of its type in the nation. The ten major areas of Auto Mechanics were covered. These included: (1) History, (2) Chassis Suspension and Frames, (3) Brakes, (4) Transmissions, (5) Differentials, (6) Electrical Wiring, (7) Fuel Systems, (8) The Clutch, (9) Tune-Up, and (10) Air Conditioning. Students could specialize in any of these ten sub-areas of Auto Mechanics.

Every effort possible was made to improve upon the attitudes and social development of the students enrolled in Auto Mechanics. The participants were given extensive instruction on how to apply for, obtain, and hold down a job. The course also included instruction on dress, manners, ethics, and personal hygiene.

Instruction in Machines included nine general areas. These were (1) Safety, (2) Bench Work, (3) Machine-Shop Blueprint Reading, (4) Measuring Tools, (5) Machine-Shop Tool Practice, (6) The Drill Press, (7) The Grinding Machine, (8) The Shaper, and (9) Milling. As in the skill areas previously mentioned, emphasis was also placed upon social and moral training. Individualized attention was given to all students who enrolled. Every effort possible was made to insure that each participant received the best instruction the teacher had to offer.

Extensive content coverage was offered in both Welding and Sheet Metal. Welding included twelve general areas.

These were (1) Care and Operation of Equipment, (2) Blueprint Reading and Layout, (3) Casting and Heat Treatment of Metals, (4) Boiler and Tank (all positions), (5) Gas Welding, (6) Heavy Metal (all positions), (7) Structural Welding (all positions), (8) Pipeline Welding, (9) Ferrous Metals, (10) Non-ferrous Metals, (11) Tungsten Inert Gas Welding, and (12) Metal Inert Gas Welding. Sheet Metal included: (1) Drawing, (2) Job Planning, (3) Layout and Pattern Development, (4) Marking Patterns, (5) Fabrications, (6) Installation Work, (7) Installation of Duct for Heating and Ventilation, (8) Hotel and Cafeteria Equipment, and (9) Maintenance and Safety.

Provisions were made for individualized instruction--using the latest equipment and training facilities--in each of the vocational skill areas. All vocational classes were taught by qualified personnel certified by the Oklahoma State Board for Vocational Education.

Summary

All academic classes were ungraded, and students were allowed to work on individual or group assignments according to their level in those areas where there was a need for knowledge and credit. Textbooks, encyclopedias, maps, globes, charts, newspapers, periodicals, movies, tapes, television, and various teaching machines were available for use in all classes. Reports and projects, both written and oral, were made by individuals or groups. General instruction was provided in all areas by qualified and certified personnel.

Emphasis was placed upon both the basic skills and social-moral development in all classes. There was no particular starting point nor ending as used with reference to traditional classes or subject matter. Emphasis was placed upon the elimination of mere ground covering and busy work. Serious attempts were made to arouse interest and curiosity so that learning would take place.

CHAPTER IV

PROCEDURES OF THE STUDY

The Population

This study, threefold in nature, was designed to investigate differences in vocational and academic achievement between subgroups for six independent variables. It was designed to investigate the differences in the proportions of students rated successful and unsuccessful in training by five instructors. It was also designed to investigate the differences in the proportions of students completing the program and those who re-dropped out.

The population consisted of 168 subjects selected from a total of 2,179 persons located in the Oklahoma City metropolitan area who met the initial selection criteria of the Oklahoma Employment Security Commission. Candidates selected for the program had to be between the ages of 18 and 22, either unemployed or underemployed, and must have been a high school dropout for at least two years. It was also necessary for candidates to be administered the General Aptitude Test Battery, Form B-1002, and scores checked against norms required for entrance into the various skill areas. In addition to this test, each candidate was given an interest test and interviewed individually by qualified counselors. All

persons having serious mental or physical deficiencies were excluded from the program. This screening process in large measure insured experimental control of many confounding variables, and aided in the stratification of subgroups for each of the independent variables. Information in Table 1 includes the distribution of students and mean aptitude scores in subgroups for each of the independent variables. Table 1 also includes the mean aptitude scores for the non-withdrawal group, re-dropouts that were interviewed, and the re-dropouts who could not be located for interview purposes.

TABLE 1

DISTRIBUTION OF STUDENTS AND MEAN APTITUDE SCORES
IN SUBGROUPS FOR SIX INDEPENDENT VARIABLES

Variable	Subgroup	Number	Mean Aptitude
Cultural Background	Rural	41	90.2
	Nonrural	101	91.4
Home Background	Stable	83	92.0
	Broken	59	89.8
Mobility	Mobile	50	91.9
	Nonmobile	92	90.6
Age	20+	103	90.7
	19-	65	89.7
Sex	Male	70	89.4
	Female	98	91.5
Race	White	113	95.2
	Non-white	55	81.6
Non-withdrawal Group		94	91.7
Interviewed Re-dropouts		48	89.8
Noninterviewed Re-dropouts		26	88.2
Total Re-dropouts		74	89.2
Total Population		168	90.6

Instruments of Measurement

The Sequential Tests of Educational Progress, Form 3-B, was used as the pretest and post-test instrument for measuring academic achievement. This instrument includes tests in six major fields of school and college instruction. These fields are Reading, Writing, Listening, Social Studies, Mathematics, and Science. The tests in all these areas are basically power, rather than speed tests. All but the slowest students completed them in the time limits allowed.

The norms for the tests are based on the performance of students from a large number of schools, carefully chosen to be representative of the geographic areas of the nation. The Kuder-Richardson Formula 20 was used to estimate all of the reliabilities and standard errors of measurement for the six S T E P tests. "The median reliabilities are .915 for reading, .865 for writing, .895 for listening, .850 for science, .835 for mathematics, and .890 for social studies."¹

The General Aptitude Test Battery, Form B-1002, (which measures nine different aptitudes) as administered by the O E S C was used as a measure of general aptitude.² This test battery of the United States Employment Service

¹Sequential Tests of Educational Progress--Technical Report (Los Angeles: Cooperative Test Division, Educational Testing Service, 1957), p. 10.

²United States Department of Labor, Guide to the Use of the General Aptitude Test Battery, Section III: Development (Washington 25, D. C.: Bureau of Employment Security, October, 1962).

constitutes one of the best known of the factored aptitude test batteries. There are twelve tests in the battery which are combined to measure the following factors: (1) intelligence, (2) verbal aptitude, (3) numerical aptitude, (4) spatial aptitude, (5) form perception, (6) clerical perception, (7) motor coordination, (8) finger dexterity, and (9) manual dexterity. Reliability, based on combined test-retest data published by the United States Department of Labor, is .80+ for intelligence, verbal aptitude, numerical aptitude, and spatial aptitude. Reliabilities are .70+ for clerical perception, form perception, motor coordination, and manual dexterity; and .60+ for finger dexterity.

The outstanding characteristic of this multifactored aptitude test is that a person's scores can be compared with 36 occupational aptitude patterns. These patterns are believed to be pertinent to about 500 occupations. In nearly 250 of them, the patterns were empirically established; the others were included upon the basis of judgments made from job analysis data.

Data on validity are being continuously collected for the test battery. Various state employment offices have collaborated with the United States Employment Service in validating the test battery in local work situations. As far as possible, the validation procedure for each new situation is to carry out an aptitude oriented job analysis followed by the development of a suitable criterion of

proficiency. Production records, earnings, work samples, and ratings may be used. The test battery is administered. Validity data are obtained in the form of a tetrachoric correlation between criterion and aptitude scores. Concurrent and longitudinal designs are utilized, although the latter type is relatively uncommon, except with student groups. On the basis of the statistical findings and other considerations, critical aptitudes are selected for the occupation, and cutting scores determined for each aptitude. This is done in such a way as to eliminate about one-third of the individuals. Where possible, cross validation is undertaken although this has not been common so far. An attempt is made to fit the occupation into an already established occupational aptitude pattern (a set of two to four aptitudes with cutting scores) of which there are thirty-six at the present time. Thus, if the occupation in question shares two of three or three of four critical aptitudes with an established occupational aptitude pattern, with cutting scores within ten points, it is grouped with that particular pattern. If not, it is held out for later grouping with a new pattern, and may be used individually in the meantime.

Instruments utilized in measuring achievement in the vocational areas were the following:

1. Purdue Trade Information Test in Welding
2. Purdue Trade Information Test for Sheet Metal Workers
3. Purdue Test for Machinists and Machine Operators

4. Garage Mechanic Test
5. Oklahoma State Board of Cosmetology Operators Examination
6. Purdue Clerical Adaptability Test
7. Minnesota Clerical Test
8. Gregg Shorthand Speed Test
9. Gregg Typing Speed Test

The four Purdue trade tests used in this study are designed to aid industry and vocational schools in determining the amount of information in the various fields that is possessed by applicants or students. In vocational and trade schools, as well as in other formal training programs, these tests serve as terminal achievement examinations. A more detailed description of these four instruments in terms of purposes, reliability, and validity may be found in Appendix B of this report.

The best instrument found available to measure achievement in Auto Mechanics was the Garage Mechanic Test. Publishers say: "This is an achievement test. It seeks to measure the extent to which a particular person has profited from training and/or experience in a given field--in this case, automotive repair."³ Basically, this test gives the employer a quick method of determining automotive knowledge. A more detailed description of this instrument may also be found in Appendix B.

³P. L. Mullenbruch, Garage Mechanic Test, Preliminary Manual (Minneapolis: Educational Test Bureau, Educational Publishers, Inc., 1956).

A discontinued form of the Oklahoma State Board of Cosmetology Operators Examination was used as the measure of achievement in Cosmetology. It was necessary to use this form due to the refusal of the Oklahoma State Board of Cosmetology to release a current form for research purposes.

This test exemplified the current examinations being used as a basis for issuance of license in Oklahoma. There were no published reliability or validity ratings available, thus making the use of this test questionable. The non-availability of published reliability or validity ratings of State Board examinations in this area seems to indicate that additional research is needed in the general area of cosmetology practices in Oklahoma.

Even though published ratings were not available on this test, teachers in the program indicated respect for the instrument. The questions are adapted from Milady publications, and give comprehensive coverage of the course content as used in the Manpower Program. The assumption of validity and reliability with reference to the instrument used in Cosmetology is based solely upon the power to license for practice in Oklahoma by the Oklahoma State Board of Cosmetology.

The Purdue Clerical Adaptability Test, Minnesota Clerical Test, Gregg Shorthand Speed Test, and Gregg Typing Speed Test were used to test speed and accuracy in the performance of tasks related to clerical work. "The Minnesota Clerical Test consists of two parts--Number Checking and

Name Checking. In each part there are two hundred items consisting of one hundred identical pairs and one hundred dissimilar pairs. The examinee is asked to check the identical pairs. The numbers in Number Checking range from three through twelve digits, and the names in Name Checking contain from seven through seventeen letters. Separate time limits are used for the two parts. The total testing time is fifteen minutes."⁴

The speed tests utilized in measuring speeds in Typing and Shorthand were those issued by the Gregg Awards Department. The Typing test was preprinted in Today's Secretary (June, 1964). The Shorthand test was taken from the Business Teacher (May-June, 1964). Scores were computed on the basis of Gross Words Per Minute, with the Error Cut-Off Plan incorporated in the Typing test to facilitate administration and grading. There were no published reliability or validity ratings on these tests. The scores utilized are merely expressions of Gross Speed.

All the vocational tests utilized in this study were considered the best instruments available at the time of administration. A detailed description of the various instruments in terms of purposes, reliability, and validity is made in Appendix B of this report.

⁴"Reproduced by permission. Copyright 1933/1961, The Psychological Corporation, New York, N. Y. All rights reserved."

Other instruments used in this study were the Structured Interview and the Teachers' Checklist for Evaluating Student Training Success. The Checklist was used for the purpose of determining the proportions of students rated successful by teachers, as compared to those rated unsuccessful. The interview was used to determine the cultural and home background factors included in this study.

Collection of the Data

The total population was administered the G A T B, Form G-1002, by the O E S C. This took place upon the entry of students into the program. Rooms that were well lighted, ventilated, and quiet were made available for testing. Trained proctors were utilized so that instructions might be properly given, questions answered, and to facilitate the proper preparation and marking of answer sheets.

Following the administration of the G A T B, answer sheets were scored, and results recorded on accumulative data sheets.⁵ These sheets were designed to store all the data necessary in this study.

The S T E P pretest was administered during the last three weeks of October, 1963. These tests were administered during 70-minute blocks of time. Complete administration of this achievement battery took 420 minutes. Answer sheets were IBM machine scored by the Testing and Evaluation

⁵See Appendix C.

Department of the Oklahoma City Public Schools. Results were then recorded on accumulative data sheets.

Structured interviews were made with 142 of the subjects included in this investigation during March and April, 1964. All students actively enrolled in the program were scheduled for interviews at 30-minute intervals. They were called out of class, asked to report to Room 405-A at Central High School, interviewed, and recorded on magnetic tape. Answers to the questions relating to cultural and home background and mobility were recorded on interview check sheets, and compared with answers recorded on magnetic tapes to insure recording accuracy. On the basis of these interviews, each participant was classified into the various subgroup categories, and results recorded on accumulative data sheets.

Students who were no longer actively enrolled in the program were contacted at their homes, jobs, or other various places where they could be located. Answers to the interview questions were recorded by two qualified counselors, who went into the field to obtain information pertinent to this study. These answers were cross-checked to insure consistency and accuracy of answers. These students, classified as re-dropouts, were assigned into subgroup categories, and information recorded on accumulative data sheets. All interviews were made and data recorded on or before April 29, 1964.

The Teachers' Checklist⁶ was completed during the month of May, 1964. Teachers were asked to evaluate the 168 participants objectively. They were asked to evaluate the students in terms of interest, attendance, classroom behavior, participation, and grades. The evaluation was based upon the teacher observations of participants during the period of time they were officially enrolled in the M D T A Training Program.

The S T E P post-test was administered during the second half of May, 1964. Every effort was made to keep the testing conditions identical to those existing during the pretesting period. Upon completion of the post-tests, results were recorded on data sheets.

The administration of vocational achievement tests was made during the first two weeks of June, 1964. Three testing periods were utilized. Auto Mechanics, Machines, Welding, and Sheet Metal students were tested simultaneously. Stenography and Cosmetology students were tested during separate periods. All vocational tests were hand scored, and results recorded on individual data sheets.

Upon the completion of the post-testing sessions, checks were made on each of the accumulative data sheets to verify the completeness and accuracy of recorded information. Following these checks, all data were transferred to IBM cards and made ready for statistical computations.

⁶See Appendix D.

Statistical Treatment

The Sequential Tests of Educational Progress yielded six raw pretest scores and six raw post-test scores for each participant, which served as the academic achievement data of this study. The Minnesota Clerical Test, Purdue Clerical Adaptability Test, Gregg Shorthand Speed Test, and Gregg Typing Speed Test yielded ten raw scores which served as the vocational achievement data for stenographers in this study. Five other raw scores, which served as vocational achievement data in this study, included those yielded from the (1) Oklahoma State Board of Cosmetology Operators Examination, (2) Garage Mechanic Test, (3) Purdue Trade Information Test in Welding, (4) Purdue Trade Information Test for Sheet Metal Workers, and (5) Purdue Trade Information Test for Machinists and Machine Operators. These instruments yielded one raw score for each participant in Cosmetology, Auto Mechanics, Welding, Sheet Metal, and Machines.

In addition to these test scores, such information as the cultural and home background, mobility classification, teacher evaluation of training success, aptitude, vocation, age, sex, race, and identification number of each student was key punched on IBM cards for facility in handling on the digital computer machines of Pan American Petroleum Corporation.

The chi-square test of significance was used to compare the proportions of subjects who completed the program

and those who re-dropped out. This test was used to compare the subgroups on each of the six independent variables. The same test was utilized to determine if statistically significant differences existed in the proportions of students rated successful and those rated unsuccessful by five instructors. Comparisons were made for participants with rural and non-rural backgrounds.

Aptitude scores of students, who were interviewed and classified as re-dropouts, and those re-dropouts who were not interviewed were ranked in order of increasing size for each of the comparison groups and tested by means of the Mann-Whitney U Test.⁷ This technique was used to test whether significant differences existed between the two groups in terms of aptitudes.

The Mann-Whitney U Test described by Seigel⁸ was used to provide tests of significance with regard to the subgroups for each of the independent variables. This procedure was necessary to determine if matched groups existed. This technique differed from the one described by Barnes only in terms of the correction for tie ranks and the computation of z values when N exceeded 20.

Null hypotheses that no differences existed between the two subgroups for each of the six independent variables on the vocational measures used in the study were established

⁷Barnes, loc. cit.

⁸Seigel, loc. cit.

and tested by means of the Mann-Whitney U Test described by Seigel. This treatment was applied to test each of the 75 specific null hypotheses generated from the fourth general null hypothesis mentioned in Chapter I.

The primary statistical technique used to analyze the data relative to academic achievement was the single classification analysis of covariance described by Wert, Neidt, and Ahmann.⁹ Typically, this technique provides tests of significance for stratified comparison groups where there is need to simultaneously include measurements other than the criterion in the tests of significance. This statistical technique was applied to test the 36 specific null hypotheses generated from general Ho₃.

Summary

The population of this study consisted of 168 trainees enrolled in the M D T A Training Program in Oklahoma City during the 1963-64 school year, who completed at least one section of the S T E P, Form 3-B, pretest. These subjects were selected on the basis of screening procedures used by the Oklahoma Employment Security Commission, and placed into stratified subgroups for six independent variables.

By the conclusion of the 43-week training program, 74 of these participants had re-dropped out of school. These 74 re-dropouts were compared with the 94 students, who

⁹Wert, Neidt, and Ahmann, loc. cit.

had remained during the study, in terms of aptitudes, completion-noncompletion of the program, and training success as evaluated by teachers.

The 94 students, who remained through the entirety of the program, were compared on 36 specific null hypotheses relating to academic achievement and 75 specific null hypotheses relating to vocational achievement. The 119 specific hypotheses, stemming from the four general null hypotheses mentioned in Chapter I, may be found in Chapter V.

A total of eleven measuring instruments were utilized in measuring aptitude, vocational achievement, and academic achievement. A structured interview was made to determine cultural background, home background, and mobility. The Teachers' Checklist was developed and used to determine training success.

Three statistical techniques were employed in the study. The first technique, known as chi-square, was employed to compare the frequencies of non-withdrawals with re-dropouts for each of the independent variables. It was also used to compare the frequencies of students rated successful by five instructors and those rated unsuccessful for the subgroups of cultural background. The second technique, known as the Mann-Whitney U Test, was employed to test the significance of difference between aptitudes of re-dropouts who were interviewed and re-dropouts who were not interviewed. This same technique was employed to test the significance of

difference in vocational achievement between subgroups for each of the six independent variables. It was also used to test whether the subgroups for each of the independent variables had been drawn from the same population.

The third technique, probably the most important one used in this study, was the single classification analysis of covariance. This technique provided tests of significance with regard to academic achievement for the comparison groups.

CHAPTER V

STATISTICAL ANALYSES

This study was concerned with determining if significant differences existed in the proportions of dropout participants completing the M D T A Training Program in Oklahoma City and the proportions re-dropping out. It was concerned with the over-all training success of rural and nonrural participants as evaluated by teachers.

However, regardless of this interest in connection with the re-dropout rate and training evaluation, the primary concern was to determine if statistically significant differences existed in the academic and vocational achievement of trainees enrolled in the program throughout the 1963-64 school year.

Academic differences were tested in the areas of Reading, Writing, Listening, Social Studies, Mathematics, and Science. Vocational differences were tested in the areas of Stenography, Cosmetology, Auto Mechanics, Machines, Sheet Metal, and Welding. All tests of significance were made on the basis of cultural background, home background, mobility, age, sex, and race. Aptitude differences were tested to see

if significant differences existed between the two subgroups for each of the above mentioned variables.

To accomplish the investigative task, seven questions and four general null hypotheses were established to be tested. The seven questions were generated from the design of the study, and seemed important enough to run statistical tests of significance to determine if significant differences existed in terms of aptitude between the subgroups, as well as the two groups of re-dropouts.

From the four general null hypotheses, 119 specific null hypotheses were generated. Null hypotheses 1-6 were related to the holding power of the program or, more specifically, the re-dropout rate. Null hypotheses 7-8 were related to the evaluation of training success. Null hypotheses 9-44 were related to academic achievement, and 45-119 were related to vocational achievement. For purposes of this study, the required level of statistical significance was set at the .05 level.

Aptitude

To determine if significance differences existed in terms of aptitude between the subgroups for the seven questions included in this study, tests of significance were made using the Mann-Whitney U Test. By referring to Tables 2 and 3, the results of these tests may be found.

Question 1: Is there a statistically significant difference in the aptitudes of the M D T A trainees with rural

and nonrural backgrounds? The obtained z value was -0.5797 and the required value for significance was -2.0 . On the basis of these values, it was concluded that significant differences did not exist between the subgroups for cultural background.

TABLE 2

THE MANN-WHITNEY U TEST OF SIGNIFICANCE OF DIFFERENCE IN THE APTITUDES OF SUBGROUPS FOR SIX INDEPENDENT VARIABLES

Variable	Control		Experimental		z Value
	N ₁	U ₁	N ₂	U ₂	
Cultural Background	31 R	1048.5	63 N	904.5	-0.5797
Home Background	53 S	965.0	41 B	1208.0	-0.9273
Mobility	31 M	912.0	63 N	1041.0	-0.5193
Age	31 19-	1118.5	63 20+	834.5	-1.1432
Sex	28 M	941.0	66 F	907.0	-0.1407
Race	61 W	425.5	33 N	1587.5	-4.6073*

*Significant at .05 level.

Question 2: Is there a statistically significant difference in the aptitudes of the M D T A trainees from stable and broken homes? The acquired z value was -0.9273 and the required value for significance was -2.0 . It was resolved that a significant difference did not exist in the aptitudes between the subgroups for home background.

Question 3: Is there a statistically significant difference in the aptitudes of the M D T A trainees who are

classified mobile and nonmobile? The obtained z value was -0.5193 and the required value for significance was -2.0. On the basis of this test, it was determined that significant differences in aptitudes did not exist between the subgroups for the mobility factor.

Question 4: Is there a statistically significant difference in the aptitudes of the M D T A trainees ages 19- and 20+? The z value was -1.1432 and the established value for significance was -2.0. It was concluded that significant differences in aptitudes did not exist between the subgroups for age.

Question 5: Is there a statistically significant difference in the aptitudes of the male and female M D T A trainees? The obtained z value was -0.1407 and the required value for significance was -2.0. On the basis of these values, it was resolved that statistically significant differences in the aptitudes of males and females in the program did not exist.

Question 6: Is there a statistically significant difference in the aptitudes of white and non-white M D T A trainees? The z value found was -4.6073 and the value required for significance was -2.0. This was a statistically significant difference in favor of the white group of trainees. The difference can probably be attributed to the socioeconomic and cultural background of this particular group of non-white trainees.

Question 7: Is there a statistically significant difference in the aptitudes of the re-dropouts interviewed and those who were not interviewed? The obtained z value was -0.4982 and the required value for significance was -2.0. Thus, it was concluded that significant differences in aptitude did not exist and that the two groups of re-dropouts were homogeneous in this respect.

TABLE 3

THE MANN-WHITNEY U TEST OF SIGNIFICANCE OF DIFFERENCE
IN THE APTITUDES OF RE-DROPOUTS INTERVIEWED
AND RE-DROPOUTS NOT INTERVIEWED

Variable	Interviewed		Not Interviewed		z Value
	N ₁	U ₁	N ₂	U ₂	
Aptitude	48	1172.0	26	668.0	-0.4982

*Significant at .05 level.

Program Holding Power

To determine if significant differences between the subgroups of the six independent variables existed in terms of completion and noncompletion of the program, chi-square tests of significance were made. Chi-square values for these comparisons may be found by referring to Table 4. Hypotheses 1-6 pertain to these tests of significance.

Hypothesis 1: There is no significant difference in the proportions of re-dropouts as compared to those completing the program when compared on the basis of cultural background. The computed value of χ^2 was 2.2826 and the

critical value 3.841. It was concluded that the observed frequencies did not differ significantly from expected frequencies, and the hypothesis was not rejected

TABLE 4

THE CHI-SQUARE TEST OF THE FREQUENCY DISTRIBUTION
OF THE COMPLETION AND NONCOMPLETION GROUPS
FOR SIX INDEPENDENT VARIABLES

Variable	d f	χ^2
Cultural Background	1	2.2826
Home Background	1	4.8956*
Mobility	1	0.0610
Sex	1	12.3903*
Age	1	29.3502*
Race	1	5.4356*

$$\chi^2_{.05} = 3.841$$

Hypothesis 2: There is no significant difference in the proportions of re-dropouts as compared to those completing the program when compared on the basis of home background. The computed value of χ^2 was 4.8956 and the critical value 3.841. This was a statistically significant difference in favor of the completion group coming from stable home backgrounds. The hypothesis was rejected, and the difference was attributed to the unstabilizing influence of parent divorce and broken home environment.

Hypothesis 3: There is no significant difference in the proportions of re-dropouts as compared to those completing

the program when compared on the basis of mobility. The χ^2 value was found to be 0.0610 and the critical value 3.841. On the basis of these values, it was determined that observed frequencies did not differ significantly from expected frequencies. The hypothesis was not rejected.

Hypothesis 4: There is no significant difference in the proportions of re-dropouts as compared to those completing the program when compared on the basis of sex. The computed χ^2 value was 12.3903 and the critical value 3.841. This was a statistically significant difference in favor of the female participants. The hypothesis was rejected, and the difference was attributed to the difference in the sex of the two groups.

Hypothesis 5: There is no significant difference in the proportions of re-dropouts as compared to those completing the program when compared on the basis of age. The χ^2 value was found to be 29.3502. When compared to the critical value 3.841, it was determined that a statistically significant difference existed in favor of the trainees who were 20 years of age and older. The hypothesis was rejected, and the difference attributed to the difference in the age of the two groups.

Hypothesis 6: There is no significant difference in the proportions of re-dropouts as compared to those completing the program when compared on the basis of race. The χ^2 value was 5.4356 and the critical value 3.841. This was

a statistically significant difference in favor of the white group. The hypothesis was rejected, and the difference attributed to the difference in the race of the two groups.

Training Evaluation

To determine if there were any differences in the training success of participants with rural and nonrural backgrounds, chi-square tests of significance were made. Chi-square values for specific null hypotheses 7-8 may be found in Table 5.

TABLE 5

THE CHI-SQUARE TEST OF THE FREQUENCY DISTRIBUTION OF
DROPOUTS WITH RURAL AND NONRURAL BACKGROUNDS

Rating	d f	χ^2
Successful	4	1.0848
Unsuccessful	4	2.5929

$$\chi^2_{.05} = 9.488$$

Hypothesis 7: There is no significant difference in the proportions of rural students rated successful in training as compared to nonrural students rated successful. The computed value of χ^2 was 1.0848 and the critical value 9.488. This was not a statistically significant difference between the observed and expected frequencies, and the hypothesis was not rejected.

Hypothesis 8: There is no significant difference in the proportions of rural students rated unsuccessful in

training as compared to nonrural students rated unsuccessful. The χ^2 value was 2.5929 and the critical value 9.488. On the basis of these values, it was determined that observed and expected frequencies did not differ significantly. Thus, the hypothesis was not rejected.

Academic Achievement

The single classification analysis of covariance was used to determine if significant differences existed in achievement. The S T E P post-test scores were used as the criterion. Since general aptitude and prior achievement levels could have conceivably influenced each participant's response to the criterion, individual differences in aptitude and prior achievement were controlled by using the G A T B scores as a measure of general aptitude, and S T E P pretest scores as a measure of prior achievement levels for each participant. By using these scores as control variables, the bias introduced in terms of these factors was removed.

No significant differences in terms of academic achievement were found between the subgroups of the independent variables (1) cultural background, (2) home background, (3) mobility, (4) sex, (5) age, and (6) race. Hypotheses 9-36 pertain to the tests of significance between the subgroups for each of the six academic areas tested. Tables 6, 7, 8, 9, 10, and 11 include the F values computed for each of the six academic areas tested. These tables include all of the F values reported in Appendix A, Tables 39-74.

Cultural Background

Hypothesis 9: There is no statistically significant difference in the Reading achievement scores of the rural and nonrural M D T A trainees. The computed F value of 0.1708 with 1 and 90 degrees of freedom was not significant beyond the .05 level, and the hypothesis was not rejected.

Hypothesis 10: There is no statistically significant difference in the Writing achievement scores of rural and nonrural M D T A trainees. The computed F value was 1.9258 with 90 and 1 degrees of freedom. The hypothesis failed to be rejected because this value was not significant beyond the .05 level of confidence.

Hypothesis 11: There is no statistically significant difference in the Listening achievement scores of rural and nonrural M D T A trainees. The computed F value was 0.0177 with 1 and 90 degrees of freedom. This was not significant beyond the .05 level, and the hypothesis failed to be rejected.

Hypothesis 12: There is no statistically significant difference in the Social Studies achievement scores of rural and nonrural M D T A trainees. The computed F value was 1.6118 with 90 and 1 degrees of freedom. This was not significant beyond the .05 level, and the hypothesis was not rejected.

Hypothesis 13: There is no statistically significant difference in the Mathematics achievement scores of rural and

nonrural M D T A trainees. The computed F value was 1.4171 with 90 and 1 degrees of freedom. This was not significant beyond the .05 level, and the hypothesis was not rejected.

TABLE 6

ANALYSIS OF COVARIANCE OF S T E P SCORES OF RURAL
AND NONRURAL HIGH SCHOOL DROPOUTS

Subject	d f	F Value
Reading	1-90	0.1708
Writing	90-1	1.9258
Listening	1-90	0.0177
Social Studies	90-1	1.6118
Mathematics	90-1	1.4171
Science	1-90	0.5847

*Significant at .05 level.

Hypothesis 14: There is no statistically significant difference in the Science achievement scores of rural and nonrural M D T A trainees. The computed F value was 0.5847 with 1 and 90 degrees of freedom. The hypothesis failed to be rejected because this value was not significant beyond the .05 level of confidence.

Home Background

Hypothesis 15: There is no statistically significant difference in the Reading achievement scores of the M D T A trainees from stable and broken homes. The computed

F value of 0.5120 with 1 and 90 degrees of freedom was not significant beyond the .05 level. The hypothesis was not rejected.

TABLE 7

ANALYSIS OF COVARIANCE OF S T E P SCORES OF HIGH SCHOOL DROPOUTS FROM STABLE AND BROKEN HOMES

Subject	d f	F Value
Reading	1-90	0.5120
Writing	90-1	1.1114
Listening	1-90	0.4220
Social Studies	1-90	0.7348
Mathematics	1-90	0.0207
Science	1-90	0.6471

*Significant at .05 level.

Hypothesis 16: There is no statistically significant difference in the Writing achievement scores of the M D T A trainees from stable and broken homes. The computed F value of 1.1114 with 90 and 1 degrees of freedom was not significant beyond the .05 level, and the hypothesis failed to be rejected.

Hypothesis 17: There is no statistically significant difference in the Listening achievement scores of the M D T A trainees from stable and broken homes. The computed F value was 0.4220 with 1 and 90 degrees of freedom. This value was not significant, and the hypothesis was not rejected.

Hypothesis 18: There is no statistically significant difference in the Social Studies achievement scores of the M D T A trainees from stable and broken homes. The computed F value of 0.7348 with 1 and 90 degrees of freedom was not significant, and the hypothesis was not rejected.

Hypothesis 19: There is no statistically significant difference in the Mathematics achievement scores of the M D T A trainees from stable and broken homes. The computed F value was 0.0207 with 1 and 90 degrees of freedom. The F value was not significant, and the hypothesis failed to be rejected.

Hypothesis 20: There is no statistically significant difference in the Science achievement scores of the M D T A trainees from stable and broken homes. The computed F value was 0.6471 with 1 and 90 degrees of freedom. This was not significant, and the hypothesis was not rejected.

Mobility

Hypothesis 21: There is no statistically significant difference in the Reading achievement scores of the M D T A trainees classified mobile and nonmobile. The computed F value of 0.1723 with 1 and 90 degrees of freedom was not significant, and the hypothesis failed to be rejected.

Hypothesis 22: There is no statistically significant difference in the Writing achievement scores of the M D T A trainees classified mobile and nonmobile. The

computed F value of 0.0193 with 1 and 90 degrees of freedom was not significant. The hypothesis was not rejected.

Hypothesis 23: There is no statistically significant difference in the Listening achievement scores of the M D T A trainees classified mobile and nonmobile. The computed F value of 0.1322 with 1 and 90 degrees of freedom was not significant beyond the .05 level of confidence. The hypothesis was not rejected.

TABLE 8

ANALYSIS OF COVARIANCE OF S T E P SCORES OF HIGH SCHOOL DROPOUTS CLASSIFIED MOBILE AND NONMOBILE

Subject	d f	F Value
Reading	1-90	0.1723
Writing	1-90	0.0193
Listening	1-90	0.1322
Social Studies	1-90	0.5802
Mathematics	1-90	0.7031
Science	90-1	1.1961

*Significant at .05 level.

Hypothesis 24: There is no statistically significant difference in the Social Studies achievement scores of the M D T A trainees classified mobile and nonmobile. The computed F value was 0.5802 with 1 and 90 degrees of freedom. The hypothesis was not rejected as this value was not significant at the .05 confidence level.

Hypothesis 25: There is no statistically significant difference in the Mathematics achievement scores of the M D T A trainees classified mobile and nonmobile. The computed F value of 0.7031 with 1 and 90 degrees of freedom was not significant beyond the .05 level, and the hypothesis failed to be rejected.

Hypothesis 26: There is no statistically significant difference in the Science achievement scores of the M D T A trainees classified mobile and nonmobile. The computed F value was found to be 1.1961 with 90 and 1 degrees of freedom. This was not a significant difference beyond the .05 level of confidence, and the hypothesis was not rejected.

Sex

Hypothesis 27: There is no statistically significant difference in the Reading achievement scores of male and female M D T A trainees. The computed F value of 1.4894 with 90 and 1 degrees of freedom was not significant beyond the .05 level. On the basis of this F value, the hypothesis was not rejected.

Hypothesis 28: There is no statistically significant difference in the Writing achievement scores of male and female M D T A trainees. The F value was 0.3562 with 1 and 90 degrees of freedom. This was not a significant difference beyond the .05 level, and the hypothesis was not rejected.

Hypothesis 29: There is no statistically significant difference in the Listening achievement scores of male and female M D T A trainees. The computed F value of 0.0081 with 1 and 90 degrees of freedom was not significant beyond the .05 level of confidence. The hypothesis was not rejected.

TABLE 9

ANALYSIS OF COVARIANCE OF S T E P SCORES OF MALE
AND FEMALE HIGH SCHOOL DROPOUTS

Subject	d f	F Value
Reading	90-1	1.4894
Writing	1-90	0.3562
Listening	1-90	0.0081
Social Studies	1-90	0.7966
Mathematics	1-90	0.5628
Science	1-90	0.0103

*Significant at .05 level.

Hypothesis 30: There is no statistically significant difference in the Social Studies achievement scores of male and female M D T A trainees. The F value of 0.7966 with 1 and 90 degrees of freedom was not significant beyond the .05 confidence level. Thus, the hypothesis was not rejected.

Hypothesis 31: There is no statistically significant difference in the Mathematics achievement scores of male and female M D T A trainees. The computed F value of

0.5628 with 1 and 90 degrees of freedom was not significant at the .05 level. The hypothesis was not rejected.

Hypothesis 32: There is no statistically significant difference in the Science achievement scores of male and female M D T A trainees. The computed F value was 0.0103 with 1 and 90 degrees of freedom. This was not significant at the .05 level, and the hypothesis was not rejected.

Age

Hypothesis 33: There is no statistically significant difference in the Reading achievement scores of M D T A trainees ages 19- and 20+. The computed F value of 0.0059 with 1 and 90 degrees of freedom was not significant beyond the .05 level, and the hypothesis failed to be rejected.

Hypothesis 34: There is no statistically significant difference in the Writing achievement scores of the M D T A trainees ages 19- and 20+. The computed F value of 1.2735 with 90 and 1 degrees of freedom was not significant at the .05 confidence level, and the hypothesis was not rejected.

Hypothesis 35: There is no statistically significant difference in the Listening achievement scores of the M D T A trainees ages 19- and 20+. The computed F value of 0.0011 with 1 and 90 degrees of freedom was not significant at the .05 level. The hypothesis was not rejected.

Hypothesis 36: There is no statistically significant difference in the Social Studies achievement scores of

the M D T A trainees ages 19- and 20+. The F value was 0.1376 with 1 and 90 degrees of freedom. This was determined to be insignificant at the .05 level, and the hypothesis failed to be rejected.

TABLE 10

ANALYSIS OF COVARIANCE OF S T E P SCORES OF HIGH SCHOOL DROPOUTS AGES 19- AND 20+

Subject	d f	F Value
Reading	1-90	0.0059
Writing	90-1	1.2735
Listening	1-90	0.0011
Social Studies	1-90	0.1376
Mathematics	1-90	0.7817
Science	1-90	0.1575

*Significant at .05 level.

Hypothesis 37: There is no statistically significant difference in the Mathematics achievement scores of the M D T A trainees ages 19- and 20+. The F value computed was 0.7817 with 1 and 90 degrees of freedom. This was not significant at the .05 level, and the hypothesis was not rejected.

Hypothesis 38: There is no statistically significant difference in the Science achievement scores of the M D T A trainees ages 19- and 20+. The computed F value of 0.1575 with 1 and 90 degrees of freedom was not significant beyond the .05 confidence level. The hypothesis was not rejected.

Race

Hypothesis 39: There is no statistically significant difference in the Reading achievement scores of white and non-white M D T A trainees. The computed F value of 0.5224 with 1 and 90 degrees of freedom was not significant beyond the .05 level, and the hypothesis was not rejected.

TABLE 11

ANALYSIS OF COVARIANCE OF S T E P SCORES OF WHITE AND
NON-WHITE HIGH SCHOOL DROPOUTS

Subject	d f	F Value
Reading	1-90	0.5224
Writing	1-90	0.3914
Listening	1-90	0.0004
Social Studies	1-90	0.5859
Mathematics	1-90	0.1331
Science	1-90	0.0064

*Significant at .05 level.

Hypothesis 40: There is no statistically significant difference in the Writing achievement scores of white and non-white M D T A trainees. The computed F value of 0.3914 with 1 and 90 degrees of freedom was not significant beyond the .05 level, and the hypothesis was not rejected.

Hypothesis 41: There is no statistically significant difference in the Listening achievement scores of white and non-white M D T A trainees. The computed F value was

0.0004 with 1 and 90 degrees of freedom. This was not significant at the .05 confidence level, and the hypothesis was not rejected.

Hypothesis 42: There is no statistically significant difference in the Social Studies achievement scores of white and non-white M D T A trainees. The F value was 0.5859 with 1 and 90 degrees of freedom. This was not significant beyond the .05 level, and the hypothesis failed to be rejected.

Hypothesis 43: There is no statistically significant difference in the Mathematics achievement scores of white and non-white M D T A trainees. The computed F value of 0.1331 with 1 and 90 degrees of freedom was not significant beyond the .05 level, and the hypothesis was not rejected.

Hypothesis 44: There is no statistically significant difference in the Science achievement scores of white and non-white M D T A trainees. The computed F value of 0.0064 with 1 and 90 degrees of freedom was not significant beyond the .05 confidence level. On the basis of this value, the hypothesis was not rejected.

Vocational Achievement

The Mann-Whitney U Test of significance was used to determine if significant difference existed between the subgroups for six different vocations. Tables 12, 13, 14, 15, 16, 17, 18, 19, 20, and 21 include the z values computed for

tests utilized in each of the six vocational areas. These tables include all of the U and z values reported in Appendix A, Tables 75-149.

Stenography

Differences were tested on ten different test scores related to the various skills necessary in stenographic work. Table 12 includes the results of these tests of significance as computed on the basis of cultural background.

Hypothesis 45: There is no statistically significant difference in the Spelling scores of the M D T A stenographic trainees with rural and nonrural backgrounds. The computed z value of -0.1406 had a two tailed probability greater than .05. This was not significant, and the hypothesis was not rejected.

Hypothesis 46: There is no statistically significant difference in the Computation scores of the M D T A stenographic trainees with rural and nonrural backgrounds. The computed z value was -0.9109 with a two tailed probability greater than .05. This was not significant, and the hypothesis failed to be rejected.

Hypothesis 47: There is no statistically significant difference in the Checking scores of the M D T A stenographic trainees with rural and nonrural backgrounds. The computed z value was -0.4586 and had a two tailed probability greater than .05. This was not significant, and the hypothesis was not rejected.

Hypothesis 48: There is no statistically significant difference in the Word Meaning scores of the M D T A stenographic trainees with rural and nonrural backgrounds. The computed z value was -1.4404 . This value had a two tailed probability greater than $.05$ and was not significant. The hypothesis was not rejected.

Hypothesis 49: There is no statistically significant difference in the Copying scores of the M D T A stenographic trainees with rural and nonrural backgrounds. The computed z value was -0.1911 . This value had a two tailed probability greater than $.05$ and was not significant. The hypothesis was not rejected.

Hypothesis 50: There is no statistically significant difference in the Reasoning scores of the M D T A stenographic trainees with rural and nonrural backgrounds. The computed z value was -0.1286 and had a two tailed probability greater than $.05$. This was not significant, and the hypothesis failed to be rejected.

Hypothesis 51: There is no statistically significant difference in the Number Comparison scores of the M D T A stenographic trainees with rural and nonrural backgrounds. The computed z value was -0.8136 . This value had a two tailed probability greater than $.05$. This was not significant, and the hypothesis failed to be rejected.

Hypothesis 52: There is no statistically significant difference in the Name Comparison scores of the M D T A

stenographic trainees with rural and nonrural backgrounds. The computed z value was -0.5469 , and the two tailed probability of this value was greater than $.05$. This was not significant, and the hypothesis was not rejected.

TABLE 12

THE MANN-WHITNEY U TEST OF SIGNIFICANCE OF DIFFERENCE OF
TEN VOCATIONAL ACHIEVEMENT SCORES OF STENOGRAPHERS
WITH RURAL AND NONRURAL BACKGROUNDS

Subject	Rural		Nonrural		z Value
	N ₁	U ₁	N ₂	U ₂	
Spelling	24	221.5	18	210.5	-0.1406
Computation	24	180.5	18	351.5	-0.9109
Checking	24	198.0	18	369.0	-0.4586
Word Meaning	24	272.5	18	159.5	-1.4404
Copying	24	208.5	18	223.5	-0.1911
Reasoning	24	211.0	18	221.0	-0.1286
Number Comparison	24	248.0	18	184.0	-0.8136
Name Comparison	24	194.5	18	237.5	-0.5469
Shorthand Speed	24	186.0	18	246.0	-0.8252
Typing Speed	24	222.0	18	210.0	-0.1528

*Significant at $.05$ level.

Hypothesis 53: There is no statistically significant difference in the Shorthand Speed scores of the M D T A stenographic trainees with rural and nonrural backgrounds. The computed z value was -0.8252 with a two tailed probability greater than $.05$. This was not significant, and the hypothesis was not rejected.

Hypothesis 54: There is no statistically significant difference in the Typing Speed scores of the M D T A stenographic trainees with rural and nonrural backgrounds. The computed z value was -0.1528 with a two tailed probability greater than $.05$. This was not significant, and the hypothesis failed to be rejected.

Specific null hypotheses 55-64 were related to home background. Table 13 includes the results of the tests of significance as computed for the subgroups of this variable.

Hypothesis 55: There is no statistically significant difference in the Spelling scores of the M D T A stenographic trainees with stable and broken home backgrounds. The computed z value was -1.6542 , and the two tailed probability was greater than $.05$. This was not significant, and the hypothesis was not rejected.

Hypothesis 56: There is no statistically significant difference in the Computation scores of the M D T A stenographic trainees with stable and broken home backgrounds. The computed z value was -0.2092 . This value had a two tailed probability greater than $.05$ and was not significant. On the basis of this computation, the hypothesis failed to be rejected.

Hypothesis 57: There is no statistically significant difference in the Checking scores of the M D T A stenographic trainees with stable and broken home backgrounds. The computed z value was -0.4154 , and the two tailed

probability was greater than .05. This was not significant, and the hypothesis was not rejected.

TABLE 13

THE MANN-WHITNEY U TEST OF SIGNIFICANCE OF DIFFERENCE OF
TEN VOCATIONAL ACHIEVEMENT SCORES OF STENOGRAPHERS
WITH STABLE AND BROKEN HOME BACKGROUNDS

Subject	Stable		Broken		z Value
	N ₁	U ₁	N ₂	U ₂	
Spelling	26	271.5	16	144.5	-1.6542
Computation	26	216.0	16	200.0	-0.2092
Checking	26	224.0	16	192.0	-0.4154
Word Meaning	26	185.0	16	231.0	-0.5975
Copying	26	175.0	16	241.0	-0.8568
Reasoning	26	167.5	16	248.5	-1.0611
Number Comparison	26	146.5	16	269.5	-1.5933
Name Comparison	26	203.0	16	213.0	-0.1296
Shorthand Speed	26	191.0	16	225.0	-0.4765
Typing Speed	26	154.0	16	262.0	-1.4018

*Significant at .05 level.

Hypothesis 58: There is no statistically significant difference in the Word Meaning scores of the M D T A stenographic trainees with stable and broken home backgrounds. The computed z value of -0.5975 was not significant as the two tailed probability was greater than .05. The hypothesis was not rejected.

Hypothesis 59: There is no statistically significant difference in the Copying scores of the M D T A stenographic trainees with stable and broken home backgrounds. The computed z value was -0.8568 . This was not significant as the two tailed probability was greater than $.05$. The hypothesis was not rejected.

Hypothesis 60: There is no statistically significant difference in the Reasoning scores of the M D T A stenographic trainees with stable and broken home backgrounds. The computed z value of -1.0611 was not significant as the two tailed probability of this value was greater than $.05$. The hypothesis was not rejected.

Hypothesis 61: There is no statistically significant difference in the Number Comparison scores of the M D T A stenographic trainees with stable and broken home backgrounds. The computed z value was -1.5933 . This was not significant as the two tailed probability was greater than $.05$. The hypothesis failed to be rejected.

Hypothesis 62: There is no statistically significant difference in the Name Comparison scores of the M D T A stenographic trainees with stable and broken home backgrounds. The computed z value was -0.1296 . This was not significant as the two tailed probability was greater than $.05$. The hypothesis was not rejected.

Hypothesis 63: There is no statistically significant difference in the Shorthand Speed scores of the M D T A

stenographic trainees with stable and broken home backgrounds. The computed z value of -0.4765 was not significant as the two tailed probability was greater than $.05$. The hypothesis was not rejected.

Hypothesis 64: There is no statistically significant difference in the Typing Speed scores of the M D T A stenographic trainees with stable and broken home backgrounds. The computed z value was -1.4018 . This was not significant as the two tailed probability was greater than $.05$. The hypothesis failed to be rejected.

Specific null hypotheses 65-74 were related to mobility. Table 14 includes the z values computed for the subgroups of this variable.

Hypothesis 65: There is no statistically significant difference in the Spelling scores of the M D T A stenographic trainees classified mobile and nonmobile. The computed z value was -1.7514 and was not significant as the two tailed probability was greater than $.05$. The hypothesis was not rejected.

Hypothesis 66: There is no statistically significant difference in the Computation scores of the M D T A stenographic trainees classified mobile and nonmobile. The computed z value of -0.4944 was not significant as the two tailed probability was greater than $.05$. The hypothesis was not rejected.

Hypothesis 67: There is no statistically significant difference in the Checking scores of the M D T A stenographic

trainees classified mobile and nonmobile. The computed z value was -0.8318 . The two tailed probability was greater than $.05$. This was not significant, and the hypothesis was not rejected.

TABLE 14

THE MANN-WHITNEY U TEST OF SIGNIFICANCE OF DIFFERENCE OF
TEN VOCATIONAL ACHIEVEMENT SCORES OF STENOGRAPHERS
CLASSIFIED MOBILE AND NONMOBILE

Subject	Mobile		Nonmobile		z Value
	N_1	U_1	N_2	U_2	
Spelling	13	252.5	29	124.5	-1.7514
Computation	13	206.5	29	170.5	-0.4944
Checking	13	219.0	29	158.0	-0.8318
Word Meaning	13	183.0	29	194.0	-0.1501
Copying	13	201.5	29	175.5	-0.3546
Reasoning	13	196.0	29	181.0	-0.2064
Number Comparison	13	231.0	29	146.0	-1.1566
Name Comparison	13	240.5	29	136.5	-1.4158
Shorthand Speed	13	222.5	29	154.5	-1.0012
Typing Speed	13	198.0	29	179.0	-0.2591

*Significant at $.05$ level.

Hypothesis 68: There is no statistically significant difference in the Word Meaning scores of the M D T A stenographic trainees classified mobile and nonmobile. The computed z value was -0.1501 with a two tailed probability greater than $.05$. This was not significant, and the hypothesis failed to be rejected.

Hypothesis 69: There is no statistically significant difference in the Copying scores of the M D T A stenographic trainees classified mobile and nonmobile. The computed z value was -0.3546 and had a two tailed probability greater than $.05$. This was not significant, and the hypothesis was not rejected.

Hypothesis 70: There is no statistically significant difference in the Reasoning scores of the M D T A stenographic trainees classified mobile and nonmobile. The computed z value was -0.2064 . This value was not significant because the two tailed probability was greater than $.05$. The hypothesis was not rejected.

Hypothesis 71: There is no statistically significant difference in the Number Comparison scores of the M D T A stenographic trainees classified mobile and nonmobile. The computed z value was -1.1566 , and the two tailed probability was greater than $.05$. This was not significant, and the hypothesis failed to be rejected.

Hypothesis 72: There is no statistically significant difference in the Name Comparison scores of the M D T A stenographic trainees classified mobile and nonmobile. The computed z value was -1.4158 . The two tailed probability was greater than $.05$. This was not significant, and the hypothesis was not rejected.

Hypothesis 73: There is no statistically significant difference in the Shorthand Speed scores of the M D T A

stenographic trainees classified mobile and nonmobile. The computed z value was -1.0012 with a two tailed probability greater than $.05$. This was not significant, and the hypothesis was not rejected.

Hypothesis 74: There is no statistically significant difference in the Typing Speed scores of the M D T A stenographic trainees classified mobile and nonmobile. The computed z value was -0.2591 . The two tailed probability was greater than $.05$. This was not significant, and the hypothesis was not rejected.

Specific null hypotheses 75-84 were related to age. Table 15 includes the z values computed for the subgroups of this variable.

Hypothesis 75: There is no statistically significant difference in the Spelling scores of the M D T A stenographic trainees ages 19- and 20+. The computed z value was -0.0130 with a two tailed probability greater than $.05$. This was not significant, and the hypothesis was not rejected.

Hypothesis 76: There is no statistically significant difference in the Computation scores of the M D T A stenographic trainees ages 19- and 20+. The computed z value was -0.7452 . This value had a two tailed probability greater than $.05$. This was not significant, and the hypothesis was not rejected.

Hypothesis 77: There is no statistically significant difference in the Checking scores of the M D T A stenographic trainees ages 19- and 20+. The computed z value was

-0.8698 with a two tailed probability greater than .05. This was not significant, and the hypothesis was not rejected.

TABLE 15

THE MANN-WHITNEY U TEST OF SIGNIFICANCE OF DIFFERENCE OF
TEN VOCATIONAL ACHIEVEMENT SCORES OF STENOGRAPHERS
AGES 19- AND 20+

Subject	Age 19-		Age 20+		z Value
	N ₁	U ₁	N ₂	U ₂	
Spelling	16	208.5	26	207.5	-0.0130
Computation	16	236.5	26	179.5	-0.7452
Checking	16	174.5	26	241.5	-0.8698
Word Meaning	16	250.5	26	165.5	-1.1041
Copying	16	210.5	26	205.5	-0.0649
Reasoning	16	228.0	26	188.0	-0.5240
Number Comparison	16	213.5	26	202.5	-0.1425
Name Comparison	16	179.5	26	236.5	-0.7387
Shorthand Speed	16	171.0	26	245.0	-1.0372
Typing Speed	16	199.5	26	216.5	-0.2207

*Significant at .05 level.

Hypothesis 78: There is no statistically significant difference in the Word Meaning scores of the M D T A stenographic trainees ages 19- and 20+. The computed z value was -1.1041 with a two tailed probability greater than .05. This was not significant, and the hypothesis was not rejected.

Hypothesis 79: There is no statistically significant difference in the Copying scores of the M D T A

stenographic trainees ages 19- and 20+. The computed z value was -0.0649. This value had a two tailed probability greater than .05 and was not significant. The hypothesis failed to be rejected.

Hypothesis 80: There is no statistically significant difference in the Reasoning scores of the M D T A stenographic trainees ages 19- and 20+. The computed z value of -0.5240 with a two tailed probability greater than .05 was not significant. The hypothesis was not rejected.

Hypothesis 81: There is no statistically significant difference in the Number Comparison scores of the M D T A stenographic trainees ages 19- and 20+. The computed z value was -0.1425. This value had a two tailed probability greater than .05 and was not significant. The hypothesis failed to be rejected.

Hypothesis 82: There is no statistically significant difference in the Name Comparison scores of the M D T A stenographic trainees ages 19- and 20+. The computed z value was -0.7387 with a two tailed probability greater than .05. This was not significant, and the hypothesis was not rejected.

Hypothesis 83: There is no statistically significant difference in the Shorthand Speed scores of the M D T A stenographic trainees ages 19- and 20+. The computed z value was -1.0372. This was not significant as the two tailed probability was greater than .05. The hypothesis failed to be rejected.

Hypothesis 84: There is no statistically significant difference in the Typing Speed scores of the M D T A stenographic trainees ages 19- and 20+. The computed z value of -0.2207 had a two tailed probability greater than .05 and was not significant. The hypothesis was not rejected.

Specific null hypotheses 85-94 were related to tests of significance between the subgroups for race. Table 16 includes the z values computed for the racial subgroups.

Hypothesis 85: There is no statistically significant difference in the Spelling scores of the white and non-white M D T A stenographic trainees. The computed z value was -0.0792. The two tailed probability was greater than .05, and this was not significant. The hypothesis failed to be rejected.

Hypothesis 86: There is no statistically significant difference in the Computation scores of the white and non-white M D T A stenographic trainees. The computed z value of -1.8815 had a two tailed probability greater than .05 and was not significant. The hypothesis was not rejected.

Hypothesis 87: There is no statistically significant difference in the Checking scores of the white and non-white M D T A stenographic trainees. The computed z value was -1.8682, and the two tailed probability was greater than .05. This was not significant, and the hypothesis failed to be rejected.

Hypothesis 88: There is no statistically significant difference in the Word Meaning scores of the white and

non-white M D T A stenographic trainees. The computed z value was -2.3959 with a two tailed probability smaller than $.05$. This was significant, and the hypothesis was rejected. The difference in favor of the white group was probably due to the differences in the general aptitudes of the two sub-groups.

TABLE 16

THE MANN-WHITNEY U TEST OF SIGNIFICANCE OF DIFFERENCE
OF TEN VOCATIONAL ACHIEVEMENT SCORES OF
WHITE AND NON-WHITE STENOGRAPHERS

Subject	White		Non-white		z Value
	N ₁	U ₁	N ₂	U ₂	
Spelling	27	205.5	15	199.5	-0.0792
Computation	27	131.5	15	273.5	-1.8815
Checking	27	131.5	15	273.5	-1.8682
Word Meaning	27	111.5	15	293.5	-2.3959*
Copying	27	157.5	15	247.5	-1.1841
Reasoning	27	120.0	15	285.0	-2.1907*
Number Comparison	27	184.0	15	221.0	-0.4858
Name Comparison	27	133.5	15	271.5	-1.8126
Shorthand Speed	27	165.5	15	239.5	-1.0512
Typing Speed	27	138.0	15	267.0	-1.6970

*Significant at $.05$ level.

Hypothesis 89: There is no statistically significant difference in the Copying scores of the white and non-white M D T A stenographic trainees. The computed z value

was -1.1841. The two tailed probability was greater than .05 and was not significant. The hypothesis was not rejected.

Hypothesis 90: There is no statistically significant difference in the Reasoning scores of the white and non-white M D T A stenographic trainees. The computed z value of -2.1907 with a two tailed probability smaller than .05 was significant. The hypothesis was rejected. The differences in favor of the white group were probably due to the differences in the general aptitudes of the two subgroups.

Hypothesis 91: There is no statistically significant difference in the Number Comparison scores of the white and non-white M D T A stenographic trainees. The computed z value was -0.4858. This value had a two tailed probability greater than .05 and was not significant. The hypothesis failed to be rejected.

Hypothesis 92: There is no statistically significant difference in the Name Comparison scores of the white and non-white M D T A stenographic trainees. The computed z value of -1.8126 with a two tailed probability was not significant. The hypothesis was not rejected.

Hypothesis 93: There is no statistically significant difference in the Shorthand Speed scores of white and non-white M D T A stenographic trainees. The computed z value was -1.0512. This value had a two tailed probability greater than .05 and was not significant. The hypothesis failed to be rejected.

Hypothesis 94: There is no statistically significant difference in the Typing Speed scores of the white and non-white M D T A stenographic trainees. The computed z value of -1.6970 with a two tailed probability greater than .05 was not significant. The hypothesis was not rejected.

Cosmetology

Tests of significance in Cosmetology were computed for the subgroups of each independent variable. The z values may be found by referring to Tables 17, 18, 19, 20, and 21.

Hypothesis 95: There is no statistically significant difference in the Cosmetology achievement scores of the M D T A cosmetology trainees with rural and nonrural backgrounds. The computed z value was -1.5694. This value had a two tailed probability greater than .05 and was not significant. On the basis of this computation, the hypothesis was not rejected.

Hypothesis 96: There is no statistically significant difference in the Cosmetology achievement scores of the M D T A cosmetology trainees with stable and broken home backgrounds. The computed z value was -1.0737, and the two tailed probability was greater than .05. This was not significant, and the hypothesis failed to be rejected.

Hypothesis 97: There is no statistically significant difference in the Cosmetology achievement scores of the M D T A cosmetology trainees classified mobile and nonmobile. The computed z value of -0.8189 with a two tailed probability

greater than .05 was not significant. On the basis of this computation, the hypothesis failed to be rejected.

TABLE 17

THE MANN-WHITNEY U TEST OF SIGNIFICANCE OF DIFFERENCE OF VOCATIONAL ACHIEVEMENT SCORES OF STUDENTS WITH RURAL AND NONRURAL BACKGROUNDS FOR FIVE DIFFERENT VOCATIONS

Vocation	Rural		Nonrural		z Value
	N ₁	U ₁	N ₂	U ₂	
Cosmetology	2	37.0	22	7.0	-1.5694
Auto Mechanics	2	11.5	8	4.5	-0.9195
Machines	2	6.0	8	10.0	-0.5222
Sheet Metal	0	0.0	5	0.0	0.0000
Welding	1	2.0	2	0.0	0.0000

*Significant at .05 level.

Hypothesis 98: There is no statistically significant difference in the Cosmetology achievement scores of the M D T A cosmetology trainees ages 19- and 20+. The computed z value was -0.2091. The two tailed probability was greater than .05 and was, therefore, not significant. The hypothesis was not rejected.

Hypothesis 99: There is no statistically significant difference in the Cosmetology achievement scores of the white and non-white M D T A cosmetology trainees. The computed z value of -2.0532 with a two tailed probability smaller than .05 was significant. The hypothesis was rejected. The difference in favor of the white group was probably due

to the differences in the general aptitude of the two subgroups.

Auto Mechanics

Tests of significance in Auto Mechanics were computed for the subgroups of each independent variable except race and sex. All subjects were male and white. However, the z values computed may be found by referring to Tables 17, 18, 19, and 20.

Hypothesis 100: There is no statistically significant difference in the Automotive achievement scores of the rural and nonrural M D T A trainees in Auto Mechanics. The computed z value of -0.9195 with a two tailed probability greater than $.05$ was not significant. The hypothesis was not rejected.

Hypothesis 101: There is no statistically significant difference in the Automotive achievement scores of the M D T A trainees in Auto Mechanics with stable and broken home backgrounds. The computed z value of -0.2627 with a two tailed probability greater than $.05$ was not significant. The hypothesis failed to be rejected.

Hypothesis 102: There is no statistically significant difference in the Automotive achievement scores of the M D T A trainees in Auto Mechanics classified mobile and non-mobile. The computed z value of -0.5363 with a two tailed probability greater than $.05$ was not significant. The hypothesis was not rejected.

Hypothesis 103: There is no statistically significant difference in the Automotive achievement scores of the M D T A trainees in Auto Mechanics ages 19- and 20+. The computed z value of -0.4290 with a two tailed probability greater than .05 was not significant. The hypothesis was not rejected.

TABLE 18

THE MANN-WHITNEY U TEST OF SIGNIFICANCE OF DIFFERENCE OF VOCATIONAL ACHIEVEMENT SCORES OF STUDENTS WITH STABLE AND BROKEN HOME BACKGROUNDS FOR FIVE DIFFERENT VOCATIONS

Vocation	Stable		Broken		z Value
	N ₁	U ₁	N ₂	U ₂	
Cosmetology	11	53.0	13	90.0	-1.0737
Auto Mechanics	8	7.0	2	9.0	-0.2627
Machines	5	1.0	5	24.0	-2.4023*
Sheet Metal	1	4.0	4	0.0	0.0000
Welding	2	0.0	1	2.0	0.0000

*Significant at .05 level.

Hypothesis 104: There is no statistically significant difference in the Automotive achievement scores of the white and non-white M D T A trainees in Auto Mechanics. The z value could not be computed as there were no non-white subjects enrolled.

Machines

Tests of significance in Machines were computed for the subgroups of each independent variable. The exceptions

were sex and age. All subjects were male and 20 years of age and older. However, the z values computed may be found in Tables 17, 18, 19, and 21.

Hypothesis 105: There is no statistically significant difference in the Machinist achievement scores of the M D T A trainees with rural and nonrural backgrounds. The computed z value was -0.5222 with a two tailed probability greater than .05. This was not significant, and the hypothesis was not rejected.

TABLE 19

THE MANN-WHITNEY U TEST OF SIGNIFICANCE OF DIFFERENCE OF VOCATIONAL ACHIEVEMENT SCORES OF STUDENTS CLASSIFIED MOBILE AND NONMOBILE FOR FIVE DIFFERENT VOCATIONS

Vocation	Mobile		Nonmobile		z Value
	N ₁	U ₁	N ₂	U ₂	
Cosmetology	5	59.0	19	36.0	-0.8189
Auto Mechanics	4	9.5	6	14.5	-0.5363
Machines	4	6.0	6	18.0	-1.2792
Sheet Metal	4	1.5	1	2.5	-0.3627
Welding	1	1.0	2	1.0	0.0000

*Significant at .05 level.

Hypothesis 106: There is no statistically significant difference in the Machinist achievement scores of the M D T A trainees with stable and broken home backgrounds. The computed z value of -2.4023 with a two tailed probability smaller than .05 was significant. The hypothesis was

rejected. The difference was attributed to the difference in the home backgrounds of the two subgroups.

Hypothesis 107: There is no statistically significant difference in the Machinist achievement scores of the M D T A trainees classified mobile and nonmobile. The computed z value was -1.2792 with a two tailed probability greater than $.05$. This was not significant, and the hypothesis was not rejected.

Hypothesis 108: There is no statistically significant difference in the Machinist achievement scores of the M D T A trainees ages 19- and 20+. The z value could not be computed as all subjects were age 20+.

Hypothesis 109: There is no statistically significant difference in the Machinist achievement scores of the white and non-white M D T A trainees in Machines. The computed z value of -1.9845 with a two tailed probability greater than $.05$ was not significant. The hypothesis was not rejected.

Sheet Metal

Tests of significance in Sheet Metal were computed for the subgroups of each independent variable. The exceptions were cultural background, home background, age, and sex. There were no rural subjects, one subject with a stable home background, one subject under 20 years of age, and all subjects were male. Therefore, all computations made on these variables ended with a z value of 0.0000 . However,

computations were made on mobility and race. The z values for these computations may be found by referring to Tables 19 and 20.

Hypothesis 110: There is no statistically significant difference in the Sheet Metal achievement scores of the M D T A trainees with rural and nonrural backgrounds. The z value could not be computed as all the subjects possessed nonrural backgrounds.

Hypothesis 111: There is no statistically significant difference in the Sheet Metal achievement scores of the M D T A trainees in Sheet Metal with stable and broken home backgrounds. The z value could not be computed as only one subject possessed a stable home background.

Hypothesis 112: There is no statistically significant difference in the Sheet Metal achievement scores of the M D T A trainees in Sheet Metal classified mobile and non-mobile. The computed z value was -0.3627. The two tailed probability was greater than .05 and was not significant. The hypothesis was not rejected.

Hypothesis 113: There is no statistically significant difference in the Sheet Metal achievement scores of the M D T A trainees in Sheet Metal ages 19- and 20+. The z value could not be computed as there was only one subject under 20 years of age.

Hypothesis 114: There is no statistically significant difference in the Sheet Metal achievement scores of the

white and non-white M D T A trainees in Sheet Metal. The computed z value of -0.3627 with a two tailed probability greater than .05 was not significant. The hypothesis failed to be rejected.

TABLE 20

THE MANN-WHITNEY U TEST OF SIGNIFICANCE OF DIFFERENCE OF VOCATIONAL ACHIEVEMENT SCORES OF STUDENTS AGES 19- AND 20+ FOR FIVE DIFFERENT VOCATIONS

Vocation	Age 19-		Age 20+		z Value
	N ₁	U ₁	N ₂	U ₂	
Cosmetology	9	71.0	15	64.0	-0.2091
Auto Mechanics	4	10.0	6	14.0	-0.4290
Machines	0	0.0	10	0.0	0.0000
Sheet Metal	1	4.0	4	0.0	0.0000
Welding	1	2.0	2	0.0	0.0000

*Significant at .05 level.

Welding

Tests of significance in Welding could not be computed as only three subjects were enrolled in the program. As the z values were computed for these three subjects and all the values were 0.0000, they were included in Tables 17, 18, 19, 20, and 21. However, the computations were not valid, and specific null hypotheses 115-119 were not actually tested for statistical significance.

Hypothesis 115: There is no statistically significant difference in the Welding achievement scores of the

M D T A trainees with rural and nonrural backgrounds. The z value could not be computed due to insufficient sample size.

Hypothesis 116: There is no statistically significant difference in the Welding achievement scores of the M D T A trainees with stable and broken home backgrounds. The z value could not be computed due to insufficient sample size.

Hypothesis 117: There is no statistically significant difference in the Welding achievement scores of the M D T A trainees classified mobile and nonmobile. The z value could not be computed due to insufficient sample size.

Hypothesis 118: There is no statistically significant difference in the Welding achievement scores of the M D T A trainees ages 19- and 20+. The z value could not be computed due to insufficient sample size.

TABLE 21

THE MANN-WHITNEY U TEST OF SIGNIFICANCE OF DIFFERENCE OF VOCATIONAL ACHIEVEMENT SCORES OF WHITE AND NON-WHITE STUDENTS FOR FIVE DIFFERENT VOCATIONS

Vocation	White		Non-white		z Value
	N ₁	U ₁	N ₂	U ₂	
Cosmetology	12	36.5	12	107.5	-2.0532*
Auto Mechanics	10	0.0	0	0.0	0.0000
Machines	5	3.0	5	22.0	-1.9845
Sheet Metal	4	1.5	1	2.5	-0.3627
Welding	3	0.0	0	0.0	0.0000

*Significant at .05 level.

Hypothesis 119: There is no statistically significant difference in the Welding achievement scores of the white and non-white M D T A trainees. The z value could not be computed due to insufficient sample size.

Summary

Three different types of statistical analyses were made in this study. They were (1) the chi-square test of significance, (2) the single classification analysis of covariance, and (3) the Mann-Whitney U Test.

The first was made to find if significant differences existed in the proportions of students completing the program and those who re-dropped out. It was also made to find if significant differences existed in the proportions of students rated successful and unsuccessful by teachers for the subgroups of cultural background.

The second was made to determine if significant differences existed in the academic achievement for the subgroups of each independent variable. The third was made to test for homogeneity in terms of aptitude for each of the various subgroups. It was also used to determine if significant differences existed in the vocational achievement of the subgroups for each of the independent variables.

On the basis of these analyses, significant differences were found to exist for only one of the seven questions and eight of the 119 specific null hypotheses. A significant difference was found to exist in the general aptitude

of white and non-white groups. There were also significant differences found relative to completion and noncompletion of the program between the subgroups of home background, sex, age, and race.

No significant differences were found relative to academic achievement. However, relative to vocational achievement, significant differences were found to exist between the racial subgroups on the Word Meaning and Reasoning scores of stenographic trainees, and on the Cosmetology scores of cosmetology trainees. A significant difference was also found to exist between the home background subgroups on achievement in Machines.

CHAPTER VI

SUMMARIZATION

Scope of the Study

This study was designed to be a systematic analysis of the federally-supported Manpower Development Training Program in Oklahoma City. More specifically, it was designed to determine if recaptured high school dropouts differing in cultural and home backgrounds, mobility, sex, age, and race differ significantly in terms of (1) program completion and noncompletion; (2) training success; (3) academic achievement; and (4) vocational achievement, when trained in a special program of this type.

The project was also designed to serve as a pilot program analysis for a Ford Foundation sponsored research project. Efforts were made to identify adequate instruments of measurement, programmatic weaknesses, and possible procedural pitfalls in carrying out an investigation of these particular types of young people.

The design of the study required the answering of seven questions pertinent to aptitudes. It also required the testing of four general null hypotheses relative to the

two stratified subgroups of each of the six previously mentioned independent variables. These were (1) there is no statistically significant difference in the proportions of re-dropouts and non-withdrawals in the training program; (2) there is no statistically significant difference in the proportions of rural and nonrural participants rated successful in training when compared to those rated unsuccessful; (3) there is no statistically significant difference in the academic achievement of high school dropouts in the M D T A Training Program in Oklahoma City; and (4) there is no statistically significant difference in the vocational achievement of high school dropouts in the Oklahoma City M D T A Program. These four general null hypotheses were divided into 119 specific null hypotheses to be tested.

Population

The population of the study included 168 trainees enrolled in the M D T A Training Program in Oklahoma City during the 1963-64 school year. Only those who completed at least one section of the S T E P pretests were considered in the study. All subjects were selected on the basis of screening procedures used by the Oklahoma Employment Security Commission. Subjects were between 18 and 22 years of age, had been either unemployed or underemployed, had dropped out of high school at least two years prior to entry, and were considered free of serious mental or physical deficiencies.

Analyses

All subjects were classified and placed into stratified subgroups for six independent variables on the basis of interviews and school records. Students who failed to complete both pretests and post-tests and were no longer in active attendance were classified as re-dropouts and placed in the noncompletion group. All others were classified as high school graduates and placed into the completion group. Student success in training was determined on the basis of teacher evaluations in terms of interest, attendance, classroom behavior, class participation, and grades. Comparisons were made between the subgroups in terms of academic achievement. The academic areas compared included Reading, Writing, Listening, Social Studies, Mathematics, and Science. Vocational achievement comparisons were made in Stenography, Cosmetology, Auto Mechanics, Machines, Sheet Metal, and Welding.

The Sequential Tests of Educational Progress were used to obtain data for determining differences in academic achievement. The instruments utilized in gaining information for determining differences in vocational achievement were the (1) Minnesota Clerical Test, (2) Purdue Clerical Adaptability Test, (3) Gregg Shorthand Speed Test, (4) Gregg Typing Speed Test, (5) Oklahoma State Board of Cosmetology Operators Examination, (6) Garage Mechanic Test, (7) Purdue Trade Information Test for Machinists and Machine Operators, (8) Purdue Trade Information Test for Sheet Metal Workers, and (9) Purdue Trade Information Test in Welding. The ratings of

training success were obtained through the utilization of a specially prepared Teachers' Checklist. All the other information used in this study was obtained either through Structured Interviews or from school records.

Three statistical techniques were utilized in computing the tests of significance. These were (1) the chi-square test of significance, (2) the Mann-Whitney U Test, and (3) the single classification analysis of covariance. All formulas were programmed by a professional programmer and computations made on a high speed 1620 IBM computer.

Findings and Interpretations

Aptitude

In the Mann-Whitney U Tests, which were computed relevant to the aptitudes of the subgroups of the six independent variables and the two groups of re-dropouts, six of the seven indicated no significant difference at the .05 level of confidence. However, a significant difference was found to exist between the white and non-white subgroups. This finding was not surprising when considered in terms of current sociological literature. The data in literature such as Black Metropolis¹ and White and Negro Schools in the South² lend supporting evidence that the Negro people have not enjoyed a

¹St. Clair Drake and Horace R. Cayton, Black Metropolis (New York: Harper & Row, 1962).

²Truman M. Pierce et al., White and Negro Schools in the South (Englewood Cliffs: Prentice-Hall, Inc., 1955).

comparable position with whites in terms of cultural, social, economic, and educational opportunities in the United States.

Program Holding Power

In the chi-square tests of significance computed, four of six indicated significant differences in terms of program completion and noncompletion. These four significant differences--at the .05 level of confidence--were between the subgroups of home background, sex, age, and race. From these computations it was determined that participants who came from stable homes were more likely to complete the entire program than participants coming from unstable homes. This finding was in agreement with those of Lanier, Gragg, Hollingshead, and Snapp. On the basis of this finding, evidently a relationship did exist between home background and the holding power of the program.

It was determined that females were more likely to complete the program than males. Other studies included in the review indicated the same trend. Hecker found that 55 per cent of the school leavers in Kentucky were boys. Dillon reported 54 per cent in Michigan, Ohio, and Indiana; and according to the Maryland State Department of Education, 55 per cent of the dropouts in Maryland are boys. On the basis of consideration given previous findings, and the computations of this investigation, apparently boys are more likely to re-drop out than girls after being enrolled in programs of this type.

Participants who were 20 years of age and older were found to be better risks in terms of program completion than trainees under this age. Students who were older displayed greater concern for their economic well-being, as well as more maturity in their approach to establishing and accomplishing goals. This was not found true for participants under 20 years of age.

The program was found to have greater holding power for white trainees than non-white. When evaluated on the basis of the economic, social, cultural, and educational experiences of the participants, the program did very well even in terms of non-white trainees. However, non-white students were found to have poorer attendance records, and appeared less interested in the training than white participants.

These findings were consistent with those found in a majority of the previous studies reviewed in this investigation. On the basis of these findings, one might logically conclude that a non-white boy--under age 20, coming from a broken home background, who is selected for training--is more likely to re-drop out prior to completion of an extensive program of this type than a white boy, age 20 or older, coming from a stable home background. However, it could well be that any one of these factors, or any combination of factors, could just as easily have resulted in a participant's re-dropping out of the program.

When considered on the basis of findings reported in previous investigations, probably one of the more important

findings in this study was that no significant difference existed in the proportions of students who re-dropped and those who completed the program when compared on the basis of cultural background. It has been pointed out in current literature that many high school dropouts are students who have migrated from rural to urban areas and are greatly handicapped because of the inadequacy of their cultural experiences, economic position, and educational training. Publications such as The Culturally Deprived Child,³ Knowing and Teaching the Migrant Child,⁴ and The Education of Migrant Children⁵ all support this contention. However, on the basis of the results of this study, this was not found true. Because such conflicting findings in research exist and because certain stereotypes are known to be held, it would seem that serious consideration should be given to carrying out additional research projects in an effort to determine if these inadequacies do really exist, and if the students who move from rural areas to the heavily urbanized centers are actually handicapped in terms of the factors necessary for academic-vocational achievement and over-all training success.

³Frank Riessman, The Culturally Deprived Child (New York: Harper & Row, 1962).

⁴Elizabeth Sutton, Knowing and Teaching the Migrant Child (Washington, D. C.: N. E. A. Department of Rural Education, 1960).

⁵Shirley E. Greene, The Education of Migrant Children (Washington, D. C.: National Council on Agricultural Life and Labor, N. E. A. Department of Rural Education, 1954).

Educators have claimed in the past that a relationship does exist between the mobility of students and their ability to successfully complete school. It has been generally concluded that a student who moves about the country on numerous occasions does poorly in his academic work, is likely to develop serious social maladjustments, is vulnerable to emotional disturbances, and as a result is more likely to drop out of school than students who come from families that are stable in the community. These stereotypes have been held by educators and the general public alike for the past several decades.

In this study, there was no significant difference found to exist between the subgroups on the mobility variable. Participants from families classified mobile stayed in the program almost as well as those students who came from families classified as nonmobile.

On the basis of these two findings--and contrary to many present-day beliefs--it would seem that whether or not a student is from a rural or urban background, or comes from a mobile or nonmobile family, has little influence on his ability to successfully complete his training. This also indicates the possibility that present-day society has become so mobile and urbanized that such factors as cultural background and family mobility no longer significantly influence the educational training of present-day youngsters. At least, it can be said with certainty that these factors did

not significantly influence the completion or noncompletion of this particular program by those participants included in the investigation.

Training Success

In the chi-square tests of significance, relevant to training success as evaluated by teachers, no significant difference was found to exist in the proportions of rural students rated successful when compared with nonrural students rated successful. No significant difference was found to exist in the proportions of rural students rated unsuccessful when compared to nonrural students rated unsuccessful. On the basis of this evidence, cultural background apparently had little influence upon the over-all training success of the M D T A trainees. Participants with rural backgrounds seemingly achieved as much academically and vocationally as nonrural participants. They also displayed similar emotional stability, and were considered as well adjusted socially by their teachers as those participants coming from nonrural backgrounds.

Academic Achievement

On the basis of the thirty-six F values obtained through the technique known as single classification analysis of covariance, no significant differences at the .05 level were found to exist between the subgroups in terms of academic achievement. These values were computed for each of the six academic areas tested.

No significant differences in academic achievement were found between the racial subgroups even though a significant difference was found to exist in terms of their aptitudes. On the basis of this finding, it was determined that non-white participants were able to overcome any handicap that might have been caused by aptitude deficiencies and to achieve almost as well as white participants. However, it should be noted that mean gains in terms of achievement scores were very small, thus limiting any conclusions which might be drawn.⁶ The program was not considered biased toward any particular subgroup even though non-white participants achieved ahead of their aptitudes.

After comparing the mean achievement scores for each of the areas tested, it was determined that greater over-all gains were made in Reading, Listening, and Science. Almost negligible gains were made in Writing, Social Studies, and Mathematics. However, gains in all the areas were certainly too small to claim the program desirable in terms of academic achievement for these particular types of youth.

No significant differences were found to exist between the subgroups of cultural background, home background, and mobility in terms of academic achievement. These findings were not in agreement with the stereotyped beliefs prevalent in present-day thought and commonly expounded in current literature. The educational handicaps relative to

⁶See Appendix A, Table 151.

the above variables are pointed out in publications such as Slums and Suburbs,⁷ Education and the Disadvantaged American,⁸ and Education in Depressed Areas.⁹

It should be noted that significant differences were not found between the subgroups in any of the academic areas tested. On the basis of these findings, the comparison variables used in this study apparently did not account for variability in academic performance by participants in the program. Evidently these young people are no longer handicapped as previously thought. This raises doubt as to the accuracy of certain previously held stereotyped beliefs, and indicates the possibility that social changes have taken place whereby the influence of these factors has been virtually eliminated.

Significant differences in academic achievement were not found between the subgroups of age and sex. Students under age 20 achieved approximately the same as those over this age. This was an interesting finding inasmuch as participants under age 20 displayed greater instability, lack of maturity, and educational experience. Male participants were found to achieve as well academically as females. This finding was also surprising as the male participants had recorded poorer attendance records, showed less concern for their work, and displayed signs of poor adjustment to the training

⁷Conant, op. cit.

⁸Educational Policies Commission, op. cit.

⁹Passow, op. cit.

program. The re-dropout rate was higher among males indicating less interest in the program and greater instability in terms of personal goals in life.

Vocational Achievement

In the Mann-Whitney U Tests computed relevant to vocational achievement, only four of seventy-five indicated significant differences at the .05 confidence level. Two of these were between the subgroups of race on Word Meaning and Reasoning scores. Both of these scores were directly related to the stenographic skills necessary for success in Stenography. The other two significant differences were found to exist between the racial subgroups in Cosmetology and the home background subgroups in Machines.

The reasons for these significant differences between the racial subgroups were attributed to aptitudes, as there was little doubt that non-white participants entered the program not having had equal cultural-social-educational experiences. However, these differences could have been the result of cultural bias in the measuring instrument. Regardless of the reason, there was a significant difference in favor of the white group of participants.

The significant difference found between the home background subgroups in Machines was attributed to emotional instability and lack of adjustment in the program. To be successful in Machine training, a participant should be emotionally stable, possess average intelligence, and have good

numerical and spatial aptitudes and manual dexterity. Participants who were enrolled in Machines possessed the latter four attributes on the basis of test scores, but 50 per cent had come from broken homes and were guilty of frequent emotional outbursts throughout the training program.

No significant differences were found between the subgroups on seventy-one of the tests computed. Therefore, it was impossible to distinguish between the subgroups in terms of vocational achievement. Regardless of the lack of significance in the differences existing between the subgroups, it should be noted that all vocational teachers indicated that significant gains had been observed in the mastery of skills necessary for success in the various vocations. Terminal achievement scores were found to indicate that participants who had completed the program should be able to compete for employment in their chosen fields.

Conclusions

From the results of this investigation, the following conclusions relative to the M D T A Training Program in Oklahoma City were made:

1. It was concluded that, when economic and social barriers to successful training are removed through subsistence allowances and homogeneous grouping in terms of social attributes, withdrawal rates from public school training programs may be significantly reduced.

2. The traditional rural, nonrural dichotomy, which assumes that rural youth suffer greater academic handicaps than urban youth, was not upheld by this study. Because no significant differences were found between urban and rural youth in their ability to complete the M D T A Training Program successfully, it was concluded that urban, rural differences may be disappearing. The variable may no longer significantly influence achievement in public school programs.

3. Differences in academic-vocational achievement and over-all training success between youngsters, who possess different cultural backgrounds and histories of family mobility, may be appreciably reduced when serious attempts are made by qualified school personnel to overcome handicaps accentuated by these factors.

4. Completion rates of programs of this type may be significantly influenced by the selection criteria in terms of age, race, and home background factors.

5. Underachieving youngsters may be appreciably helped in terms of social-academic-vocational achievement through nonsequential activities that relate courses of study directly to specific skill areas, increased individual attention, and being allowed to progress at individual rates of speed.

Recommendations

On the basis of the results of this pilot investigation, the following recommendations pertinent to future programs and research seemed warranted.

Future Programs

1. Cultural free tests should be used in selecting trainees for specialized training in programs of this type.

2. Expert guidance services, along with motivating student activities that are directed toward the needs of students with less than average abilities, should be provided in these programs.

3. Increased expenditures in upgrading course content, providing adequate facilities, and securing trained personnel for these types of youth are recommended.

4. Employment of nonpolitical, conscientious administrators who are specially trained to operate these programs is recommended.

5. It is recommended that programs of this type not be carried on in conjunction with regular high school programs, but in separate buildings and operated by highly specialized personnel.

6. Clinical and psychological services that offer immediate attention are recommended for programs of this type.

7. It is recommended that programs of this type be expanded to include basic education for the functionally illiterate as a prerequisite for training in a vocational skill area.

8. Increased financial support, prorated according to attendance and performance, is recommended to increase the holding power of programs of this type.

9. No efforts should be spared to enlist the cooperation of community agencies in the education of these young people.

10. Every effort should be made to secure the cooperation of community business leaders in making part-time student employment opportunities available on a nondiscriminatory basis while participants are in training, and to open up permanent employment opportunities as incentives for successful training completion.

11. Efforts should be made to improve the general selection criteria by raising age and examination requirements--screening out those that are seriously handicapped or mentally retarded and refusing to accept applicants who are obviously looking for free handouts and not genuine educational training.

For Research

1. Longitudinal follow-up studies should be made in an effort to determine if participants who complete programs of this type are actually more successful socially and economically than high school dropouts who never receive such training.

2. The development of reliable standardized tests that accurately measure achievement in specialized vocations is recommended as a worth-while venture in future research.

3. Additional research in an effort to reliably establish the effects of rural to urban migration and mobility upon school achievement is strongly recommended.

4. Constant programmatic research projects in terms of content analysis and curriculum improvement for programs of this type are recommended.

BIBLIOGRAPHY

Books

- American Personnel and Guidance Association. Guidance and the School Dropout. Washington, D. C.: National Education Association, 1964.
- Ayres, Leonard P. Laggards in Our Schools. New York: Charities Publishing Company, 1909.
- Conant, James B. Slums and Suburbs. New York: McGraw-Hill Book Company, Inc., 1961.
- Drake, St. Clair, and Cayton, Horace R. Black Metropolis. New York: Harper & Row, 1962.
- Echert, Ruth E., and Marshall, Thomas O. When Youth Leave School. New York: McGraw-Hill Book Company, Inc., 1938.
- Greene, Shirley E. The Education of Migrant Children. Washington, D. C.: National Council on Agricultural Life and Labor, N. E. A. Department of Rural Education, 1954.
- Hollingshead, August B. Elmtown's Youth. New York: John Wiley & Sons, 1949.
- Huhlen, Raymond G. The Psychology of Adolescent Development. New York: Harper & Brothers, 1952.
- Lichter, Solomon O. The Drop-Outs. New York: The Free Press of Glencoe, 1962.
- Passow, Henry A. Education in Depressed Areas. New York: Teachers College, Columbia University, 1963.
- Pierce, Truman M., et al. White and Negro Schools in the South. Englewood Cliffs: Prentice-Hall, Inc., 1955.
- Riessman, Frank. The Culturally Deprived Child. New York: Harper & Row, 1962.

- Seigel, Sidney. Nonparametric Statistics for the Behavioral Sciences. New York: McGraw-Hill Book Company, Inc., 1956.
- Sutton, Elizabeth. Knowing and Teaching the Migrant Child. Washington, D. C.: N. E. A. Department of Rural Education, 1960.
- Wert, James E., Neidt, Charles D., and Ahmann, Stanley J. Statistical Methods in Education and Psychological Research. New York: Appleton-Century-Crofts, Inc., 1954.

Public Documents

- Office of Education. The Impact of Urbanization on Education. Washington, D. C.: Government Printing Office, 1962.
- Strayer, George G. Age and Grade Census of Schools and Colleges: A Study of Retardation and Elimination. Bureau of Education Bulletin No. 5. Washington, D. C.: Government Printing Office, 1911.
- Thorndike, Edward L. Elimination of Pupils from School. Bureau of Education Bulletin No. 4. Washington, D. C.: Government Printing Office, 1907.

Booklets and Pamphlets

- Barnes, Fred P. Practical Research Processes. Springfield: Illinois Curriculum Program, Office of the Superintendent of Public Instruction, 1958.
- Educational Policies Commission. Education and the Disadvantaged American. Washington, D. C.: National Education Association, 1962.
- Guide to the Use of the General Aptitude Test Battery. Section III: Development. Washington: United States Department of Labor, Bureau of Employment Security, 1962.
- Sequential Tests of Educational Progress: Technical Report. Princeton: Cooperative Test Division, Educational Testing Service, 1957.

Articles and Periodicals

- Brewer, Weldon. "Why Did They Quit?" Education Digest, XV (September, 1949), 30-31.

- Cantoni, Louis J. "Stay-Ins Get Better Jobs," Personnel and Guidance Journal, XXXIII (May, 1955), 351-53.
- Cook, Edward L., Jr. "An Analysis of Factors Related to Withdrawal from High School Prior to Graduation," Journal of Educational Research, L (November, 1956), 191-96.
- Foster, E. M. "School Survival Rates," School Life, XXII (September, 1936), 13-14.
- Gragg, William L. "Some Factors Which Distinguish Dropouts from High School Graduates," Occupations, XXVII (April, 1949), 457-59.
- Grant, Vance W. "Holding Power of U. S. Schools Rises," School Life, XLV (November, 1962), 35.
- Hand, Harold C. "Do School Costs Drive Out the Youth of the Poor?" Progressive Education, XXVIII (January, 1951), 89-93.
- Hecker, Stanley E. "Early School Leavers in Kentucky," Bulletin of the Bureau of School Service, XXV, No. 4. Lexington: University of Kentucky (1953), 23.
- Lanier, Armand J. "A Guidance-Faculty Study of Student Withdrawals," Journal of Educational Research, XLIII (December, 1950), 664-66.
- McGee, George A. "We Increased Our Holding Power," National Education Association Journal, XLII (November, 1953), 482.
- Schreiber, Daniel. "School Dropouts," National Education Association Journal, LI (May, 1962), 51.
- Schreiber, Daniel. "The School Dropout--Fugitive from Failure," Bulletin of the National Association of Secondary School Principals, (May, 1963), p. 46.
- Snepp, Daniel W. "Can We Salvage the Dropouts?" The Clearing House, XXXI (September, 1956), 51.
- Wolfbein, Seymour L. "Expertness in Preparing Youth for Employment: The Need," California Journal of Secondary Education, XXXVIII (1963), 106-09.
- Young, Joe M. "Lost, Strayed, or Stolen," The Clearing House, XXIX (October, 1954), 89-92.

Reports

Dillon, Harold J. Early School Leavers: A Major Educational Problem. New York: National Child Labor Committee, 1949.

Maryland State Department of Education. Our Dropouts: The Maryland Cooperative Study of Dropouts. Baltimore: The Department, 1963.

Nachman, Leonard R., Getson, Russell F., and Odgers, John G. Pilot Study of Ohio High School Dropouts, 1961-62. Columbus: State Department of Education, 1963.

Unpublished Material

Allen, Deryle K. "A Study of Drop-outs from the Public Secondary Schools of Oklahoma City for the Year 1954-1955." Unpublished Doctoral dissertation, University of Oklahoma, 1957.

Cook, Edward S. "An Analysis of Factors Related to Withdrawal from High School Prior to Graduation." Unpublished Doctoral dissertation, University of Georgia, 1953.

Roessel, Fred P. "Minnesota Multiphasic Inventory Results for High School Dropouts and Graduates." Unpublished Doctoral dissertation, University of Minnesota, 1954.

Seymour, Carleton H. "The Characteristics of Pupils Who Leave School Early." Unpublished Doctoral dissertation, Harvard University, 1950.

Sonstegard, Manford A. "A Study of Graduates and Dropouts of the Cedar Falls, Iowa, Secondary Schools." Unpublished Doctoral dissertation, Northwestern University, 1952.

Other Sources

Andrew, Dorothy M., and Paterson, Donald G. Minnesota Clerical Test: Manual. New York: The Psychological Corporation, 1959.

Gregg Awards Department. "Gregg Awards Shorthand Speed Tests," Business Teacher, XLI, No. 5 (May-June, 1964).

Gregg Awards Department. Typewriting Speed Tests. New York: McGraw-Hill Book Company, 1963.

Lawshe, C. H. Purdue Clerical Adaptability Test: Manual of Instructions. Lafayette: Occupational Research Center, Purdue Research Foundation, Purdue University, 1956.

Mullenbruch, P. L. Garage Mechanic Test: Manual. Minneapolis: Educational Test Bureau, Educational Publishers, Inc., 1956.

Owen, H. F., et al. Purdue Test for Machinists and Machine Operators: Manual. Chicago: Science Research Associates, 1949.

Sequential Tests of Educational Progress: Manuals for Interpreting Scores. Princeton: Cooperative Test Division, Educational Testing Service, 1957.

Tiffin, Joseph, Modisette, B. R., and Griffin, W. B. The Purdue Trade Information Test for Sheet Metal Workers: Preliminary Manual. Lafayette: Occupational Research Center, Purdue Research Foundation, Purdue University, 1958.

Tiffin, Joseph, and Griffin, Warren B. The Purdue Trade Information Test in Welding: Preliminary Manual. Lafayette: Occupational Research Center, Purdue Research Foundation, Purdue University, 1952.

APPENDICES

APPENDIX A

STATISTICAL TABLES

TABLE 22

THE CHI-SQUARE TEST OF THE FREQUENCY DISTRIBUTION OF THE
CULTURAL BACKGROUND OF DROPOUTS IN THE MANPOWER PROGRAM

Background	Completion	Noncompletion	Total
Frequencies Observed			
Rural	31	10	41
Nonrural	63	38	101
Total	94	48	142
Frequencies Expected			
Rural	28.87% of 94 = 27.1378	28.87% of 48 = 13.8576	41
Nonrural	71.13% of 94 = 66.8622	71.13% of 48 = 34.1424	101
Total	94	48	142

$$x^2 = \frac{(O - E)^2}{E}$$

$$x^2 = 2.2826$$

$$x^2_{.05} = 3.841$$

TABLE 23

THE CHI-SQUARE TEST OF THE FREQUENCY DISTRIBUTION OF THE
HOME BACKGROUND OF DROPOUTS IN THE MANPOWER PROGRAM

Home Background	Completion	Noncompletion	Total
Frequencies Observed			
Broken	41	18	59
Stable	53	30	83
Total	94	48	142
Frequencies Expected			
Broken	41.55% of 94 = 39.0570	41.55% of 48 = 19.9440	59
Stable	58.45% of 94 = 54.9430	58.45% of 48 = 28.0560	83
Total	94	48	142

$$x^2 = \frac{(O - E)^2}{E}$$

$$x^2 = 4.8956$$

$$x^2_{.05} = 3.841$$

TABLE 24

THE CHI-SQUARE TEST OF THE FREQUENCY DISTRIBUTION OF THE
MOBILITY OF DROPOUTS IN THE MANPOWER PROGRAM

Mobility	Completion	Noncompletion	Total
Frequencies Observed			
Mobile	31	19	50
Nonmobile	63	29	92
Total	94	48	142
Frequencies Expected			
Mobile	35.21% of 94 = 33.0974	35.21% of 48 = 16.9008	50
Nonmobile	64.79% of 94 = 60.9026	64.79% of 48 = 31.0992	92
Total	94	48	142

$$x^2 = \frac{(O - E)^2}{E}$$

$$x^2 = .0610$$

$$x^2_{.05} = 3.841$$

TABLE 25

THE CHI-SQUARE TEST OF THE FREQUENCY DISTRIBUTION OF THE
SEX OF DROPOUTS IN THE MANPOWER PROGRAM

Sex	Completion	Noncompletion	Total
Frequencies Observed			
Male	28	42	70
Female	66	32	98
Total	94	74	168
Frequencies Expected			
Male	41.67% of 94 = 39.1698	41.67% of 74 = 30.8358	70
Female	58.33% of 94 = 54.8302	58.33% of 74 = 43.1642	98
Total	94	74	168

$$x^2 = \frac{(O - E)^2}{E}$$

$$x^2 = 12.3903$$

$$x^2_{.05} = 3.841$$

TABLE 26

THE CHI-SQUARE TEST OF THE FREQUENCY DISTRIBUTION OF TWO
AGE GROUPS OF DROPOUTS IN THE MANPOWER PROGRAM

Age	Completion	Noncompletion	Total
Frequencies Observed			
19 and Below	31	34	65
20 and Above	63	40	103
Total	94	74	168
Frequencies Expected			
19 and Below	38.69% of 94 = 36.3691	38.69% of 74 = 28.6310	65
20 and Above	61.31% of 94 = 57.6309	61.31% of 74 = 45.3690	103
Total	94	74	168

$$x^2 = \frac{(O - E)^2}{E}$$

$$x^2 = 29.3502$$

$$x^2_{.05} = 3.841$$

TABLE 27

THE CHI-SQUARE TEST OF THE FREQUENCY DISTRIBUTION OF TWO
RACIAL GROUPS OF DROPOUTS IN THE MANPOWER PROGRAM

Race	Completion	Noncompletion	Total
Frequencies Observed			
White	61	52	113
Non-white	33	22	55
Total	94	74	168
Frequencies Expected			
White	67.26% of 94 = 63.2244	67.26% of 74 = 49.7724	113
Non-white	32.74% of 94 = 30.7756	32.74% of 74 = 24.2276	55
Total	94	74	168

$$x^2 = \frac{(O - E)^2}{E}$$

$$x^2 = 5.4356$$

$$x^2_{.05} = 3.841$$

TABLE 28

THE CHI-SQUARE TEST OF THE FREQUENCY DISTRIBUTION OF RURAL AND NONRURAL
DROPOUTS CLASSIFIED SUCCESSFUL IN THE MANPOWER PROGRAM

Cultural Background	Math Instructor	Science Instructor	Social Studies Instructor	English Instructor	Skill Instructor	Total
Frequencies Observed						
Rural	33	34	31	34	34	166
Nonrural	70	77	81	70	83	381
Total	103	111	112	104	117	547
Frequencies Expected						
Rural	30.35% of 103 = 31.2605	30.35% of 111 = 33.6885	30.35% of 112 = 33.9920	30.35% of 104 = 31.5640	30.35% of 117 = 35.5095	166
Nonrural	69.65% of 103 = 71.7395	69.65% of 111 = 77.3115	69.65% of 112 = 78.0080	69.65% of 104 = 72.4360	69.65% of 117 = 81.4905	389
Total	103	111	112	104	117	547

$$x^2 = \frac{(O - E)^2}{E}$$

$$x^2 = 1.0848$$

$$x^2_{.05} = 9.488$$

TABLE 29

THE CHI-SQUARE TEST OF THE FREQUENCY DISTRIBUTION OF RURAL AND NONRURAL
DROPOUTS CLASSIFIED UNSUCCESSFUL IN THE MANPOWER PROGRAM

Cultural Background	Math Instructor	Science Instructor	Social Studies Instructor	English Instructor	Skill Instructor	Total
Frequencies Observed						
Rural	8	7	10	7	7	39
Nonrural	31	24	20	31	18	124
Total	39	31	30	38	25	163
Frequencies Expected						
Rural	23.91% of 39 = 9.3249	23.91% of 31 = 7.4121	23.91% of 30 = 7.1730	23.91% of 38 = 9.0858	23.91% of 25 = 5.9775	39
Nonrural	76.09% of 39 = 29.6751	76.09% of 31 = 23.5879	76.09% of 30 = 22.8270	76.09% of 38 = 28.9142	76.09% of 25 = 19.0225	124
Total	39	31	30	38	25	163

$$x^2 = \frac{(O - E)^2}{E}$$

$$x^2 = 2.5929$$

$$x^2_{.05} = 9.488$$

TABLE 30

THE MANN-WHITNEY U TEST OF SIGNIFICANCE OF DIFFERENCE
IN THE APTITUDES OF RURAL AND NONRURAL STUDENTS

Rural		Nonrural	
$N_1 = 31$	$R_1 = 1400.5$	$N_2 = 63$	$R_2 = 3064.5$
	$U_1 = 1048.5$		$U_2 = 904.5$
			$z = -0.5797$

TABLE 31

THE MANN-WHITNEY U TEST OF SIGNIFICANCE OF DIFFERENCE IN THE
APTITUDES OF STUDENTS WITH STABLE AND BROKEN HOME BACKGROUNDS

Stable		Broken	
$N_1 = 53$	$R_1 = 2639.0$	$N_2 = 41$	$R_2 = 1826.0$
	$U_1 = 965.0$		$U_2 = 1208.0$
	$z = -0.9273$		

TABLE 32

THE MANN-WHITNEY U TEST OF SIGNIFICANCE OF DIFFERENCE IN
THE APTITUDES OF STUDENTS CLASSIFIED MOBILE AND NONMOBILE

Mobile		Nonmobile	
$N_1 = 31$	$R_1 = 1537.0$	$N_2 = 63$	$R_2 = 2928.0$
	$U_1 = 912.0$		$U_2 = 1041.0$
	$z = -0.5193$		

TABLE 33

THE MANN-WHITNEY U TEST OF SIGNIFICANCE OF DIFFERENCE IN
THE APTITUDES OF MALE AND FEMALE STUDENTS

Male		Female	
$N_1 = 28$	$R_1 = 1313.0$	$N_2 = 66$	$R_2 = 3152.0$
	$U_1 = 941.0$		$U_2 = 907.0$
			$z = -0.1407$

TABLE 34

THE MANN-WHITNEY U TEST OF SIGNIFICANCE OF DIFFERENCE IN
THE APTITUDES OF STUDENTS AGES 19- AND 20+

Age 19-		Age 20+	
$N_1 = 31$	$R_1 = 1330.5$	$N_2 = 63$	$R_2 = 3134.5$
	$U_1 = 1118.5$		$U_2 = 834.5$
			$z = -1.1432$

TABLE 35

THE MANN-WHITNEY U TEST OF SIGNIFICANCE OF DIFFERENCE IN
THE APTITUDES OF WHITE AND NON-WHITE STUDENTS

White		Non-white	
$N_1 = 61$	$R_1 = 3478.5$	$N_2 = 33$	$R_2 = 986.5$
	$U_1 = 425.5$		$U_1 = 1587.5$
	$z = -4.6073$		

TABLE 36

SUMS AND MEANS OF THE CRITERION AND CONTROL VARIABLES FOR DROPOUT STUDENTS IN READING

Subgroup	<u>Number</u> k	<u>Post-test Scores</u>		<u>Pretest Scores</u>		<u>G A T B Scores</u>	
		ΣY	$\bar{Y}$	ΣX_1	$\bar{X}_1$	ΣX_2	$\bar{X}_2$
Rural	31	1,590	51.29	1,588	51.23	2,811	90.68
Nonrural	63	2,990	47.46	2,939	46.65	5,813	92.27
Total	94	4,580	48.72	4,527	48.16	8,624	91.74

TABLE 37

SUMMARY OF EXPERIMENTAL DATA FOR DROPOUT STUDENTS IN READING

Scores	Symbols	Total for Entire Sample
Final Scores in Reading	ΣY^2	235,820
Pretest Scores in Reading	ΣX_1^2	230,613
<u>G A T B</u> Aptitude Scores	ΣX_2^2	808,290

Crossproducts	$\Sigma X_1 Y$	231,272
	$\Sigma X_2 Y$	429,710
	$\Sigma X_1 X_2$	425,309

TABLE 38

SUMS OF SQUARES AND CROSSPRODUCTS IN DEVIATION FORM FOR BOTH SUBGROUPS IN READING

Source of Variation	$\sum Y^2$	$\sum x_1^2$	$\sum x_2^2$	$\sum x_1 Y$	$\sum x_2 Y$	$\sum x_1 x_2$
Total	12,666.8085	12,594.6064	17,083.8723	10,701.1489	9,519.3617	9,980.8298
Within Subgroups	12,362.0379	12,159.7368	17,031.1869	10,337.0947	9,646.0778	10,132.1946

TABLE 39

**ANALYSIS OF COVARIANCE OF READING ACHIEVEMENT SCORES
OF RURAL AND NONRURAL HIGH SCHOOL DROPOUTS**

Source of Variation	Residuals		
	Degrees of Freedom	Sum of Squares	Mean Square
Total	91	3,456.7816	
Within Subgroups	90	3,450.2326	38.3359
Difference	1	6.5490	6.5490

$$F_{1,90} = \frac{6.5490}{38.3359} = 0.1708$$

TABLE 40

**ANALYSIS OF COVARIANCE OF WRITING ACHIEVEMENT SCORES
OF RURAL AND NONRURAL HIGH SCHOOL DROPOUTS**

Source of Variation	Residuals		
	Degrees of Freedom	Sum of Squares	Mean Square
Total	91	3,456.7816	
Within Subgroups	90	3,384.3622	37.6040
Difference	1	72.4193	72.4193

$$F_{90,1} = \frac{72.4193}{37.6040} = 1.9258$$

TABLE 41

ANALYSIS OF COVARIANCE OF LISTENING ACHIEVEMENT SCORES
OF RURAL AND NONRURAL HIGH SCHOOL DROPOUTS

Source of Variation	Degrees of Freedom	Residuals	
		Sum of Squares	Mean Square
Total	91	3,456.7816	
Within Subgroups	90	3,456.1016	38.4011
Difference	1	0.6799	0.6799

$$F_{1,90} = \frac{0.6799}{38.4011} = 0.0177$$

TABLE 42

ANALYSIS OF COVARIANCE OF SOCIAL STUDIES ACHIEVEMENT
SCORES OF RURAL AND NONRURAL HIGH SCHOOL DROPOUTS

Source of Variation	Degrees of Freedom	Residuals	
		Sum of Squares	Mean Square
Total	91	3,456.7816	
Within Subgroups	90	3,395.9619	37.7369
Difference	1	60.8197	60.8197

$$F_{90,1} = \frac{60.8197}{37.7329} = 1.6118$$

TABLE 43

ANALYSIS OF COVARIANCE OF MATHEMATICS ACHIEVEMENT SCORES
OF RURAL AND NONRURAL HIGH SCHOOL DROPOUTS

Source of Variation	Degrees of Freedom	Residuals	
		Sum of Squares	Mean Square
Total	91	3,456.7816	
Within Subgroups	90	3,403.1963	37.8133
Difference	1	53.5853	53.5853

$$F_{90,1} = \frac{53.5853}{37.8133} = 1.4171$$

TABLE 44

ANALYSIS OF COVARIANCE OF SCIENCE ACHIEVEMENT SCORES OF
RURAL AND NONRURAL HIGH SCHOOL DROPOUTS

Source of Variation	Degrees of Freedom	Residuals	
		Sum of Squares	Mean Square
Total	91	3,456.7816	
Within Subgroups	90	3,434.4684	38.1608
Difference	1	22.3131	22.3131

$$F_{1,90} = \frac{22.3131}{38.1608} = 0.5847$$

TABLE 45

**ANALYSIS OF COVARIANCE OF READING ACHIEVEMENT SCORES OF
HIGH SCHOOL DROPOUTS FROM STABLE AND BROKEN HOMES**

Source of Variation	Residuals		
	Degrees of Freedom	Sum of Squares	Mean Square
Total	91	3,259.1588	
Within Subgroups	90	3,240.7230	36.0080
Difference	1	18.4358	18.4358

$$F_{1,90} = \frac{18.4358}{36.0080} = 0.5120$$

TABLE 46

**ANALYSIS OF COVARIANCE OF WRITING ACHIEVEMENT SCORES OF
HIGH SCHOOL DROPOUTS FROM STABLE AND BROKEN HOMES**

Source of Variation	Residuals		
	Degrees of Freedom	Sum of Squares	Mean Square
Total	91	3,259.1588	
Within Subgroups	90	3,219.4037	35.7712
Difference	1	39.7551	39.7551

$$F_{90,1} = \frac{39.7551}{35.7712} = 1.1114$$

TABLE 47

**ANALYSIS OF COVARIANCE OF LISTENING ACHIEVEMENT SCORES OF
HIGH SCHOOL DROPOUTS FROM STABLE AND BROKEN HOMES**

Source of Variation	Residuals		
	Degrees of Freedom	Sum of Squares	Mean Square
Total	91	3,259.1588	
Within Subgroups	90	3,243.9468	36.0439
Difference	1	15.2120	15.2120

$$F_{1,90} = \frac{15.2120}{36.0439} = 0.4220$$

TABLE 48

**ANALYSIS OF COVARIANCE OF SOCIAL STUDIES ACHIEVEMENT SCORES
OF HIGH SCHOOL DROPOUTS FROM STABLE AND BROKEN HOMES**

Source of Variation	Residuals		
	Degrees of Freedom	Sum of Squares	Mean Square
Total	91	3,259.1588	
Within Subgroups	90	3,232.7653	35.9196
Difference	1	26.3935	26.3935

$$F_{1,90} = \frac{26.3935}{35.9196} = 0.7348$$

TABLE 49

**ANALYSIS OF COVARIANCE OF MATHEMATICS ACHIEVEMENT SCORES
OF HIGH SCHOOL DROPOUTS FROM STABLE AND BROKEN HOMES**

Source of Variation	Residuals		
	Degrees of Freedom	Sum of Squares	Mean Square
Total	91	3,259.1588	
Within Subgroups	90	3,258.4076	36.2045
Difference	1	0.7512	0.7512

$$F_{1,90} = \frac{0.7512}{36.2045} = 0.0207$$

TABLE 50

**ANALYSIS OF COVARIANCE OF SCIENCE ACHIEVEMENT SCORES OF
HIGH SCHOOL DROPOUTS FROM STABLE AND BROKEN HOMES**

Source of Variation	Residuals		
	Degrees of Freedom	Sum of Squares	Mean Square
Total	91	3,259.1588	
Within Subgroups	90	3,235.8925	35.9544
Difference	1	23.2663	23.2663

$$F_{1,90} = \frac{23.2663}{35.9544} = 0.6471$$

TABLE 51

**ANALYSIS OF COVARIANCE OF READING ACHIEVEMENT SCORES OF
HIGH SCHOOL DROPOUTS CLASSIFIED MOBILE AND NONMOBILE**

Source of Variation	Degrees of Freedom	Residuals	
		Sum of Squares	Mean Square
Total	91	3,828.0219	
Within Subgroups	90	3,820.7080	42.4523
Difference	1	7.3139	7.3139

$$F_{1,90} = \frac{7.3139}{42.4523} = 0.1723$$

TABLE 52

**ANALYSIS OF COVARIANCE OF WRITING ACHIEVEMENT SCORES OF
HIGH SCHOOL DROPOUTS CLASSIFIED MOBILE AND NONMOBILE**

Source of Variation	Degrees of Freedom	Residuals	
		Sum of Squares	Mean Square
Total	91	3,828.0219	
Within Subgroups	90	3,827.2019	42.5245
Difference	1	0.8199	0.8199

$$F_{1,90} = \frac{0.8199}{42.5245} = 0.0193$$

TABLE 53

**ANALYSIS OF COVARIANCE OF LISTENING ACHIEVEMENT SCORES OF
HIGH SCHOOL DROPOUTS CLASSIFIED MOBILE AND NONMOBILE**

Source of Variation	Residuals		
	Degrees of Freedom	Sum of Squares	Mean Square
Total	91	3,828.0219	
Within Subgroups	90	3,822.4070	42.4712
Difference	1	5.6149	5.6149

$$F_{1,90} = \frac{5.6149}{42.4712} = 0.1322$$

TABLE 54

**ANALYSIS OF COVARIANCE OF SOCIAL STUDIES ACHIEVEMENT SCORES
OF HIGH SCHOOL DROPOUTS CLASSIFIED MOBILE AND NONMOBILE**

Source of Variation	Residuals		
	Degrees of Freedom	Sum of Squares	Mean Square
Total	91	3,828.0219	
Within Subgroups	90	3,803.5028	42.2611
Difference	1	24.5190	24.5190

$$F_{1,90} = \frac{24.5190}{42.2611} = 0.5802$$

TABLE 55

ANALYSIS OF COVARIANCE OF MATHEMATICS ACHIEVEMENT SCORES OF
HIGH SCHOOL DROPOUTS CLASSIFIED MOBILE AND NONMOBILE

Source of Variation	Degrees of Freedom	Residuals	
		Sum of Squares	Mean Square
Total	91	3,828.0219	
Within Subgroups	90	3,798.3488	42.2039
Difference	1	29.6731	29.6731

$$F_{1,90} = \frac{29.6731}{42.2039} = 0.7031$$

TABLE 56

ANALYSIS OF COVARIANCE OF SCIENCE ACHIEVEMENT SCORES OF
HIGH SCHOOL DROPOUTS CLASSIFIED MOBILE AND NONMOBILE

Source of Variation	Degrees of Freedom	Residuals	
		Sum of Squares	Mean Square
Total	91	3,828.0219	
Within Subgroups	90	3,777.8150	41.9757
Difference	1	50.2068	50.2068

$$F_{90,1} = \frac{50.2068}{41.9757} = 1.1961$$

TABLE 57

ANALYSIS OF COVARIANCE OF READING ACHIEVEMENT SCORES OF
MALE AND FEMALE HIGH SCHOOL DROPOUTS

Source of Variation	Degrees of Freedom	Residuals	
		Sum of Squares	Mean Square
Total	91	3,755.8318	
Within Subgroups	90	3,694.6885	41.0521
Difference	1	61.1433	61.1433

$$F_{90,1} = \frac{61.1433}{41.0521} = 1.4894$$

TABLE 58

ANALYSIS OF COVARIANCE OF WRITING ACHIEVEMENT SCORES OF
MALE AND FEMALE HIGH SCHOOL DROPOUTS

Source of Variation	Degrees of Freedom	Residuals	
		Sum of Squares	Mean Square
Total	91	3,755.8318	
Within Subgroups	90	3,741.0238	41.5669
Difference	1	14.8080	14.8080

$$F_{1,90} = \frac{14.8080}{41.5669} = 0.3562$$

TABLE 59

**ANALYSIS OF COVARIANCE OF LISTENING ACHIEVEMENT SCORES
OF MALE AND FEMALE HIGH SCHOOL DROPOUTS**

Source of Variation	Degrees of Freedom	Residuals	
		Sum of Squares	Mean Square
Total	91	3,755.8318	
Within Subgroups	90	3,755.4957	41.7277
Difference	1	0.3361	0.3361

$$F_{1,90} = \frac{0.3361}{41.7277} = 0.0081$$

TABLE 60

**ANALYSIS OF COVARIANCE OF SOCIAL STUDIES ACHIEVEMENT SCORES
OF MALE AND FEMALE HIGH SCHOOL DROPOUTS**

Source of Variation	Degrees of Freedom	Residuals	
		Sum of Squares	Mean Square
Total	91	3,755.8318	
Within Subgroups	90	3,722.8799	41.3653
Difference	1	32.9519	32.9519

$$F_{1,90} = \frac{32.9519}{41.3653} = 0.7966$$

TABLE 61

**ANALYSIS OF COVARIANCE OF MATHEMATICS ACHIEVEMENT SCORES
OF MALE AND FEMALE HIGH SCHOOL DROPOUTS**

Source of Variation	Degrees of Freedom	Residuals	
		Sum of Squares	Mean Square
Total	91	3,755.8318	
Within Subgroups	90	3,732.4919	41.4721
Difference	1	23.3408	23.3408

$$F_{1,90} = \frac{23.3408}{41.4721} = 0.5628$$

TABLE 62

**ANALYSIS OF COVARIANCE OF SCIENCE ACHIEVEMENT SCORES OF
MALE AND FEMALE HIGH SCHOOL DROPOUTS**

Source of Variation	Degrees of Freedom	Residuals	
		Sum of Squares	Mean Square
Total	91	3,755.8318	
Within Subgroups	90	3,755.4008	41.7267
Difference	1	0.4310	0.4310

$$F_{1,90} = \frac{0.4310}{41.7267} = 0.0103$$

TABLE 63

**ANALYSIS OF COVARIANCE OF READING ACHIEVEMENT SCORES OF
HIGH SCHOOL DROPOUTS AGES 19- AND 20+**

Source of Variation	Degrees of Freedom	Residuals	
		Sum of Squares	Mean Square
Total	91	3,685.7012	
Within Subgroups	90	3,685.4596	40.9496
Difference	1	0.2416	0.2416

$$F_{1,90} = \frac{0.2416}{40.9496} = 0.0059$$

TABLE 64

**ANALYSIS OF COVARIANCE OF WRITING ACHIEVEMENT SCORES OF
HIGH SCHOOL DROPOUTS AGES 19- AND 20+**

Source of Variation	Degrees of Freedom	Residuals	
		Sum of Squares	Mean Square
Total	91	3,685.7012	
Within Subgroups	90	3,634.2760	40.3808
Difference	1	51.4252	51.4252

$$F_{90,1} = \frac{51.4252}{40.3808} = 1.2735$$

TABLE 65

**ANALYSIS OF COVARIANCE OF LISTENING ACHIEVEMENT SCORES
OF HIGH SCHOOL DROPOUTS AGES 19- AND 20+**

Source of Variation	Degrees of Freedom	Residuals	
		Sum of Squares	Mean Square
Total	91	3,685.7012	
Within Subgroups	90	3,685.6569	40.9517
Difference	1	0.0443	0.0443

$$F_{1,90} = \frac{0.0443}{40.9517} = 0.0011$$

TABLE 66

**ANALYSIS OF COVARIANCE OF SOCIAL STUDIES ACHIEVEMENT
SCORES OF HIGH SCHOOL DROPOUTS AGES 19- AND 20+**

Source of Variation	Degrees of Freedom	Residuals	
		Sum of Squares	Mean Square
Total	91	3,685.7012	
Within Subgroups	90	3,680.0731	40.8897
Difference	1	5.6281	5.6281

$$F_{1,90} = \frac{5.6281}{40.8897} = 0.1376$$

TABLE 67

ANALYSIS OF COVARIANCE OF MATHEMATICS ACHIEVEMENT SCORES
OF HIGH SCHOOL DROPOUTS AGES 19- AND 20+

Source of Variation	Degrees of Freedom	Residuals	
		Sum of Squares	Mean Square
Total	91	3,685.7012	
Within Subgroups	90	3,653.9626	40.5996
Difference	1	31.7386	31.7386

$$F_{1,90} = \frac{31.7386}{40.5996} = 0.7817$$

TABLE 68

ANALYSIS OF COVARIANCE OF SCIENCE ACHIEVEMENT SCORES OF
HIGH SCHOOL DROPOUTS AGES 19- AND 20+

Source of Variation	Degrees of Freedom	Residuals	
		Sum of Squares	Mean Square
Total	91	3,685.7012	
Within Subgroups	90	3,679.2628	40.8807
Difference	1	6.4384	6.4384

$$F_{1,90} = \frac{6.4384}{40.8807} = 0.1575$$

TABLE 69

**ANALYSIS OF COVARIANCE OF READING ACHIEVEMENT SCORES OF
WHITE AND NON-WHITE HIGH SCHOOL DROPOUTS**

Source of Variation	Degrees of Freedom	Residuals	
		Sum of Squares	Mean Square
Total	91	2,078.9929	
Within Subgroups	90	2,066.9962	22.9666
Difference	1	11.9967	11.9967

$$F_{1,90} = \frac{11.9967}{22.9666} = 0.5224$$

TABLE 70

**ANALYSIS OF COVARIANCE OF WRITING ACHIEVEMENT SCORES OF
WHITE AND NON-WHITE HIGH SCHOOL DROPOUTS**

Source of Variation	Degrees of Freedom	Residuals	
		Sum of Squares	Mean Square
Total	91	2,078.9929	
Within Subgroups	90	2,069.9902	22.9999
Difference	1	9.0027	9.0027

$$F_{1,90} = \frac{9.0027}{22.9999} = 0.3914$$

TABLE 71

**ANALYSIS OF COVARIANCE OF LISTENING ACHIEVEMENT SCORES
OF WHITE AND NON-WHITE HIGH SCHOOL DROPOUTS**

Source of Variation	Degrees of Freedom	Residuals	
		Sum of Squares	Mean Square
Total	91	2,078.9929	
Within Subgroups	90	2,078.9835	23.0998
Difference	1	0.0094	0.0094

$$F_{1,90} = \frac{0.0094}{23.0998} = 0.0004$$

TABLE 72

**ANALYSIS OF COVARIANCE OF SOCIAL STUDIES ACHIEVEMENT SCORES
OF WHITE AND NON-WHITE HIGH SCHOOL DROPOUTS**

Source of Variation	Degrees of Freedom	Residuals	
		Sum of Squares	Mean Square
Total	91	2,078.9929	
Within Subgroups	90	2,065.5460	22.9505
Difference	1	13.4469	13.4469

$$F_{1,90} = \frac{13.4469}{22.9505} = 0.5859$$

TABLE 73

**ANALYSIS OF COVARIANCE OF MATHEMATICS ACHIEVEMENT SCORES
OF WHITE AND NON-WHITE HIGH SCHOOL DROPOUTS**

Source of Variation	Degrees of Freedom	Residuals	
		Sum of Squares	Mean Square
Total	91	2,078.9929	
Within Subgroups	90	2,075.9225	23.0658
Difference	1	3.0704	3.0704

$$F_{1,90} = \frac{3.0704}{23.0658} = 0.1331$$

TABLE 74

**ANALYSIS OF COVARIANCE OF SCIENCE ACHIEVEMENT SCORES OF
WHITE AND NON-WHITE HIGH SCHOOL DROPOUTS**

Source of Variation	Degrees of Freedom	Residuals	
		Sum of Squares	Mean Square
Total	91	2,078.9929	
Within Subgroups	90	2,078.8449	23.0983
Difference	1	0.1480	0.1480

$$F_{1,90} = \frac{0.1480}{23.0983} = 0.0064$$

TABLE 75

THE MANN-WHITNEY U TEST OF SIGNIFICANCE OF DIFFERENCE OF
SPELLING SCORES OF STENOGRAPHERS WITH
RURAL AND NONRURAL BACKGROUNDS

Rural		Nonrural	
$N_1 = 24$	$R_1 = 510.5$	$N_2 = 18$	$R_2 = 392.5$
	$U_1 = 221.5$		$U_2 = 210.5$
			$z = -0.1406$

TABLE 76

THE MANN-WHITNEY U TEST OF SIGNIFICANCE OF DIFFERENCE OF
COMPUTATION SCORES OF STENOGRAPHERS WITH
RURAL AND NONRURAL BACKGROUNDS

Rural		Nonrural	
$N_1 = 24$	$R_1 = 551.5$	$N_2 = 18$	$R_2 = 351.5$
	$U_1 = 180.5$		$U_2 = 251.5$
	$z = -0.9109$		

TABLE 77

THE MANN-WHITNEY U TEST OF SIGNIFICANCE OF DIFFERENCE OF
CHECKING SCORES OF STENOGRAPHERS WITH
RURAL AND NONRURAL BACKGROUNDS

Rural		Nonrural	
$N_1 = 24$	$R_1 = 534.0$	$N_2 = 18$	$R_2 = 369.0$
	$U_1 = 198.0$		$U_2 = 234.0$
	$z = -0.4586$		

TABLE 78

THE MANN-WHITNEY U TEST OF SIGNIFICANCE OF DIFFERENCE OF
WORD MEANING SCORES OF STENOGRAPHERS WITH
RURAL AND NONRURAL BACKGROUNDS

Rural		Nonrural	
$N_1 = 24$	$R_1 = 459.5$	$N_2 = 18$	$R_2 = 443.5$
	$U_1 = 272.5$		$U_2 = 159.5$
			$z = -1.4404$

TABLE 79

THE MANN-WHITNEY U TEST OF SIGNIFICANCE OF DIFFERENCE OF
COPYING SCORES OF STENOGRAPHERS WITH
RURAL AND NONRURAL BACKGROUNDS

Rural		Nonrural	
$N_1 = 24$	$R_1 = 523.5$	$N_2 = 18$	$R_2 = 379.5$
	$U_1 = 208.5$		$U_2 = 223.5$
	$z = -0.1911$		

TABLE 80

THE MANN-WHITNEY U TEST OF SIGNIFICANCE OF DIFFERENCE OF
REASONING SCORES OF STENOGRAPHERS WITH
RURAL AND NONRURAL BACKGROUNDS

Rural		Nonrural	
$N_1 = 24$	$R_1 = 521.0$	$N_2 = 18$	$R_2 = 382.0$
	$U_1 = 211.0$		$U_2 = 221.0$
	$z = -0.1286$		

TABLE 81

THE MANN-WHITNEY U TEST OF SIGNIFICANCE OF DIFFERENCE OF
NUMBER COMPARISON SCORES OF STENOGRAPHERS
WITH RURAL AND NONRURAL BACKGROUNDS

Rural		Nonrural	
$N_1 = 24$	$R_1 = 484.0$	$N_2 = 18$	$R_2 = 419.0$
	$U_1 = 248.0$		$U_2 = 184.0$
			$z = -0.8136$

TABLE 82

THE MANN-WHITNEY U TEST OF SIGNIFICANCE OF DIFFERENCE OF
NAME COMPARISON SCORES OF STENOGRAPHERS WITH
RURAL AND NONRURAL BACKGROUNDS

Rural		Nonrural	
$N_1 = 24$	$R_1 = 537.5$	$N_2 = 18$	$R_2 = 365.5$
	$U_1 = 194.5$		$U_2 = 237.5$
	$z = -0.5469$		

TABLE 83

THE MANN-WHITNEY U TEST OF SIGNIFICANCE OF DIFFERENCE OF
SHORTHAND SPEED SCORES OF STENOGRAPHERS WITH
RURAL AND NONRURAL BACKGROUNDS

Rural		Nonrural	
$N_1 = 24$	$R_1 = 546.0$	$N_2 = 18$	$R_2 = 357.0$
	$U_1 = 186.0$		$U_2 = 246.0$
	$z = -0.8252$		

TABLE 84

THE MANN-WHITNEY U TEST OF SIGNIFICANCE OF DIFFERENCE OF
TYPING SPEED SCORES OF STENOGRAPHERS WITH
RURAL AND NONRURAL BACKGROUNDS

Rural		Nonrural	
$N_1 = 24$	$R_1 = 510.0$	$N_2 = 18$	$R_2 = 393.0$
	$U_1 = 222.0$		$U_2 = 210.0$
			$z = -0.1528$

TABLE 85

THE MANN-WHITNEY U TEST OF SIGNIFICANCE OF DIFFERENCE OF
SPELLING SCORES OF STENOGRAPHERS WITH
STABLE AND BROKEN HOME BACKGROUNDS

Stable		Broken	
$N_1 = 26$	$R_1 = 495.5$	$N_2 = 16$	$R_2 = 407.5$
	$U_1 = 271.5$		$U_2 = 144.5$
			$z = -1.6542$

TABLE 86

THE MANN-WHITNEY U TEST OF SIGNIFICANCE OF DIFFERENCE
OF COMPUTATION SCORES OF STENOGRAPHERS WITH
STABLE AND BROKEN HOME BACKGROUNDS

Stable		Broken	
$N_1 = 26$	$R_1 = 551.0$	$N_2 = 16$	$R_2 = 352.0$
	$U_1 = 216.0$		$U_2 = 200.0$
			$z = -0.2092$

TABLE 87

THE MANN-WHITNEY U TEST OF SIGNIFICANCE OF DIFFERENCE
OF CHECKING SCORES OF STENOGRAPHERS WITH
STABLE AND BROKEN HOME BACKGROUNDS

Stable		Broken	
$N_1 = 26$	$R_1 = 543.0$	$N_2 = 16$	$R_2 = 360.0$
	$U_1 = 224.0$		$U_2 = 192.0$
			$z = -0.4154$

TABLE 88

THE MANN-WHITNEY U TEST OF SIGNIFICANCE OF DIFFERENCE
OF WORD MEANING SCORES OF STENOGRAPHERS WITH
STABLE AND BROKEN HOME BACKGROUNDS

Stable		Broken	
$N_1 = 26$	$R_1 = 582.0$	$N_2 = 16$	$R_2 = 321.0$
	$U_1 = 185.0$		$U_2 = 231.0$
	$z = -0.5975$		

TABLE 89

THE MANN-WHITNEY U TEST OF SIGNIFICANCE OF DIFFERENCE
OF COPYING SCORES OF STENOGRAPHERS WITH
STABLE AND BROKEN HOME BACKGROUNDS

Stable		Broken	
$N_1 = 26$	$R_1 = 592.0$	$N_2 = 16$	$R_2 = 311.0$
	$U_1 = 175.0$		$U_2 = 241.0$
	$z = -0.8568$		

TABLE 90

THE MANN-WHITNEY U TEST OF SIGNIFICANCE OF DIFFERENCE
OF REASONING SCORES OF STENOGRAPHERS WITH
STABLE AND BROKEN HOME BACKGROUNDS

Stable		Broken	
$N_1 = 26$	$R_1 = 599.5$	$N_2 = 16$	$R_2 = 303.5$
	$U_1 = 167.5$		$U_2 = 248.5$
	$z = -1.0611$		

TABLE 91

THE MANN-WHITNEY U TEST OF SIGNIFICANCE OF DIFFERENCE
OF NUMBER COMPARISON SCORES OF STENOGRAPHERS WITH
STABLE AND BROKEN HOME BACKGROUNDS

Stable		Broken	
$N_1 = 26$	$R_1 = 620.5$	$N_2 = 16$	$R_2 = 282.5$
	$U_1 = 146.5$		$U_2 = 269.5$
	$z = -1.5933$		

TABLE 92

THE MANN-WHITNEY U TEST OF SIGNIFICANCE OF DIFFERENCE
OF NAME COMPARISON SCORES OF STENOGRAPHERS WITH
STABLE AND BROKEN HOME BACKGROUNDS

Stable		Broken	
$N_1 = 26$	$R_1 = 564.0$	$N_2 = 16$	$R_2 = 339.0$
	$U_1 = 203.0$		$U_2 = 213.0$
	$z = -0.1296$		

TABLE 93

THE MANN-WHITNEY U TEST OF SIGNIFICANCE OF DIFFERENCE
OF SHORTHAND SPEED SCORES OF STENOGRAPHERS WITH
STABLE AND BROKEN HOME BACKGROUNDS

Stable		Broken	
$N_1 = 26$	$R_1 = 576.0$	$N_2 = 16$	$R_2 = 327.0$
	$U_1 = 191.0$		$U_2 = 225.0$
	$z = -0.4765$		

TABLE 94

THE MANN-WHITNEY U TEST OF SIGNIFICANCE OF DIFFERENCE
OF TYPING SPEED SCORES OF STENOGRAPHERS WITH
STABLE AND BROKEN HOME BACKGROUNDS

Stable		Broken	
$N_1 = 26$	$R_1 = 613.0$	$N_2 = 16$	$R_2 = 290.0$
	$U_1 = 154.0$		$U_2 = 262.0$
	$z = -1.4018$		

TABLE 95

THE MANN-WHITNEY U TEST OF SIGNIFICANCE OF DIFFERENCE
OF SPELLING SCORES OF STENOGRAPHERS CLASSIFIED
MOBILE AND NONMOBILE

Mobile		Nonmobile	
$N_1 = 13$	$R_1 = 215.5$	$N_2 = 29$	$R_2 = 687.5$
	$U_1 = 252.5$		$U_2 = 124.5$
			$z = -1.7514$

TABLE 96

THE MANN-WHITNEY U TEST OF SIGNIFICANCE OF DIFFERENCE
OF COMPUTATION SCORES OF STENOGRAPHERS
CLASSIFIED MOBILE AND NONMOBILE

Mobile		Nonmobile	
$N_1 = 13$	$R_1 = 261.5$	$N_2 = 29$	$R_2 = 641.5$
	$U_1 = 206.5$		$U_2 = 170.5$
			$z = -0.4944$

TABLE 97

THE MANN-WHITNEY U TEST OF SIGNIFICANCE OF DIFFERENCE
OF CHECKING SCORES OF STENOGRAPHERS CLASSIFIED
MOBILE AND NONMOBILE

Mobile		Nonmobile	
$N_1 = 13$	$R_1 = 249.0$	$N_2 = 29$	$R_2 = 654.0$
	$U_1 = 219.0$		$U_2 = 158.0$
			$z = -0.8318$

TABLE 98

THE MANN-WHITNEY U TEST OF SIGNIFICANCE OF DIFFERENCE
OF WORD MEANING SCORES OF STENOGRAPHERS
CLASSIFIED MOBILE AND NONMOBILE

Mobile		Nonmobile	
$N_1 = 13$	$R_1 = 285.0$	$N_2 = 29$	$R_2 = 618.0$
	$U_1 = 183.0$		$U_2 = 194.0$
	$z = -0.1501$		

TABLE 99

THE MANN-WHITNEY U TEST OF SIGNIFICANCE OF DIFFERENCE
OF COPYING SCORES OF STENOGRAPHERS CLASSIFIED
MOBILE AND NONMOBILE

Mobile		Nonmobile	
$N_1 = 13$	$R_1 = 266.5$	$N_2 = 29$	$R_2 = 636.5$
	$U_1 = 201.5$		$U_2 = 175.5$
			$z = -0.3546$

TABLE 100

THE MANN-WHITNEY U TEST OF SIGNIFICANCE OF DIFFERENCE
OF REASONING SCORES OF STENOGRAPHERS CLASSIFIED
MOBILE AND NONMOBILE

Mobile		Nonmobile	
$N_1 = 13$	$R_1 = 272.0$	$N_2 = 29$	$R_2 = 631.0$
	$U_1 = 196.0$		$U_2 = 181.0$
			$z = -0.2064$

TABLE 101

THE MANN-WHITNEY U TEST OF SIGNIFICANCE OF DIFFERENCE
OF NUMBER COMPARISON SCORES OF STENOGRAPHERS
CLASSIFIED MOBILE AND NONMOBILE

Mobile		Nonmobile	
$N_1 = 13$	$R_1 = 237.0$	$N_2 = 29$	$R_2 = 666.0$
	$U_1 = 231.0$		$U_2 = 146.0$
			$z = -1.1566$

TABLE 102

THE MANN-WHITNEY U TEST OF SIGNIFICANCE OF DIFFERENCE
OF NAME COMPARISON SCORES OF STENOGRAPHERS
CLASSIFIED MOBILE AND NONMOBILE

Mobile		Nonmobile	
$N_1 = 13$	$R_1 = 227.5$	$N_2 = 29$	$R_2 = 675.5$
	$U_1 = 240.5$		$U_2 = 136.5$
			$z = -1.4158$

TABLE 103

THE MANN-WHITNEY U TEST OF SIGNIFICANCE OF DIFFERENCE
OF SHORTHAND SPEED SCORES OF STENOGRAPHERS
CLASSIFIED MOBILE AND NONMOBILE

Mobile		Nonmobile	
$N_1 = 13$	$R_1 = 245.5$	$N_2 = 29$	$R_2 = 657.5$
	$U_1 = 222.5$		$U_2 = 154.5$
			$z = -1.0012$

TABLE 104

THE MANN-WHITNEY U TEST OF SIGNIFICANCE OF DIFFERENCE
OF TYPING SPEED SCORES OF STENOGRAPHERS
CLASSIFIED MOBILE AND NONMOBILE

Mobile		Nonmobile	
$N_1 = 13$	$R_1 = 270.0$	$N_2 = 29$	$R_2 = 633.0$
	$U_1 = 198.0$		$U_2 = 179.0$
			$z = -0.2591$

TABLE 105

THE MANN-WHITNEY U TEST OF SIGNIFICANCE OF DIFFERENCE OF
SPELLING SCORES OF STENOGRAPHERS AGES 19- AND 20+

Age 19-		Age 20+	
$N_1 = 16$	$R_1 = 343.5$	$N_2 = 26$	$R_2 = 559.5$
	$U_1 = 208.5$		$U_2 = 207.5$
			$z = -1.0130$

TABLE 106

THE MANN-WHITNEY U TEST OF SIGNIFICANCE OF DIFFERENCE OF
COMPUTATION SCORES OF STENOGRAPHERS AGES 19- AND 20+

Age 19-		Age 20+	
$N_1 = 16$	$R_1 = 315.5$	$N_2 = 26$	$R_2 = 587.5$
	$U_1 = 236.5$		$U_2 = 179.5$
			$z = -0.7452$

TABLE 107

THE MANN-WHITNEY U TEST OF SIGNIFICANCE OF DIFFERENCE OF
CHECKING SCORES OF STENOGRAPHERS AGES 19- AND 20+

Age 19-		Age 20+	
$N_1 = 16$	$R_1 = 377.5$	$N_2 = 26$	$R_2 = 525.5$
	$U_1 = 174.5$		$U_2 = 241.5$
	$z = -0.8698$		

TABLE 108

THE MANN-WHITNEY U TEST OF SIGNIFICANCE OF DIFFERENCE OF
WORD MEANING SCORES OF STENOGRAPHERS AGES 19- AND 20+

Age 19-		Age 20+	
$N_1 = 16$	$R_1 = 301.5$	$N_2 = 26$	$R_2 = 601.5$
	$U_1 = 250.5$		$U_2 = 165.5$
			$z = -1.1041$

TABLE 109

THE MANN-WHITNEY U TEST OF SIGNIFICANCE OF DIFFERENCE OF
COPYING SCORES OF STENOGRAPHERS AGES 19- AND 20+

Age 19-		Age 20+	
$N_1 = 16$	$R_1 = 341.5$	$N_2 = 26$	$R_2 = 561.5$
	$U_1 = 210.5$		$U_2 = 205.5$
			$z = -0.0649$

TABLE 110

THE MANN-WHITNEY U TEST OF SIGNIFICANCE OF DIFFERENCE OF
REASONING SCORES OF STENOGRAPHERS AGES 19- AND 20+

Age 19-		Age 20+	
$N_1 = 16$	$R_1 = 324.0$	$N_2 = 26$	$R_2 = 579.0$
	$U_1 = 228.0$		$U_2 = 188.0$
			$z = -0.5240$

TABLE 111

THE MANN-WHITNEY U TEST OF SIGNIFICANCE OF DIFFERENCE OF
NUMBER COMPARISON SCORES OF STENOGRAPHERS AGES 19- AND 20+

Age 19-		Age 20+	
$N_1 = 16$	$R_1 = 338.5$	$N_2 = 26$	$R_2 = 564.5$
	$U_1 = 213.5$		$U_2 = 202.5$
			$z = -0.1425$

TABLE 112

THE MANN-WHITNEY U TEST OF SIGNIFICANCE OF DIFFERENCE OF
NAME COMPARISON SCORES OF STENOGRAPHERS AGES 19- AND 20+

Age 19-		Age 20+	
$N_1 = 16$	$R_1 = 372.5$	$N_2 = 26$	$R_2 = 530.5$
	$U_1 = 179.5$		$U_2 = 236.5$
	$z = -0.7387$		

TABLE 113

THE MANN-WHITNEY U TEST OF SIGNIFICANCE OF DIFFERENCE OF
SHORTHAND SPEED SCORES OF STENOGRAPHERS AGES 19- AND 20+

Age 19-		Age 20+	
$N_1 = 16$	$R_1 = 381.0$	$N_2 = 26$	$R_2 = 522.0$
	$U_1 = 171.0$		$U_2 = 245.0$
	$z = -1.0372$		

TABLE 114

THE MANN-WHITNEY U TEST OF SIGNIFICANCE OF DIFFERENCE OF
TYPING SPEED SCORES OF STENOGRAPHERS AGES 19- AND 20+

Age 19-		Age 20+	
$N_1 = 16$	$R_1 = 352.5$	$N_2 = 26$	$R_2 = 550.5$
	$U_1 = 199.5$		$U_2 = 216.5$
	$z = -0.2207$		

TABLE 115

THE MANN-WHITNEY U TEST OF SIGNIFICANCE OF DIFFERENCE OF
SPELLING SCORES OF WHITE AND NON-WHITE STENOGRAPHERS

White		Non-white	
$N_1 = 27$	$R_1 = 577.5$	$N_2 = 15$	$R_2 = 325.5$
	$U_1 = 205.5$		$U_2 = 199.5$
			$z = -0.0792$

TABLE 116

THE MANN-WHITNEY U TEST OF SIGNIFICANCE OF DIFFERENCE OF
COMPUTATION SCORES OF WHITE AND NON-WHITE STENOGRAPHERS

White		Non-white	
$N_1 = 27$	$R_1 = 651.5$	$N_2 = 15$	$R_2 = 251.5$
	$U_1 = 131.5$		$U_2 = 273.5$
	$z = -1.8815$		

TABLE 117

THE MANN-WHITNEY U TEST OF SIGNIFICANCE OF DIFFERENCE OF
CHECKING SCORES OF WHITE AND NON-WHITE STENOGRAPHERS

White		Non-white	
$N_1 = 27$	$R_1 = 651.5$	$N_2 = 15$	$R_2 = 251.5$
	$U_1 = 131.5$		$U_2 = 273.5$
	$z = -1.8682$		

TABLE 118

THE MANN-WHITNEY U TEST OF SIGNIFICANCE OF DIFFERENCE OF
WORD MEANING SCORES OF WHITE AND NON-WHITE STENOGRAPHERS

White		Non-white	
$N_1 = 27$	$R_1 = 671.5$	$N_2 = 15$	$R_2 = 231.5$
	$U_1 = 111.5$		$U_2 = 293.5$
	$z = -2.3959$		

TABLE 119

THE MANN-WHITNEY U TEST OF SIGNIFICANCE OF DIFFERENCE OF
COPYING SCORES OF WHITE AND NON-WHITE STENOGRAPHERS

White		Non-white	
$N_1 = 27$	$R_1 = 625.5$	$N_2 = 15$	$R_2 = 277.5$
	$U_1 = 157.5$		$U_2 = 247.5$
	$z = -1.1841$		

TABLE 120

THE MANN-WHITNEY U TEST OF SIGNIFICANCE OF DIFFERENCE OF
REASONING SCORES OF WHITE AND NON-WHITE STENOGRAPHERS

White		Non-white	
$N_1 = 27$	$R_1 = 663.0$	$N_2 = 15$	$R_2 = 240.0$
	$U_1 = 120.0$		$U_2 = 285.0$
	$z = -2.1907$		

TABLE 121

THE MANN-WHITNEY U TEST OF SIGNIFICANCE OF DIFFERENCE
OF NUMBER COMPARISON SCORES OF WHITE
AND NON-WHITE STENOGRAPHERS

White		Non-white	
$N_1 = 27$	$R_1 = 599.0$	$N_2 = 15$	$R_2 = 304.0$
	$U_1 = 184.0$		$U_2 = 221.0$
	$z = -0.4858$		

TABLE 122

THE MANN-WHITNEY U TEST OF SIGNIFICANCE OF DIFFERENCE OF
NAME COMPARISON SCORES OF WHITE AND NON-WHITE STENOGRAPHERS

White		Non-white	
$N_1 = 27$	$R_1 = 649.5$	$N_2 = 15$	$R_2 = 253.5$
	$U_1 = 133.5$		$U_2 = 271.5$
	$z = -1.8126$		

TABLE 123

THE MANN-WHITNEY U TEST OF SIGNIFICANCE OF DIFFERENCE OF
SHORTHAND SPEED SCORES OF WHITE AND NON-WHITE STENOGRAPHERS

White		Non-white	
$N_1 = 27$	$R_1 = 617.5$	$N_2 = 15$	$R_2 = 285.5$
	$U_1 = 165.5$		$U_2 = 239.5$
	$z = -1.0512$		

TABLE 124

THE MANN-WHITNEY U TEST OF SIGNIFICANCE OF DIFFERENCE OF
TYPING SPEED SCORES OF WHITE AND NON-WHITE STENOGRAPHERS

White		Non-white	
$N_1 = 27$	$R_1 = 645.0$	$N_2 = 15$	$R_2 = 258.0$
	$U_1 = 138.0$		$U_2 = 267.0$
	$z = -1.6970$		

TABLE 125

THE MANN-WHITNEY U TEST OF SIGNIFICANCE OF DIFFERENCE
OF COSMETOLOGY ACHIEVEMENT SCORES OF DROPOUTS
WITH RURAL AND NONRURAL BACKGROUNDS

Rural		Nonrural	
$N_1 = 2$	$R_1 = 10.0$	$N_2 = 22$	$R_2 = 290.0$
	$U_1 = 37.0$		$U_2 = 7.0$
			$z = -1.5694$

TABLE 126

THE MANN-WHITNEY U TEST OF SIGNIFICANCE OF DIFFERENCE
OF COSMETOLOGY ACHIEVEMENT SCORES OF DROPOUTS
WITH STABLE AND BROKEN HOME BACKGROUNDS

Stable		Broken	
$N_1 = 11$	$R_1 = 156.0$	$N_2 = 13$	$R_2 = 144.0$
	$U_1 = 53.0$		$U_2 = 90.0$
	$z = -1.0737$		

TABLE 127

THE MANN-WHITNEY U TEST OF SIGNIFICANCE OF DIFFERENCE
OF COSMETOLOGY ACHIEVEMENT SCORES OF DROPOUTS
CLASSIFIED MOBILE AND NONMOBILE

Mobile		Nonmobile	
$N_1 = 5$	$R_1 = 51.0$	$N_2 = 19$	$R_2 = 249.0$
	$U_1 = 59.0$		$U_2 = 36.0$
			$z = -0.8189$

TABLE 128

THE MANN-WHITNEY U TEST OF SIGNIFICANCE OF DIFFERENCE OF
COSMETOLOGY ACHIEVEMENT SCORES OF DROPOUTS AGES 19- AND 20+

Age 19-		Age 20+	
$N_1 = 9$	$R_1 = 109.0$	$N_2 = 15$	$R_2 = 191.0$
	$U_1 = 71.0$		$U_2 = 64.0$
			$z = -0.2091$

TABLE 129

THE MANN-WHITNEY U TEST OF SIGNIFICANCE OF DIFFERENCE
OF COSMETOLOGY ACHIEVEMENT SCORES OF WHITE
AND NON-WHITE DROPOUTS

White		Non-white	
$N_1 = 12$	$R_1 = 185.5$	$N_2 = 12$	$R_2 = 114.5$
	$U_1 = 36.5$		$U_2 = 107.5$
	$z = -2.0532$		

TABLE 130

THE MANN-WHITNEY U TEST OF SIGNIFICANCE OF DIFFERENCE
OF AUTOMOTIVE ACHIEVEMENT SCORES OF DROPOUTS
WITH RURAL AND NONRURAL BACKGROUNDS

Rural		Nonrural	
$N_1 = 2$	$R_1 = 7.5$	$N_2 = 8$	$R_2 = 47.5$
	$U_1 = 11.5$		$U_2 = 4.5$
			$z = -0.9195$

TABLE 131

THE MANN-WHITNEY U TEST OF SIGNIFICANCE OF DIFFERENCE
OF AUTOMOTIVE ACHIEVEMENT SCORES OF DROPOUTS
WITH STABLE AND BROKEN HOME BACKGROUNDS

Stable		Broken	
$N_1 = 8$	$R_1 = 45.0$	$N_2 = 2$	$R_2 = 10.0$
	$U_1 = 7.0$		$U_2 = 9.0$
	$z = -0.2627$		

TABLE 132

THE MANN-WHITNEY U TEST OF SIGNIFICANCE OF DIFFERENCE
OF AUTOMOTIVE ACHIEVEMENT SCORES OF DROPOUTS
CLASSIFIED MOBILE AND NONMOBILE

Mobile		Nonmobile	
$N_1 = 4$	$R_1 = 24.5$	$N_2 = 6$	$R_2 = 30.5$
	$U_1 = 9.5$		$U_2 = 14.5$
	$z = -0.5363$		

TABLE 133

THE MANN-WHITNEY U TEST OF SIGNIFICANCE OF DIFFERENCE OF
AUTOMOTIVE ACHIEVEMENT SCORES OF DROPOUTS AGES 19- AND 20+

Age 19-		Age 20+	
$N_1 = 4$	$R_1 = 24.0$	$N_2 = 6$	$R_2 = 31.0$
	$U_1 = 10.0$		$U_2 = 14.0$
	$z = -0.4290$		

TABLE 134

THE MANN-WHITNEY U TEST OF SIGNIFICANCE OF DIFFERENCE
OF AUTOMOTIVE ACHIEVEMENT SCORES OF WHITE AND
NON-WHITE DROPOUTS

White		Non-white	
$N_1 = 10$	$R_1 = 55.0$	$N_2 = 0$	$R_2 = 0.0$
	$U_1 = 0.0$		$U_2 = 0.0$
			$z = 0.0000$

TABLE 135

THE MANN-WHITNEY U TEST OF SIGNIFICANCE OF DIFFERENCE
OF MACHINIST ACHIEVEMENT SCORES OF DROPOUTS
WITH RURAL AND NONRURAL BACKGROUNDS

Rural		Nonrural	
$N_1 = 2$	$R_1 = 13.0$	$N_2 = 8$	$R_2 = 42.0$
	$U_1 = 6.0$		$U_2 = 10.0$
	$z = -0.5222$		

TABLE 136

THE MANN-WHITNEY U TEST OF SIGNIFICANCE OF DIFFERENCE
OF MACHINIST ACHIEVEMENT SCORES OF DROPOUTS
WITH STABLE AND BROKEN HOME BACKGROUNDS

Stable		Broken	
$N_1 = 5$	$R_1 = 39.0$	$N_2 = 5$	$R_2 = 16.0$
	$U_1 = 1.0$		$U_2 = 24.0$
	$z = -2.4023$		

TABLE 137

THE MANN-WHITNEY U TEST OF SIGNIFICANCE OF DIFFERENCE
OF MACHINIST ACHIEVEMENT SCORES OF DROPOUTS
CLASSIFIED MOBILE AND NONMOBILE

Mobile		Nonmobile	
$N_1 = 4$	$R_1 = 28.0$	$N_2 = 6$	$R_2 = 27.0$
	$U_1 = 6.0$		$U_2 = 18.0$
	$z = -1.2792$		

TABLE 138

THE MANN-WHITNEY U TEST OF SIGNIFICANCE OF DIFFERENCE OF
MACHINIST ACHIEVEMENT SCORES OF DROPOUTS AGES 19- AND 20+

Age 19-		Age 20+	
$N_1 = 0$	$R_1 = 0.0$	$N_2 = 10$	$R_2 = 55.0$
	$U_1 = 0.0$		$U_2 = 0.0$
			$z = 0.0000$

TABLE 139

THE MANN-WHITNEY U TEST OF SIGNIFICANCE OF DIFFERENCE
OF MACHINIST ACHIEVEMENT SCORES OF WHITE
AND NON-WHITE DROPOUTS

White		Non-white	
$N_1 = 5$	$R_1 = 37.0$	$N_2 = 5$	$R_2 = 18.0$
	$U_1 = 3.0$		$U_2 = 22.0$
	$z = -1.9845$		

TABLE 140

THE MANN-WHITNEY U TEST OF SIGNIFICANCE OF DIFFERENCE
OF SHEET METAL ACHIEVEMENT SCORES OF DROPOUTS
WITH RURAL AND NONRURAL BACKGROUNDS

Rural		Nonrural	
$N_1 = 0$	$R_1 = 0.0$	$N_2 = 5$	$R_2 = 15.0$
	$U_1 = 0.0$		$U_2 = 0.0$
			$z = 0.0000$

TABLE 141

THE MANN-WHITNEY U TEST OF SIGNIFICANCE OF DIFFERENCE
OF SHEET METAL ACHIEVEMENT SCORES OF DROPOUTS
WITH STABLE AND BROKEN HOME BACKGROUNDS

Stable		Broken	
$N_1 = 1$	$R_1 = 1.0$	$N_2 = 4$	$R_2 = 14.0$
	$U_1 = 4.0$		$U_2 = 0.0$
			$z = 0.0000$

TABLE 142

THE MANN-WHITNEY U TEST OF SIGNIFICANCE OF DIFFERENCE
OF SHEET METAL ACHIEVEMENT SCORES OF DROPOUTS
CLASSIFIED MOBILE AND NONMOBILE

Mobile		Nonmobile	
$N_1 = 4$	$R_1 = 12.5$	$N_2 = 1$	$R_2 = 2.5$
	$U_1 = 1.5$		$U_2 = 2.5$
	$z = -0.3627$		

TABLE 143

THE MANN-WHITNEY U TEST OF SIGNIFICANCE OF DIFFERENCE OF
SHEET METAL ACHIEVEMENT SCORES OF DROPOUTS AGES 19- AND 20+

Age 19-		Age 20+	
$N_1 = 1$	$R_1 = 1.0$	$N_2 = 4$	$R_2 = 14.0$
	$U_1 = 4.0$		$U_2 = 0.0$
			$z = 0.0000$

TABLE 144

THE MANN-WHITNEY U TEST OF SIGNIFICANCE OF DIFFERENCE
OF SHEET METAL ACHIEVEMENT SCORES OF WHITE
AND NON-WHITE DROPOUTS

White		Non-white	
$N_1 = 4$	$R_1 = 12.5$	$N_2 = 1$	$R_2 = 2.5$
	$U_1 = 1.5$		$U_2 = 2.5$
	$z = -0.3627$		

TABLE 145

THE MANN-WHITNEY U TEST OF SIGNIFICANCE OF DIFFERENCE
OF WELDING ACHIEVEMENT SCORES OF DROPOUTS
WITH RURAL AND NONRURAL BACKGROUNDS

Rural		Nonrural	
$N_1 = 1$	$R_1 = 1.0$	$N_2 = 2$	$R_2 = 5.0$
	$U_1 = 2.0$		$U_2 = 0.0$
			$z = 0.0000$

TABLE 146

THE MANN-WHITNEY U TEST OF SIGNIFICANCE OF DIFFERENCE
OF WELDING ACHIEVEMENT SCORES OF DROPOUTS
WITH STABLE AND BROKEN HOME BACKGROUNDS

Stable		Broken	
$N_1 = 2$	$R_1 = 5.0$	$N_2 = 1$	$R_2 = 1.0$
	$U_1 = 0.0$		$U_2 = 2.0$
			$z = 0.0000$

TABLE 147

THE MANN-WHITNEY U TEST OF SIGNIFICANCE OF DIFFERENCE
OF WELDING ACHIEVEMENT SCORES OF DROPOUTS
CLASSIFIED MOBILE AND NONMOBILE

Mobile		Nonmobile	
$N_1 = 1$	$R_1 = 2.0$	$N_2 = 2$	$R_2 = 4.0$
	$U_1 = 1.0$		$U_2 = 1.0$
	$z = 0.0000$		

TABLE 148

THE MANN-WHITNEY U TEST OF SIGNIFICANCE OF DIFFERENCE OF
WELDING ACHIEVEMENT SCORES OF DROPOUTS AGES 19- AND 20+

Age 19-		Age 20+	
$N_1 = 1$	$R_1 = 1.0$	$N_2 = 2$	$R_2 = 5.0$
	$U_1 = 2.0$		$U_2 = 0.0$
			$z = 0.0000$

TABLE 149

THE MANN-WHITNEY U TEST OF SIGNIFICANCE OF DIFFERENCE
OF WELDING ACHIEVEMENT SCORES OF WHITE
AND NON-WHITE DROPOUTS

White		Non-white	
$N_1 = 3$	$R_1 = 6.0$	$N_2 = 0$	$R_2 = 0.0$
	$U_1 = 0.0$		$U_2 = 0.0$
			$z = 0.0000$

TEST SCORES FOR 168 DROPOUTS ENROLLED IN THE MDTA TRAINING PROGRAM DURING THE 1963-64 SCHOOL YEAR

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TABLE 150 -- CONTINUED

Measuring Instruments

Identification Number	GATE	STEP Pre-test					STEP Post-test					Purdue Personnel					Admin. Clerical		Shorthand Speed	Typing Speed	Cosmetology	Auto Mechanics	Machines	Sheet Metal	Welding																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
		Reading	Writing	Listening	Social Studies	Mathematics	Science	Reading	Writing	Listening	Social Studies	Mathematics	Science	Spelling	Computation	Checking	Word Meaning	Copying								Reasoning	Number Comparison	Name Comparison																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																				
14	90	46	35	58	44	20	41	51	36	66	36	33	39																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			

Measuring Instruments

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TABLE 150 -- CONTINUED

Measuring Instruments

Identification Number	OATB	STEP Pre-test					STEP Post-test					Purdue Personnel					Mun. Clerical		Shorthand Speed	Typing Speed	Cosmetology	Auto Mechanics	Machines	Sheet Metal	Welding																			
		Reading	Writing	Listening	Social Studies	Mathematics	Science	Reading	Writing	Listening	Social Studies	Mathematics	Science	Spelling	Computation	Checking	Word Meaning	Copying								Reasoning	Number Comparison	Name Comparison																
42	58	39	28	40	33	13	23	26	35	29	32	24	32	32	06	09	11	46	02	150	086	50	44	73																				
43	117	65	46	61	60	32	39	61	47	69	56	37	42	38	10	23	27	30	06	156	158	60	42																					
44	85	25	32	41	23	21	20	48	34	45	34	23	35																															
45	111	48	42	64	45	40	31	53	37	58	48	41	36	41	13	26	20	33	08	123	171	80	48																					
46	92	63	51	71	59	34	43	62	50	70	56	25	41	34	12	18	15	39	06	175	144	80	59																					
47	74	32	23	39	32	16	19	25	18	46	19	13	19											048																				
48	102	60	49	63	52	36	35	54	49	63	51	33	39	34	09	22	22	32	06	125	138	80	50																					
49	104	49	28	50	50	35	39	56	42	55	52	29	41																		077													
50	72	36	32	47	39	25	26	44	43	62	46	12	36																									062						
51	85	46	34	39	39	23	23	56	31	53	35	17	24	36	01	13	17	26	01	104	134	60	37																					
52	89	41	38	63	47	28	38	39	40	63	43	24	34	37	08	23	19	45	05	123	103	60	48																					
53	104	58	42	73	52	46	44	56	41	69	56	37	44											24																				
54	105	57	36	68	58	40	51	54	39	71	55	43	48																		27													
55	98	57	39	70	47	29	38	65	45	76	58	37	36	35	08	14	24	26	06	112	129	80	45																					

TABLE 150 -- CONTINUED

Measuring Instruments

Measuring Instruments																													
Identification Number	GATB	STEP Pretest						STEP Post-test						Purdue Personnel						Mime. Charted		Shorthand Speed	Typing Speed	Cosmetology	Auto Mechanics	Machines	Sheet Metal	Welding	
		Reading	Writing	Listening	Social Studies	Mathematics	Science	Reading	Writing	Listening	Social Studies	Mathematics	Science	Spelling	Computation	Checking	Word Meaning	Copying	Reasoning	Number Comparison	Name Comparison								
56	90	55	51	67	49	34	40	61	48	66	52	33	41	43	12	25	21	36	03	091	143	60	44	70	23				
57	98	47	25	56	47	26	37	44	23	57	34	33	31																
58	78	32	24	23	28	17	37	32	19	39	25	19	36																
59	117	63	48	66	58	38	45	60	41	69	49	37	44																
60	127	66	57	66	69	44	49	68	56	72	64	43	46	47	12	24	26	30	08	188	176	90	63						
61	76	48	39	58	48	12	32	50	41	57	44	16	37	29	05	05	13	27	00	124	114	60	47						
62	80	51	50	51	48	34	38	46	45	51	50	23	38	37	10	24	17	47	06	175	153	80	45						
63	95	57	42	61	53	27	36	54	45	55	58	27	42		11	22	13	34	03	119	242	60	46						
64	75	20	20	39	19	20	26	27	19	48	25	13	38																
65	111	53	40	66	56	38	42	52	21	68	42	45	46																
66	115	61	44	71	60	37	39	62	49	68	57	30	41	37	08	18	22	32	05	159	159	80	58						
67	76	53	38	58	39	32	29	50	38	58	42	40	30	29	10	16	14	22	06	127	124	80	48						
68	102	58	39	65	57	44	41	54	43	64	51	43	46																
69	98	58	43	66	60	31	43	58	51	67	63	32	40	40	10	21	30	28	03	133	128	80	52						

TABLE 150 -- CONTINUED

Measuring Instruments

Identification Number	GATB	STEP Pre-test					STEP Post-test					Purdue Personnel					Minn. Clerical											
		Reading	Writing	Listening	Social Studies	Mathematics	Science	Reading	Writing	Listening	Social Studies	Mathematics	Science	Spelling	Computation	Checking	Word Meaning	Copying	Reasoning	Number Comparison	Name Comparison	Shorthand Speed	Typing Speed	Cosmetology	Auto Mechanics	Machines	Sheet Metal	Welding
70	92	55	44	64	48	31	42	59	41	67	40	19	43											83				
71	86	50	35	39	39	27	35	42	46	54	40	26	33	33	06	24	11	27	01	128	111	60	34					
72	98	60	47	63	51	33	46	60	49	70	60	38	41	35	11	20	24	24	07	125	138	80	56					
73	103	56	34	63	46	33	39	39	29	71	35	39	34														21	
74	106	55	39	70	58	38	43	57	37	73	58	38	44															
75	79	56	38	58	42	20	33	56	32	61	36	13	34											54			25	
76	94	40	34	41	39	28	26	46	38	41	35	28	45														20	
77	101	56	45	59	43	32	44	59	43	64	50	33	40	37	14	21	14	36	04	176	174	90	60					
78	94	53	36	66	40	29	39	59	27	62	35	21	35															
79	82	50	40	34	56	14	36	33	35	33	54	28	41															
80	71	27	30	30	31	20	23	34	23	40	31	16	21											58				
81	82	38	29	47	40	27	30	51	39	41	40	32	31															
82	101	56	47	68	56	28	44	61	51	73	62	40	42	32	05	16	27	36	03	115	131	30	54					
83	84	28	29	38	18	31	28	30	30	42	40	35	36															

TABLE 150 -- CONTINUED

Measuring Instruments

Identification Number	GATB	STEP Pre-test					STEP Post-test					Purdue Personnel					Minn. Clerical		Shorthand Speed	Typing Speed	Cosmetology	Auto Mechanics	Machines	Sheet Metal	Welding				
		Reading	Writing	Listening	Social Studies	Mathematics	Science	Reading	Writing	Listening	Social Studies	Mathematics	Science	Spelling	Computation	Checking	Word Meaning	Copying								Reasoning	Number Comparison	Name Comparison	
84	101	52	41	62	52	32	42	60	45	67	51	34	48																
85	112	51	48	59	50	27	29	57	40	66	52	28	30																
86	105	53	39	57	50	36	34	52	43	61	47	29	37																
87	91	34	23	69	44	26	29	34	23	71	44	14	41																
88	98	51	39	60	44	42	43	54	38	57	41	33	40	25	09	14	16	32	05	137	131	80	59						
89	93	38	37	41	36	24	30	41	37	51	31	17	44	08	17	14	39	02	155	136	80	54							
90	73	37	29	32	39	21	24	35	27	55	45	14	31																
91	98	57	46	70	63	32	41	65	52	73	65	43	42	38	07	14	23	19	05	118	137	60	52						
92	90	48	33	53	40	27	35	28	19	55	33	10	28	31	03	10	09	36	00	151	110	60	59						
93	98	52	36	46	50	22	24	51	38	40	37	24	36	37	06	23	13	30	01	168	151	60	52						
94	113	49	44	71	51	33	44	49	36	70	36	32	36																
* 95	94	41	28		43		14																						
* 96	74		32	52			21																						
* 97	110	58	46	65	57	34	37																						

TABLE 150 -- CONTINUED

Measuring Instruments

Measuring Instruments																																		
Identification Number		GATB						STEP Pretest					STEP Post-test					Purdue Personnel					Min. Clerical											
* 98	93	47	33	38	36	26	29	Reading	Writing	Listening	Social Studies	Mathematics	Science	Reading	Writing	Listening	Social Studies	Mathematics	Science	Spelling	Computation	Checking	Word Meaning	Copying	Reasoning	Number Comparison	Name Comparison	Shorthand Speed	Typing Speed	Cosmetology	Auto Mechanics	Machines	Sheet Metal	Welding
* 99	100	53	47	72	56	31	41																											
*100	58	21																																
*101	86	63	42	67	60	35	43																											
*102	84	47	41	53	46	31	33																											
*103	85				35	21																												
*104	88	57	36	57	42	21	25																											
*105	88	48	35	59	49	27	30																											
*106	107	46				36	46																											
*107	126	49		57	48		36																											
*108	96	48	32	44		31	31																											
*109	82			63	44		29																											
*110	95	37	21	53		25	34																											
*111	75		22	32	39	13	30																											

TABLE 150 -- CONTINUED

Measuring Instruments

Measuring Instruments																										
Identification Number	QATB	STIP Pre-test					STIP Post-test					Purdue Personnel				Minn. Clerical		Shorthand Speed	Typing Speed	Cosmetology	Auto Mechanics	Machines	Sheet Metal	Welding		
		Reading	Writing	Listening	Social Studies	Mathematics	Science	Reading	Writing	Listening	Social Studies	Mathematics	Science	Spelling	Computation	Checking	Word Meaning								Copying	Reasoning
#112	107	60	45	64	46	31	34																			
#113	84	46	31	36	29	13	25																			
#114	100	55	44	64	57	32	39																			
#115	93	54	41	57	51	20	35																			
#116	60	25		33	20	18	14																			
#117	86	43		49																						
#118	83	49	22	54	36	28	40																			
#119	111	56	35	58	45	28	36																			
#120	92					24	32																			
#121	81	40	29	35	34	17	23																			
#122	76		29		34	18																				
#123	94	52	46	60	49	30	42																			
#124	62	24	20	26	26	24	16																			
#125	55		36				31																			

Measuring Instruments:

202

Measuring Instruments

203

Measuring Instruments

[illegible]

*** Re-dropouts Interviewed**

TABLE 151
MEANS AND DIFFERENCE OF ACADEMIC ACHIEVEMENT
OF 94 HIGH SCHOOL DROPOUTS

Subject	Means		Difference
	Pretest	Post-test	
Reading	48.2	48.7	0.5
Writing	37.6	37.9	0.3
Listening	54.8	58.2	3.4
Social Studies	45.2	44.4	-0.8
Mathematics	28.0	28.0	0.0
Science	33.9	36.1	2.2

APPENDIX B

SUPPLEMENTAL DESCRIPTION OF MEASURING INSTRUMENTS

SUPPLEMENTAL DESCRIPTION OF MEASURING INSTRUMENTS

The Purdue Clerical Adaptability Test

Description and Purpose

This test was developed to aid in the selection and placement of clerical and office personnel. It consists of six separate sections, each of which measures a skill or ability required on certain clerical jobs. These six independent test sections include: (1) Spelling, (2) Computation, (3) Checking, (4) Word Meaning, (5) Copying, and (6) Reasoning (Arithmetical).

Reliability

The reliability estimates presented on the diagonals in Table 152 are coefficients of consistency, and have been obtained through Spearman-Brown extensions of split-half correlations. While these coefficients range from a high of .97 on Section 5, Copying, to a low of .79 on Section 6, Reasoning, it is the opinion of the authors that split-half reliability estimates on some of the tests are not completely appropriate because of the time factor. For example, the estimate of .97 on Section 5, Copying, is probably spuriously high because this section involves primarily motor activity

with rate of speed an important variable. Similarly, but probably to a lesser degree, time is an important element in Section 3, Checking. Coefficients were obtained on a group of 168 applicants.

Intercorrelations. Table 152 also reports the intercorrelations between the six sections for the same applicant group. While the tests, as expected, have some variance in common, there is considerable uniqueness among the several sections.

TABLE 152

RELIABILITY COEFFICIENTS OBTAINED BY THE SPLIT-HALF METHOD
AND INTERCORRELATIONS BETWEEN SECTIONS
(N = 168 APPLICANTS)¹

Section	Section					
	1	2	3	4	5	6
1. Spelling	(.95)	.50	.40	.52	.23	.44
2. Computation	.50	(.80)	.29	.35	.17	.64
3. Checking	.40	.29	(.92)	.30	.35	.22
4. Word Meaning	.52	.35	.30	(.96)	.19	.44
5. Copying	.23	.17	.35	.19	(.97)	.15
6. Reasoning	.44	.64	.22	.44	.15	(.79)

Validity

An achievement test has content validity if it measures "what it is supposed to measure." As is usually the case with such tests, quantitative evidence is not feasible.

¹C. H. Lawshe, Purdue Clerical Adaptability Test: Manual of Instructions (Lafayette: Occupational Research Center, Purdue University, 1956).

However, the "job sample" nature of the six sections, together with the internal consistency reliabilities already presented in Table 152, lends strong support to the statement that their content is valid.

Additional Information

The preceding information has been taken from the manual of instructions to accompany the Purdue Clerical Adaptability Test, Form A--Revised. This was done with the permission of the Purdue Research Foundation. Additional information may be secured by referring to this manual or by writing the Occupational Research Center, Purdue University, Lafayette, Indiana.

Minnesota Clerical Test

Description and Purpose

The Minnesota Clerical Test is a test of speed and accuracy in performing tasks related to clerical work. It has been found useful for selecting clerical employees and for advising persons who wish to seek training in the clerical field.

The test consists of two parts: (1) Number Checking and (2) Name Checking. In each part there are two hundred items consisting of one hundred identical pairs and one hundred dissimilar pairs. The examinee is asked to check the identical pairs. The numbers in Number Checking range from

three through twelve digits, and the names in Name Checking contain from seven through seventeen letters. Separate time limits are used for the two parts. The total testing time is fifteen minutes.

Reliability

Since the Minnesota Clerical Test is a speed test, the determination of reliability by correlating scores on odd and even items would be inappropriate. However, very few studies have been reported in which the test was administered twice to the same people. The reliability coefficients resulting from three such studies range from .56 to .93 for Number Checking and from .62 to .86 for Name Checking. In all instances, there was a considerable time interval between successive testings. During this interval, changes in ability due to training and experience undoubtedly tended to produce lower coefficients of reliability than would ordinarily be obtained from a test-retest situation with a small intervening period of time.²

Validity

Validity coefficients ranged from .14 to .56 for Number Checking and from .24 to .47 for Name Checking. These

²"Reproduced by permission. Copyright 1933/1961. The Psychological Corporation, New York, N. Y. All rights reserved."

were based on scores made by subjects employed in clerical or closely related occupations.

Additional Information

Information related to the Minnesota Clerical Test was taken from the general instruction manual. Permission to use this information was granted by The Psychological Corporation, 304 East 45th Street, New York 17, New York. Additional information concerning this instrument may be secured by referring to this manual.

Garage Mechanic Test

Description and Purpose

This is an achievement test. It seeks to measure the extent to which a particular person has profited from training and/or experience in a given field--in this case, automotive repair. To this end the items are restricted to a coverage of the knowledge and information which would normally be expected of those trained or engaged in this special field. The items of this test are based upon information provided in Motor's Auto Repair Manual, Kun's Auto Mechanic Training Manual, and the automotive service manuals and service bulletins provided for dealers and service garages by the various car manufacturers, together with some knowledge and experience of the author in the actual service and repair of automotive equipment.

Areas covered by the test include: (1) Tune-up and Related Internal-combustion Engine Servicing Principles, (2) Ignition, (3) Carburetion, (4) Clutch, (5) Transmission, (6) Differential and Drive Shaft, (7) Brakes, (8) Steering, and (9) other miscellaneous areas.

Development of the Test

The original test consisted of 133 items which included true-false, multiple choice, and parts identification (utilizing pictures). This form of the test was administered to approximately two hundred persons employed as garage mechanics. (Special care has been exercised throughout the development of this test to see that repairmen of all makes of automobiles were included in each sampling.) As a result of the analysis of the items from the first administration, it was felt advisable to discard "parts identification" items because their range of difficulty proved to be too small; hence they failed to differentiate adequately. Other items were largely retained, and new items added to help equalize the coverage for the different areas of automotive repair which were included in the test.

The second revision of the test consisted of 122 items, and was taken by approximately three hundred garage mechanics in four states; namely, Kentucky, Ohio, Georgia, and Florida. A subsequent item study indicated that more than one hundred of these items would be suitable for inclusion in the final test.

Norms

The table of norms was obtained from 356 tests taken by workers actually engaged in automotive repair. These testees were also from the four states previously mentioned, but were not previously tested. Excluded from the testings were all nonmechanical automotive service employees--such as lubrication men, body repairmen, or car washers and polishers. Nor did the testing include those men who prepared new cars for delivery unless they normally spent their time in actual automotive repair.

Additional Information

Permission to use the preceding information from the general instruction manual for the Garage Mechanic Test was granted by Educational Publishers, Incorporated. Additional information related to the Garage Mechanic Test may be secured by writing to the Educational Test Bureau, Educational Publishers, Incorporated, 720 Washington Avenue, S. E., Minneapolis 14, Minnesota.

Purdue Test for Machinists and Machine Operators

Description and Purpose

This test was designed to aid industry and vocational schools in determining the amount of machine-shop knowledge possessed by applicants or students. The test yields a total over-all score for general achievement in machine-shop

practice and separate sub-scores for the operation of the lathe, plane and shaper, grinder, milling machine, and for general bench work. The test is particularly useful in the selection of new machinists or machine operators. In addition, the "profile" resulting from the test sub-scores provides a basic consideration for promotion or transfer, or in the formation of a "utility-unit". In vocational and trade schools, as well as in formal training programs, it serves as a terminal achievement examination.

Reliability

The reliability of the Machinist Test was computed by correlating odd versus even items for each sub-score and for the test as a whole. The subjects used for the reliability computations were 200 students in vocational high schools, each student having a minimum of 720 hours of practical instruction in machine shop. The reliability values are summarized in Table 153.

Validity

A number of industrial concerns have used this test in a preliminary form and report favorable results. At present, the number of cases reported in each of these instances is not a sufficient sample on which to base statistical calculations, but present studies are expected to substantiate the reports. The validity of this test rests largely at present on these preliminary reports and on the thoroughness

of the sampling of machine-shop practice covered in standard textbooks on this subject. However, one statistical indication of validity has been obtained by comparing total scores of forty-seven machine-shop apprentices employed by a milling machine company with teachers' ratings of competence. The average test score of the high rated half of the apprentices was 84, while the average test score of the lower rated half was 70. The difference of 14 between these two values was 3.0 times its standard error and constitutes a statistically significant difference.

TABLE 153
COEFFICIENTS OF RELIABILITY

Test	Reliability
Grinder Operator	.90
Bench Worker	.87
Planner and Shaper Operator	.89
Lathe Operator	.80
Milling Machine Operator	.85
Total Score	.96

Additional Information

Permission to use the preceding information from the general instruction manual for the Purdue Test for Machinists and Machine Operators was granted by Purdue Research Foundation. Additional information concerning this test may be

secured by writing Science Research Associates, Incorporated, 259 East Erie Street, Chicago 11, Illinois.

The Purdue Trade Information Test for Sheet Metal Workers

Description and Purpose

This test is designed to aid industry and vocational schools in determining the amount of information about the sheet metal trade that is possessed by applicants or students. The test is particularly useful as an aid in selecting experienced sheet metal workers from applicants who claim to have had training and/or experience in the sheet metal trade. In vocational and trade schools, as well as in other formal training programs, the test serves as a terminal achievement examination.

Reliability

Reliabilities for two groups used in the double cross-validation were .90 and .77 as determined by the Kuder-Richardson Formula (20). Since the final test form is composed of more items of comparable acceptability than either of the forms used in the double cross-validation, the test undoubtedly has a reliability of at least .77, and .90 is probably the better estimate.

Validity

The mean score on the test made by 12 journeymen sheet metal workers was found to be 26. The mean score made

by 47 vocational school students having a minimum of at least 570 hours of shop instruction in sheet metal was found to be 21.1. These two means, 26 and 21.1, differ by 4.9 score units. The difference is significant at the .01 confidence level.

Additional Information

Permission to use the preceding information from the general instruction manual for the Purdue Trade Information Test for Sheet Metal Workers was granted by Purdue Research Foundation. Additional information may be secured by writing the Purdue Research Foundation, Purdue University, Lafayette, Indiana.

The Purdue Trade Information Test in Welding

Description and Purpose

This test is designed to aid industry and vocational schools in determining the amount of information in this field that is possessed by applicants or students. The test is particularly useful as an aid in the selection of new welders from applicants who claim to have had training and/or experience in the trade. In vocational and trade schools, as well as in other formal training programs, the test serves as a terminal achievement examination.

Reliability

The odd-even reliability of the test, computed on a preliminary sample of 59 cases, was found to be .91. This was based on an obtained correlation of .84 stepped up by the Spearman-Brown Prophecy Formula.

Validity

In addition to the logical validity inherent in the method of constructing the test, one short empirical study of validity has been conducted. In this study, the mean score of 11 employed journeymen welders was compared with the mean score of 46 vocational school students who had completed the standard course in welding. The mean score for journeymen welders was 44.7 and 33.3 for vocational students. The difference of 11.4 was found significant at the .01 confidence level.

Additional Information

Permission to use the preceding information from the general instruction manual for the Purdue Trade Information Test in Welding was granted by Purdue Research Foundation. Additional information about this test may be secured by writing the Purdue Research Foundation, Purdue University, Lafayette, Indiana.

APPENDIX C

ACCUMULATIVE DATA SHEET

MANPOWER DROPOUT DATA SHEET

Variable	Punch	Col. No.	Code
A		1-2	Identification Number
B		3	1 = Male 2 = Female
C		4	1 = 19- 2 = 20+
D		5	1 = White 2 = Non-white
E		6	1 = Steno 2 = Cosm 3 = Auto Mech 4 = Mach 5 = S Metal 6 = Welding
F		7	1 = Rural 2 = Nonrural
G		8	1 = Stable 2 = Broken
H		9	1 = Mobile 2 = Nonmobile
I		10-12	Aptitude Read Direct
J		13-14	Reading Pretest Read Direct
K		15-16	Reading Post-test Read Direct
L		17-18	Writing Pretest Read Direct
M		19-20	Writing Post-test Read Direct
N		21-22	Listening Pretest Read Direct
O		23-24	Listening Post-test Read Direct
P		25-26	Social Studies Pretest Read Direct
Q		27-28	Social Studies Post-test Read Direct
R		29-30	Mathematics Pretest Read Direct
S		31-32	Mathematics Post-test Read Direct
T		33-34	Science Pretest Read Direct
U		35-36	Science Post-test Read Direct
V		37	Teacher Evaluation 1 = Successful 2 = Unsuccessful
W		38-39	Cosmetology Read Direct
X		40-41	Auto Mechanics Read Direct
Y		42-43	Sheet Metal Read Direct
Z		44-45	Welding Read Direct
AA		46-48	Machines Read Direct
BB		49-50	Stenography Spelling Read Direct
CC		51-52	Computation Read Direct
DD		53-54	Checking Read Direct
EE		55-56	Word Meaning Read Direct
FF		57-58	Copying Read Direct
GG		59-60	Reasoning Read Direct
HH		61-63	Number Comparison Read Direct
II		64-66	Name Comparison Read Direct
JJ		67-68	Shorthand Speed Read Direct
KK		69-70	Typing Speed Read Direct

APPENDIX D

TEACHERS' CHECKLIST

T E A C H E R
E V A L U A T I O N O F M A N P O W E R S T U D E N T
T R A I N I N G S U C C E S S

Name _____ Date _____ Subject _____

ITEM	Poor	CIRCLE RATING		
		Fair	Excellent	
A. Interest	10-11-12-13	14-15-16	17-18-19-20	
B. Attendance	10-11-12-13	14-15-16	17-18-19-20	
C. Classroom Behavior	10-11-12-13	14-15-16	17-18-19-20	
D. Class Participation	10-11-12-13	14-15-16	17-18-19-20	
E. Grade	10-11-12-13	14-15-16	17-18-19-20	

Score _____ Percentile Rank _____

APPENDIX E

STRUCTURED INTERVIEW GUIDE

STRUCTURED INTERVIEW GUIDE

Check

- _____ 1. This is tape number _____.
- _____ 2. State your name and age, please.
- _____ 3. _____, are you making this tape of your own free will?
- _____ 4. _____, I have asked you to come for this interview for the purpose of learning more about you and becoming better acquainted. I see in your records that you have made _____ grades, and were seemingly interested in _____. Would you like to tell me about yourself?
HESITATION. You know--things like where you were born, where you have lived, what your mother and father were like, what they did, etc. HESITATION.
- _____ 5. What grade did your mother and father complete?
- _____ 6. _____, do you have any brothers and sisters?
- _____ 7. Where did you say you lived just after birth?
- _____ 8. Oh, your father was a _____. Did your mother work?
- _____ 9. Where did you live at this time?
- _____ 10. You say you lived in _____. How long did you live there?
- _____ 11. Have you lived all your life in (or on) the _____?
- _____ 12. Did your father make good money at _____?
- _____ 13. You say you have lived at _____ and _____. Are these the only places you have lived? You have moved around quite a bit, haven't you?

Check

- _____ 14. Did your mother work while you were going to school?
- _____ 15. What did she do?
- _____ 16. Are your mother and father still living? Are they still together? I see--then there were no divorces in your family, were there?
- _____ 17. How many times were they divorced?
- _____ 18. What school did you drop out of, _____?
- _____ 19. Were your parents always employed prior to your dropping out?
- _____ 20. What was your family's source of income?
- _____ 21. Did your family ever receive any form of welfare assistance prior to your dropping out?
- _____ 22. What would you say was the average weekly income of your family prior to your dropping out of school?
- _____ 23. Now you have stated that you lived most of your life on (or in) the _____. Which did you like the best?
- _____ 24. I surely appreciate your coming in and talking to me, _____. I want you to feel that you can come in and talk to me when you feel the need.
- _____ 25. _____, I'm going to have to run as I have another appointment. However, maybe you can come in again in the next few days, and we can talk some more. Would you like that? OK! You just check with the secretary out front, and she will place a time on the calendar for us. OPTION. Well, if you change your mind, just let me know and we will talk again.

APPENDIX F

FORMULAS USED FOR COMPUTATIONS

FORMULAS USED FOR STATISTICAL COMPUTATIONS

Formula 1 (chi-square test of significance):¹

$$\chi^2 = \sum \frac{(O - E)^2}{E}$$

Formula 2 (the Mann-Whitney U test):²

$$(A) \quad U = n_1 n_2 + \frac{n_1 (n_1 + 1)}{2} - R_1$$

and

$$(B) \quad U = n_1 n_2 + \frac{n_2 (n_2 + 1)}{2} - R_2$$

$$(C) \quad z = \frac{U - \frac{n_1 n_2}{2}}{\sqrt{\frac{(n_1)(n_2)(n_1 + n_2 + 1)}{12}}}$$

Formula 3 (the Mann-Whitney U test):³

$$(A) \quad U = n_1 n_2 + \frac{n_1 (n_1 + 1)}{2} - R_1$$

$$(B) \quad U = n_1 n_2 + \frac{n_2 (n_2 + 1)}{2} - R_2$$

¹Wert, Neidt, and Ahmann, op. cit., p. 147.

²Barnes, loc. cit.

³Seigel, loc. cit.

- (C) Correction for tied ranks applied to the standard deviation of the sampling distribution of U . Corrected for ties, the standard deviation becomes

$$\sigma_U = \sqrt{\left(\frac{n_1 n_2}{N(N-1)}\right) \left(\frac{N^3 - N}{12} - \sum T\right)}$$

- (D) Where $N = n_1 + n_2$

$$T = \frac{t^3 - t}{12} \quad (\text{where } t \text{ is the number of observations tied for a given rank})$$

- (E) T is found by summing the T 's over all groups of observations.

- (F) With the correction for ties, we find z by

$$z = \frac{U - \frac{n_1 n_2}{2}}{\sqrt{\left(\frac{n_1 n_2}{N(N-1)}\right) \left(\frac{N^3 - N}{12} - \sum T\right)}}$$

Formula 4 (single classification analysis of covariance,⁴ using Reading as the example):

- (A) Values found in Table 36 were computed.
 (B) Values found in Table 37 were computed.
 (C) Values in Tables 36 and 37 were used to compute the sums of squares and the sums of crossproducts in deviation form for the total sample and for within the subgroups.

For Total Sample:

$$\sum y^2 = \sum Y^2 - \frac{(\sum Y)^2}{N} =$$

For Within the Subgroups:

$$\sum y^2 = \sum Y^2 - \left[\frac{(\sum Y_Y)^2}{k_Y} + \frac{(\sum Y_N)^2}{k_N} \right] =$$

⁴Wert, Neidt, and Ahmann, op. cit., pp. 344-47.

- (D) Values from Tables 36 and 37 were used to compute the deviation form of the crossproducts between Reading post-test scores and Reading pretest scores. The same operation was repeated for crossproducts between Reading post-test and G A T B scores.

For Total Sample:

$$\sum x_1Y = \sum X_1Y - \frac{(\sum X_1)(\sum Y)}{N} =$$

For Within the Subgroups:

$$\sum x_1Y = \sum X_1Y - \left[\frac{(\sum X_{1y})(\sum Y_y)}{k_y} + \frac{(\sum X_{1n})(\sum Y_n)}{k_n} \right] =$$

The results of these computations were reported in Table 38.

- (E) The regression equations were calculated for total and within the subgroups. The nature of all relationships was assumed to be linear and the values of the criterion Y were to be predicted from known values of the two control variables-- X_1 and X_2 . The general equation was

$$Y = a_1X_1 + a_2X_2$$

The two equations necessary for the solution of each regression equation were

$$(1) \sum x_1Y = a_1\sum x_1^2 + a_2\sum x_1x_2$$

$$(2) \sum x_2Y = a_1\sum x_1x_2 + a_2\sum x_2^2$$

Values from Table 38 were substituted into the total regression equation and values of a_1 and a_2 yielded through the simultaneous solution of the normal equation. The values of a_1 and a_2 were then substituted back into the general equation to provide the necessary elements for the computation of the sum of squares of residuals for total.

- (F) The sum of squares of residuals for total was computed by employing the formula

$$\sum Y^2 - (a_1\sum x_1Y + a_2\sum x_2Y)$$

- (G) By the same procedure outlined in Steps (E) and (F), the within subgroups deviation values in Table 38 were substituted into the same normal equations and the within regression computed.

The values of a_1 and a_2 from the within regression equation were then combined with the appropriate values in Table 38 to calculate the sums of squares of residuals for the within groups.

- (H) A test of significance was then made by computing the F value. This was done in the same manner as used in the analysis of variance by substituting values from Table 39 as follows:

$$F_{1,90} = \frac{6.5490}{38.3359} = 0.1708$$