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Andary, John

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THE LONGITUDINAL EFFECTS OF CONTINUOUS EARLY CHILDHOOD COMPENSATORY EDUCATION ON THE ACHIEVEMENT OF DETROIT PUBLIC SCHOOL PUPILS

by

John Andary

DISSERTATION

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Approved by:

Claire Quinn February 17, 1983

Advisor Date

Arthur Brown

Marvel J Clute

Murray Seidler

Douglas S. Baarm, Graduate Examiner

This dissertation is dedicated to

Elizabeth Smail

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CHAPTER 1

STATEMENT OF THE PROBLEM

Introduction

When the federally funded program, Head Start, was organized in 1965, its goals mirrored the hopes of millions of impoverished Americans. Initially funded as a short-term effort, Head Start has become, after nearly eighteen years of operation and a cost of billions of dollars, one of the most ambitious educational programs for young children in the United States.

Additionally, Title I of the Elementary and Secondary Education Act (ESEA) has supported similar preschool programs. Through ESEA tens of millions of dollars have been expended on on the concept of developing cognitive abilities through an earlier than traditional intervention into the educational lives of children. Both programs have placed strong emphasis on parent education, health and nutrition education, as well as psychological and social service support. The impact made by ESEA, Title I, Preschool and Head Start Programs on the structure of American education have become so strong that prekindergarten programs appear destined to be a permanent part of that structure.

Project Follow Through, also federally funded, rose from a perceived need to extend the early childhood support initiated by Head Start into kindergarten and grades one, two, and three. A requirement for enrollment in the Follow Through Program, was participation in a year-long Head Start or other quality preschool programs. Follow Through instructional models varied from highly structured, didactic approaches to highly flexible, individualized units of instruction. Besides addressing itself to the teaching of reading and arithmetic, Follow Through, like Head Start, placed heavy emphasis on parent involvement. Funding and dimensions, however, never approached that of either Head Start or the ESEA, Title I, Preschool Program.

Several events led to the creation and the unprecedented federal funding of the programs, Head Start and Follow Through. First, the U.S. economy had been expanding throughout the 1950's and early 1960's. Even though prosperity seemed widespread, reports indicated that about the same numbers of families were living in poverty as had achieved prosperity. This incongruous situation was made more visible to the general public through popular books, notably The Other America.

Second, at about the same time, educational literature began to point out that, as a group, children of poverty achieved poorly in school, thus drawing attention to economically and academically deprived children.

Third, in 1957 Russia launched the first space satellite. The United States began to question whether its educational system was producing the quality and the quantity of mathematicians and scientists necessary to maintain technological advantages. These concerns filtered down even into education in the early grades where a new emphasis on cognitive development began to emerge.

Fourth, during this same period the Civil Rights movement was picking up momentum. One thrust of the movement was to secure equal educational opportunities for children of minority groups, many of whom were also poor. Here, too, the combination of the Civil Rights movement with the tenor of the educational climate helped promote an additional emphasis on early childhood education.

Fifth, John Kennedy, who was sympathetic toward special and early childhood education, was elected President in 1960. Lyndon Johnson continued Kennedy's thrust through his Great Society programs. The Civil Rights Act and Economic Opportunity Act of 1964 were historic events in that they furnished the legal and financial bases for Head Start.

Sixth, the concept that intelligence could be modified through experience was receiving more favorable treatment in scientific and professional literature. The idea of fixed intelligence began to crumble, and this changing thought helped lend impetus to early childhood educational intervention programs.

Early childhood teachers and educators have long realized the importance of working with preschool age children. The current emphasis, however, has been on economically disadvantaged children. The chief reason for concentrating preschool programs on the economically disadvantaged can be traced, also, to a belief that a common pattern was evident in the life cycle of children from disadvantaged families. These children enter school without the experiences necessary for school success. As a consequence, they fall farther and farther behind until they drop out of school. The same cycle would then be repeated with the next generation of disadvantaged children.

The purpose of Head Start and other compensatory education programs serving economically disadvantaged children is to break this cyclical pattern. The term "Head Start" was coined because, it was argued, if the children were to benefit from what schools had to offer, then they needed a "head start" in order to catch up with the more advantaged middle-class children so that they, in turn, would be successful in their schooling. Parent education and the health and social services components were designed to give parents of the participating children the needed support to develop more positive attitudes and to establish higher expectations for themselves and their children.

Statement of the Problem

The Detroit Public Schools have taken part in federally funded prekindergarten programs since their establishment in 1964-65 and in Project Follow Through since 1969-70. Of the 18,000 Detroit children who enter kindergarten every year, one out of six will have had prekindergarten experience. Follow Through, on the other hand, has been operative in only two schools and serves an annual total of 240 pupils. All had similar components and goals. Parent involvement and education have played prominent roles in each of these programs in the belief that parental involvement was essential for a program to be successful. The development of basic cognitive and social skills has been the goal for pupils. Supporting services for pupil participants included services of psychologists and social workers. For staff, inservice training has been provided.

Tests to evaluate pupil cognitive progress in these Detroit programs have changed over the years. Evaluation instruments for the preschool programs have included the Peabody Picture Vocabulary Test, the Appel Test, and the Caldwell Cooperative Preschool Inventory. On the other hand, Follow Through has depended on the school district's regular citywide testing program for data on pupil growth. These measures have included the Stanford Achievement Test, the Iowa Tests of Basic Skills, and the California Achievement Tests. In general, analyses of these data have indicated that pupils demonstrated growth while in the programs.

The gains reported for participants in the mandated evaluation reports have accorded credence to the conviction that these programs have had a favorable impact on student achievement. It is the maintenance of these gains that needs to be substantiated with longitudinal data.

Research literature is filled with conflicting results about the long-range benefits of preschool programs. The early Westinghouse study, for example, indicated that no lasting effects resulted from Head Start. By the time pupils reached the third grade, data indicated that those who were provided with early childhood programs did not show greater academic achievement than pupils who did not participate in preschool programs. The Perry Preschool Project in Ypsilanti, Michigan, and more recent studies show that preschool programs do have a tremendous impact on the cognitive development of children. It is important to realize that early studies involved preschool programs that were themselves in the early stages of development. Knowledge related to effective early childhood education and to the operation of preschool programs has accumulated in the last seventeen years as these programs have been modified and improved.

Lacking in the evaluation of preschool programs in the Detroit school system has been a research-based longitudinal study of the effects of these programs. The only followup studies of preschool programs that have been conducted have been those mandated by the Follow Through Program which only follows children through the third grade. In addition to the preschool program, many Detroit students receive compensatory education services in kindergarten and in grades one through twelve. An underlying concept is that there should be continuity of services; that is, once a student has received these services, the effort should be ongoing to insure that gains made by the pupils are maintained. Many students enrolled in preschool programs later receive these additional compensatory education services.

Even though this belief in continuity of service exists, it is not the typical concept in the development of a compensatory education program in Detroit. On the other hand, Follow Through was designed to serve as a followup to prekindergarten programs. The contrast between the two approaches can be viewed as irregular selection of pupils versus planned selection based on continuity of service.

Although prekindergarten programs and the philosophy underlying them is popular, only 38 percent of the school districts nationwide that receive ESEA Title I funds provide such programs according to a 1976 report to the U.S. Congress by the National Institute of Education.[1] Moreover, if continuity of service in compensatory education is a valid concept, it should be of some concern that less than

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[1]U. S. Department of Health, Education, and Welfare, Evaluating Compensatory Education (Washington, D. C., 1976), p. III-21.

four percent of Title I school districts have Follow Through programs which were funded specifically to provide continuous support and service to former preschool students. State aid for compensatory education also provides only cursory support to preschool programs. According to the aforementioned 1976 report by the National Institute of Education, only three states were providing funds for prekindergarten programs. Indeed, even though Michigan annually allocates millions of dollars for compensatory education, it does not earmark funds for preschools. The approach on the part of state governments appears to be in the direction of furnishing compensatory education money for programs designed to serve students showing poor academic achievement. That is, the programs are intended to compensate for lack of achievement after the fact instead of also allowing for preventive types of programs.

Significance of the Study

The primary purpose of this study is to investigate the long-term effects of Head Start experiences augmented by services from a Follow Through program on the achievement of pupils in reading and mathematics in grades one through six (1976 through 1981). Underlying the research is an assumption that a pupil's participation in a preschool program can be related to long-range educational benefits. It is expected, therefore, that the study will support the prevailing assumption and/or it will add to the knowledge of the effectiveness of preschool programs by providing new perspectives. In particular, new insights into the envisioned advantages of planned continuous support to children with preschool experiences during the immediate subsequent school years, specifically the support provided by the Follow Through Program, will also be realized. Additionally, it is hoped that the research design procedures will provide a model for replicative studies in the Detroit public school system.

Summary

New insights concerning child development and the counter effects of poverty on learning contributed significantly to the materialization of the Head Start program. Frustration over early reports that Head Start had not achieved the success which had been expected led to the evolvement of Project Follow Through. Both programs were intended to serve children from poor families. Head Start was for preschoolers and Follow Through for children in the early elementary grades.

Head Start and Follow Through programs are provided, also, in the belief that this intervention into the early educational lives of children will break a cyclical life pattern which exists for low socio-economic families. Research on these programs has generated conflicting evidence about their benefits. This study has been designed to investigate the long-range academic performance of pupils who have had a Head Start experience augmented by participation in a Follow Through program.

CHAPTER 2

REVIEW OF THE LITERATURE

Background

> The critical nature of our time has brought into focus the problems of the poor. Society has turned to education, as well as to economics, as a means of alleviating these problems. Educationally, it becomes increasingly important to look back into the roots of problems--into the beginnings of learning in school and in the home. Therefore, we find an unprecedented focus upon the young child.[2]

In the early 1960's, social pressures and advances in theoretical concepts on the education of young children evoked action on a nationwide scale. Head Start was the first national program designed to provide a setting for the development of children before the age when the public school would normally take over. It represents the largest project for young children ever sponsored by the federal government. Created by the Economic Opportunity Act of 1964, Head Start, as a part of President Johnson's War on Poverty, grew rapidly.

A widespread concern for society has been accompanied frequently by a heightened interest in early childhood education. When Plato contemplated the educational plan for

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[2]Evelyn Weber, Early Childhood Education (Worthington, Ohio: Jones Publishing Co., 1970), p. 36.

people in an ideal Greek society, he included a program for children under six years of age.

> He wrote that the beginning is the most important part of any work, especially in the case of a young and tender thing, for that is the time at which the character is being formed and the desired impression is most readily taken.[3]

In the early nineteenth century Froebel, a unique organizer of early childhood education, also had his educational plans grounded in his perceived needs for a better society. He insisted on a cooperative rather than a competitive classroom setting so that social values would accrue from the play of childhood. Kindergarten in the United States materialized as a result of Froebelian kindergartens in Germany.

Later in the century, Piaget theorized to educators and parents that children acquire knowledge of objects and reasoning through activities that are purposeful. He felt that meaning and understanding could not be acquired through reading and listening alone. He proposed that sound educational practice be as consistent as possible with what is known about how children develop cognitively, socially, and emotionally.

Freud, a pioneer in the field of psychogenetics, brought forth theories about child development with far-reaching effects. He developed a system of study of per-

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[3]Ibid., p. 36.

sonalities extending from birth to maturity. His studies were attempts to explain both child and abnormal behavior in a developmental sequence.

The nursery school movement which emerged in England reflected the psychoanalysis of Freud. Writers in the field of nursery school soon began to talk about freeing the child from too much discipline and allowing natural impulses. A belief that behavior is caused gained credence as nursery school teachers were cautioned to study the underlying causes of behavior. A new reason for play was recognized. Play was considered the medium for a child's revelation of his inner feelings. The psychoanalytic belief in the tremendous importance of infancy and early childhood for stable emotional development supported efforts to promote education at this level.

Until the decade of the 1960's, early childhood education had been conceived as contributing to society by helping young children become more effective individuals through social and emotional guidance. Very often the process was one of molding children to a middle-class code of ethics. By the 1970's, new programs were being implemented which were more appropriate for children of less than middle-class background, especially for those who met nationally established poverty guidelines.

In promoting preschool education as a method of compensatory education for young children, justification was based on the belief in its potential rather than on research.

> In 1965 a major new element entered the preschool education situation. Responding to increasing national social conscience as a result of minority group militancy to do something, Head Start was initiated in the summer with 500,000 children enrolled at a cost of over $90,000,000. Head Start, it was promised by some, was going to help poor children do as well as middle class affluent children in school . . in eight weeks. While the research data supporting preschool education as an effective tool for aiding children was still basically non-existent, the rising social imperatives could no longer wait. The rationale for Head Start came from men like Hunt (1961) who summarized the interaction theory of intelligence (an individual develops intellectual ability as a product of interaction between himself and the environment) and Bloom (1964) who documented the theoretical significance of early childhood for total child development. Relegated to the background was the nagging problem of genetic potential as the determining limit in general intellectual and functional levels. "Wait until the child is ready before you begin to teach; children can't read until they have a mental age of at least six years; and don't bother trying to educate those poor children, you can't change the way they think", were all pieces of advice Head Start chose to ignore.[4]

The history of the development and expansion of kindergarten, like that of preschool programs, can also be linked to social reform. While some of the first kindergartens were private enterprises for children of wealthy parents, many more developed as centers for providing educational services for children of the poor, similar

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[4]David P. Weikart, "Has Preschool Compensatory Education Failed?" (paper presented at the National Head Start Conference in New Orleans, La., 1969), p. 2.

to present Head Start programs. The rapid expansion of kindergarten in the United States came during the 1880's and 1890's.

In the early years of expansion, the kindergarten was supported by laymen in close contact with professionals. The chief aim was that of starting children on the correct path and thereby ultimately improving society. Free kindergartens, socially motivated, formed the nucleus for public school kindergartens as many of them were ultimately assimilated into public school systems.

Early Childhood Curriculum

Today, early childhood education is being asked to make its contribution to a great society in a way never before contemplated. It is well known that the child who chants a song to himself or verbalizes a story is often finding emotional release and comfort. What may be overlooked, particularly in the case of children, is the amount of organization of thought and feeling that has taken place. Preschool children often seem to have easy access to a private, playful language they all understand, a language that can help them bridge distances in nursery school and bring them into contact with one another, just as games which are designed for that purpose.

The engagement of children is often especially evident in their dramatic play.

> As they try on and test out the roles of mother, father, space pilot, fireman, bride, they are caught up in learning. They are exploring their concerns and discovering what they know, as well as what they feel. They are also mastering, in their imaginings, the problems they confront. Their involvement shows itself, too, as they work with blocks, paints, wood, cellophane, and clay, or while they gather about the teacher to listen to stories or enter into discussions that open up new concepts for them. Play is their proving ground.[5]

Recently, the focus of early childhood education has emphasized cognitive growth. Programs seem to be aimed at a cognitive strengthening of children so that they might succeed in an established school setting. Other programs aspire to fit knowledge of cognitive growth into a larger framework of human development. In whatever way the change may be viewed, it is always tied to the crumbling concept of fixed intelligence. The recognition that something could be done about a young person's intelligence by the nature of the kinds of experiences provided has stimulated a search for the appropriate program or curriculum which would enable a child, particularly from an impoverished background, to grow intellectually.

Research on Preschool Programs

The first Head Start evaluations were case studies, success stories, and fanfare. By 1967, investigators began to question the lasting effects of Head Start experiences.

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[5]Claudia Lewis, *A Big Bite of the World* (Englewood Cliffs, New Jersey: Prentice-Hall, 1979), p. 31.

During the early part of 1969, a study conducted by Westinghouse Learning Corporation and Ohio University examined a nationwide sample of 104 Head Start centers. It compared the performance of former Head Start students in the first, second, and third grades with those of control students who had not attended Head Start. In language development Head Start children did not score significantly better than the control children. In learning readiness, Head Start children scored better, but on the Stanford Achievement Test, no statistically significant differences were found between the two groups.

However, a report issued by Weikart on the Perry Preschool Project indicated that school achievement test scores up to grade three showed an experimental group to be considerably ahead of a control group. An academic preschool approach used by Bereiter and Engleman showed achievement test scores of former preschool participants to be well above first grade level upon entry into school.

Nonetheless, Heather Booth in her article, Compensatory Preschool, concludes from other research that preschool is not the "compensatory medium par excellence" that it is often claimed to be.

> Preschool education has often been acclaimed as an important influence on educational achievement capable of offsetting or even compensating for social, economic, and educational disadvantages. However, studies sug-

> gest that its effects are not as important as might be desired.[6]

It seems that the effectiveness of preschool education is questionable in terms of long-term cognitive gains. Other studies point to carefully planned and well-supervised programs, rather than the curriculum, as possibly contributing to short-term gains.

Ralph Scott of the University of Northern Iowa compared third grade test scores of former participants in a preschool program to scores of their older and nonprogram siblings. An earlier study had presented findings which demonstrated initial sharp gains in receptive language, but that these gains had declined by the time the students reached first grade. The third grade scores provided support for the position that there is little durability to any short-term verbal gains and the language-linked subjects of vocabulary and reading. Conversely, though, the latter study did support an earlier hypothesis of long-term gains within the mathematics and spatial areas.

James Payne in his book, Head Start, A Tragicomedy, cites several studies conducted on preschool programs. A few of them are restated here.

> Wolff and Stein reported on a study conducted in New York City. There were no significant differences found between the scores of Head Start children and their classmates in kindergarten as measured by the Preschool Inventory.

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[6]Heather Booth, Compensatory Preschool (Educational Review, Vol. 28, November, 1975), p. 51.

> It appeared that Head Start children from "good" teachers' classes scored consistently higher than non-Head Start children, whereas Head Start children from "poor" teachers' classes scored consistently lower than non-Head Start children.
>
> Howard and Plant evaluated the Head Start Program at the Mayfair School in San Jose, California. Head Start subjects were matched with a control group on sex, age, parental occupation, and ethnicity. The Head Start children scored significantly higher on the Peabody Picture Vocabulary Test and the Pictorial Test of Intelligence.
>
> Brazziel reviewed several Head Start intervention studies and concluded that IQ gains persist where school systems have strong ESEA, Title I, programs in the lower grades, and trail off where this is not the case.
>
> Hyman and Kliman reported on a followup study on children who had demonstrated initial IQ gains upon graduation from Head Start. After completing a year of kindergarten in public schools, subjects were compared with controls on the Metropolitan Readiness Test. The results indicated that there were no significant differences between the two groups. Also, even after the year of kindergarten, the Head Start children were still disadvantaged in spite of initial gains.

In strong support of the lasting effects of preschool intervention strategy are findings from the collaborative efforts of a number of intervention investigators, including Weikart with his Perry Preschool Project. These investigators gathered and reported data on children who had been in their prekindergarten programs and compared their long-range progress with that of control pupils included in their original studies. This group, known as the Consortium on Developmental Continuity, issued a report authored by Lazar and Darlington. The programs in the longitudinal study were diversified, using different approaches and serving different populations in different parts of the country. In general, the data indicated that the experimental subjects were in the appropriate grade for their age more often than the control pupils. According to the report, they also fared better on achievement tests in the fourth grade, though not as robustly as had been hoped.

Sevigny conducted an ex post facto longitudinal study of the cognitive growth of pupils who were participants in preschool programs in three Detroit Schools. For her study she collected data through grade five on twenty-eight participants and on twenty-eight nonparticipants. Data included report card marks, attendance, and achievement test scores. Results of her research supported the belief that a prekindergarten experience can produce long-range positive effects for participants. Contrary to almost all other research, though, Sevigny's investigation showed no differences on most cognitive measures between the experimental group and the control group in the early grades. However, differences became statistically significant in the later elementary grades.

In reviewing Head Start research there appears to be much concern over a leveling off of initial gains made by children formerly enrolled in such a program. This leveling generally occurs after several months. The phenomenon has been labelled as a fade-out effect with the implication that a preschool experience becomes inconsequential and that a child would be just as well off without it.

Research on Follow Through Programs

The Head Start program emerged from new insights into child development and a concern for the education of economically disadvantaged children. The Follow Through Program, which came later, developed because of the disappointment following early reports that Head Start had not achieved the success that had been anticipated. Both programs were aimed at serving four- to eight-year-old children from poor families. Head Start was for children in preschool and Follow Through for pupils in kindergarten and grades one through three.

The Westinghouse/Ohio University study painted a dismal picture of the effects of Head Start on the academic achievement of participants as they progressed through the primary grades. In 1967, prior to the Westinghouse report, an article by Wolff and Stein appeared in the Phi Delta Kappan which also indicated that differences between Head Start and non-Head Start pupils after the first year of the program were negligible.

The failure of Head Start gave early childhood educators an opportunity to innovate. The schools which children attended after they left Head Start were blamed for the erosion of gains. The solution was seen as a need to extend the program into kindergarten and the primary grades.

Follow Through resulted as one of the better known outgrowths of Head Start.

The Head Start format was to be continued in Follow Through. In addition, the program was to be comprehensive and nationwide. For the school year 1968-69 a pilot program was begun which in turn was to be followed during the ensuing year by a large scale action program. Budget cuts, however, forced program cutbacks and a shift in purposes. At its peak, the Follow Through Program included only 178 school districts and 84,000 pupils in kindergarten and grades one through three.

In general, Follow Through advocated small group or individualized learning programs with smaller pupil-teacher ratios than were true in regular school situations. Intensive training of professionals and paraprofessionals was crucial. The program involved parents on policy advisory committees, as volunteers or employees, and as teachers of their own children. Moreover, there were support personnel in health, nutrition, social work, and in counseling.

Budget cuts were also responsible for shifting Follow Through to a study of planned variation in which school districts were to choose among alternative types of programs put together by program developers. Medical, dental, social, psychological, and nutritional services were to be constant, whereas instructional services were systematically varied. The hope of the planners was that the evaluation of these differences would provide clues as to the best approaches to use with different children.

While the amount of research on Follow Through has not approached that on Head Start, it has, nonetheless, been just as controversial. Cross-model evaluations were the focus of national evaluations, and the one that has received the most attention was the report published by Abt Associates in 1977. In their report the school performance of Follow Through participants was compared with what would have been expected of them based on the performance of non-Follow Through children. Richard Anderson, one of the spokespersons for Abt, stated

> ... in general, across all models, all groups, and all measures, we find fewer positive effects (12.8%) than negative (19.6%) and a preponderance (67.6%) of null effects. Models that produce positive effects more often than would be expected by chance are those that emphasize the mechanics of basic skills rather than broader educational goals.[7]

The report also indicated that the model with the best performance overall on the measures included in the evaluation was the Oregon Direct Instruction model which emphasized individual and group classroom drill on basic skills.

With support from a Ford Foundation grant a critique of the Abt report was prepared by experts in the field of educational evaluation under the direction of Ernest House

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[7]Shirley G. Moore, "The Abt Report of Follow Through: Critique and Comment," Young Children, 33 (September, 1978), 52.

of the Center for Instructional Research and Curriculum Evaluation at the University of Illinois. In the critique of the Abt report, House and his colleagues felt that many important Follow Through goals went unassessed. They also questioned the statistical procedures used for comparing models with each other. House reanalyzed the data using statistical techniques that reduced a perceived bias. His results did not favor the didactic models but showed differences among the models to be within the range of possible chance. The reanalysis also indicated that participation in Follow Through was neither significantly better nor worse than nonparticipation. As a compromise, House suggested that the reality might lie somewhere between the position taken by Abt evaluators and that of his own coworkers.

Walter Hodges of Georgia State University and Robert Sheehan of the University of Virginia in a paper presented to the 1978 conference of the American Educational Research Association addressed the Follow Through evaluation issue. Their presentation was documented with references to data provided by individual model directors or sponsors as opposed to the cross-model evaluation by Abt Associates. According to Hodges and Sheehan,

> Children attending David Weikart's Cognitively Oriented model, for example, were tested for productive language skills--an area of competence that is central to the goals of the model. The children in that model, compared with the non-Follow Through comparison children, were more fluent, used more diverse vocabularies, used more descriptive statements, and wrote better organized narratives.

> Children in the Bank Street model--a model that emphasizes flexible classroom scheduling and individualized curriculum activities--initiated communication more, were better at expressing their thoughts, and were involved in more peer communication than non-Follow Through controls.
>
> A group of children enrolled in the Parent Support model sponsored by Hodges performed better on 11 of 33 measures on the California Achievement Test compared with non-Follow Through children, while there were no differences between the groups on the other 22 measures.[8]

In a three-year study of Follow Through conducted by Guidubaldi and Kehle in the Akron Public Schools the academic performance of participants and nonparticipants was examined at the end of one, two, and three years. The Follow Through Program provided for individualization of instruction from kindergarten through the third grade. Individualization was attained through diagnosis of a pupil's achievement followed by the development and implementation of a prescriptive learning plan for that student. Results showed the Follow Through students to be performing significantly better than the controls on standardized achievement tests.

Borden carried out a two-year study of Follow Through on subjects in Tupelo, Mississippi. Selected measures of pupil growth included IQ scores and achievement tests in reading, arithmetic, and spelling. Tests were given at two

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[8]Walter Hodges and Robert Sheehan, "Follow Through as Ten Years of Experimentation," Young Children, 34 (November, 1978), 55.

intervals, at the end of the first grade and at the end of the second. At the end of the first grade no significant differences in intelligence and achievement were evident between children who participated in Follow Through and their control counterparts who were not participants. By the end of the second grade, however, significant differences in reading, arithmetic, and spelling were noted.

In preparation for the possibility of funding new Follow Through research the U.S. Office of Education awarded a contract to Abt Associates to identify existing data bases that were supported by sponsors and to determine their utility for assessing possible delayed effects of Follow Through on children some years after they would have completed the program. A summary report by Abt pointed out the following:

> A review of recently completed later effects studies by Follow Through sponsors and sites was conducted in order to help establish expectations for the range of results that might emerge from future later effects studies, to help generate preliminary hypotheses for new studies, and to illuminate the areas where more work is needed. The review included synopses of studies concerning the following Follow Through sponsors: Arizona (Riley, 1978), Arizona (Cloud et al, 1979), Bank Street (Seitz et al, 1977), Far West (Bridewell and Edwards, 1979), Kansas (assorted reports), Oregon (Weber and Fuhrmann, 1978), and Oregon (Becker and Englemann, 1978).
>
> This sponsor and site research has concentrated on examining the persistence of academic effects (fade-out), and searching for sleeper effects. One study investigated the effects of Follow Through on life chances variables. Our reviews of these studies,

> together with the results of many conversations with Follow Through sponsors, support the following conclusions.
>
> First, models that produce positive effects by grade three appear to exhibit fade-out, particularly in math. This conclusion is based principally on research carried out by the Oregon and Kansas sponsors and is a relatively strong one.
>
> Second, there is no strong evidence for sleeper effects on academic outcomes, although some work points in this direction, particularly in the Far West data and the Bank Street data. These "tidbits" only whet the appetite for further study.
>
> Third, the work of the Developmental Continuity Consortium (Lazar et al, 1977) argues that preschool programs have significant positive effects on life chances variables such as special education placement and grade retention when measured in high school. A study based on data collected from Follow Through children (Cloud et al, 1979) replicated these findings and points to the importance of including life chances variables in designing later effects studies for Follow Through.[9]

Hodges and Cooper, in an accounting of the influences of Head Start and Follow Through on intellectual development, reviewed national evaluation efforts of both programs. Their conclusions were that the evidence on the effectiveness of the projects is highly controversial, but that the literature does suggest short-term effectiveness. In addition, there was also evidence of long-term effectiveness of early intervention strategies. Interestingly, part of their presentation centered on data that had been analyzed a

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[9]Abt Associates, Inc. Opportunities for Studying Later Effects of Follow Through: Executive Summary (Cambridge, Mass., February, 1980), p. 3.

second time by other researchers. In this vein, where a reanalysis of data contradicted the original, they observed that

> Once again, there are diametrically opposed interpretations of a common data base leading to the conclusion that where fair-minded persons disagree so strongly, there must be a great deal still unknown about the effects on children.[10]

Summary

Consensus seems to be that for political reasons Follow Through was not accorded the impetus of Head Start. As a consequence, even the evaluations lost something in the process. Even though it appears that some models were successful, the research indicates that they were barely better than regular school. As with Head Start, results are conflicting.

No consistent picture of success emerged from the research on the two early childhood educational efforts of the federal government, Head Start and Follow Through. For Head Start, modest or robust immediate gains from structured programs were frequent, but just as frequently gains would fade after the children left the program. Generally, at the end of the first year or two of formal schooling, comparison group gains coupled with experimental group losses would result in followup findings of no statistically significant

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[10]Walter Hodges and Mark Cooper, "Head Start and Follow Through: Influences on Intellectual Development," Journal of Special Education, 15 Number 2 (Summer, 1981), 231.

differences. In summary, the effectiveness of the early intervention programs is commonly determined by the technique of statistically measuring the difference between test scores of comparison groups. Several research studies using this procedure have been reviewed, and a general conclusion is that results are inconclusive.

CHAPTER 3

METHODOLOGY

The time span for this study encompasses the seven-year period subsequent to participation in either a pre-school or a Head Start program by the selected subjects. Subjects for the study were selected from the population of approximately three hundred kindergarten students who were enrolled in four elementary schools in Region 1 of the Detroit Public School District during the 1974-75 school year. These students were in the seventh grade during the 1981-82 school year and were enrolled in three Region 1 middle schools.

All four elementary school attendance areas are geographically within the same region, which is partially characterized by pockets of land criss-crossed by freeways. The socio-economic status of the residents can be depicted as low, and the ethnic composition is similar for the four attendance areas. Additionally, the total enrollment at each school is less than 500 pupils and each provides a pre-kindergarten program, either Title I or Head Start. The four schools receive federal funds from ESEA, Title I, for compensatory education services for their pupils as well as State funds for the same purpose under Article 3 of the State Education Aid Act. Two of these four schools house Detroit's Follow Through Program, but it would seem that only an arbitrary decision prevailed in their selection. The other two schools were singled out to serve as control schools for the research.

During the 1973-74 school year two of the four schools provided an ESEA, Title I, preschool program, and the other two provided Head Start. The program offered half-day sessions of instruction to the children each week for the complete school year. The staff for the preschool program consisted of a teacher, a full time classroom aide, and another part time aide. Each center also received the services of a social worker, a psychologist, and a language specialist. The other half of the day was used for scheduled home visits, individual tutoring of students, parent conferences, and parent education activities. Parent activities included meetings with resource persons who provided information on child development, health and nutrition, cooking, and crafts. Community excursions were conducted for the purpose of increasing parents' understandings of the services and activities of the community. Inservice was also provided for the preschool staff personnel. Each child was given physical, vision, hearing, and dental examinations upon entry into the program. The general objectives of the program were the development of basic cognitive, motivational, and social skills of the children.

The Follow Through Program was operative in two of the four schools and was designed to offer experiences which would reinforce and support those attained by former Head Start participants. The project sought to provide an individualized prescriptive plan of work for each child within the larger framework of a skill building educational program. Involvement of parents in the education of their children was an important concern, and activities intended to make parents aware of the importance of their contributions to the learning process were a regular feature of the project. In addition to teachers, the project utilized the services of a nutritionist, a psychologist, a social worker, teacher aides, and volunteers.

During the school years following 1973-74, the four schools also delivered Title I and Article 3 compensatory education services to students who were in need of additional services to improve their reading and mathematics skills. These services included instruction for small groups by a certified teacher as well as individual and small group tutoring by teacher aides.

All data pertinent to the study were obtained from school records and from records of the Research Department of the Detroit Public Schools. The Pupils' Cumulative Records were searched to determine group status for those pupils who could be included in the study as follows:

1. Group 1, pupils with no preschool experiences,
2. Group 2, pupils with preschool experiences, and

3. Group 3, pupils with Head Start experiences augmented by followup services from the Follow Through Program.

Of the 300 pupils in kindergarten in the four elementary schools during the 1974-75 school year, approximately 180 belonged to Group 1, and approximately 60 belonged to each of the other two groups. Subject mortality reduced the numbers of these students who were available for the research.

Questions to be answered by the study are:

1. Do Follow Through students sustain fewer absences than students in either comparison group in kindergarten and in each of the grades, one through six?

2. Do Follow Through students attain higher report card marks in reading than students in either comparison group in each of the grades, one through six?

3. Do Follow Through students attain higher report card marks in mathematics than students in either comparison group in each of the grades, one through six?

4. Do Follow Through students attain a higher overall grade point average than students in either comparison group?

5. Do Follow Through students master more Michigan Educational Achievement Program objectives in reading than students in either comparison group in grades four and seven?

6. Do Follow Through students master more Michigan Educational Achievement Program objectives in mathematics than students in either comparison group in grades four and seven?

7. Do Follow Through students achieve at a higher level than students in either comparison group in reading as measured by

norm-referenced tests in each of the grades, one through six?

8. Do Follow Through students achieve at a higher level than students in either comparison group in mathematics as measured by norm-referenced tests in each of the grades, one through six?

9. Are the total number of compensatory education services, Title I and State funded Article 3, received through grade six independent of group membership?

Part of the data obtained from school records relative to the questions were reading and mathematics achievement test scores. Norm-referenced test scores in these two areas were derived from standardized tests administered during the spring of each year to all pupils in the Detroit Public Schools in the grades under consideration; namely, grades one through six. The tests included the Stanford Achievement Test, Primary I and Primary II, the Iowa Tests of Basic Skills, Levels 9 and 10, and the California Achievement Test, Levels 15 and 16. Presented in Table 3.1 is a summary of the school year, grade, norm-referenced test instruments, and subtests administered annually as part of the regularly scheduled testing program for the years included in the study. Also shown in Table 3.1 are available reliability coefficients for various subtests. Raw scores as well as the derived grade equivalent scores for each subtest at every grade level were also obtained.

Other variables obtained from the school records were the pupil's attendance for each year, report card marks in

TABLE 3.1

Summary of School Year, Grade, Test Administered, and Test Reliability

School Year	Grade	Test and Subtests	Reliability
1973-74	pre-k		
1974-75	kdg		
1975-76	1	Stanford Achievement Test, Level Primary I	
		Paragraph Meaning	.90
		Arithmetic	.95
1976-77	2	Stanford Achievement Test, Level Primary II	
		Paragraph Meaning	.93
		Arithmetic Concepts	.86
1977-78	3	Iowa Tests of Basic Skills, Level 9	
		Reading Comprehension	
		Total Mathematics	
1978-79	4	Iowa Tests of Basic Skills, Level 10	
		Reading Comprehension	
		Total Mathematics	
1979-80	5	California Achievement Tests, Level 15	
		Reading Comprehension	.81
		Total Mathematics	.87
1980-81	6	California Achievement Tests, Level 16	
		Reading Comprehension	.75
		Total Mathematics	.84

reading and mathematics, and the Michigan Educational Achievement Program (MEAP) reading and mathematics scores for both the fourth grade and the seventh grade. Records of the Evaluation Section of the Research Department were used to obtain data relating to Title I and Article 3 services received by the subjects in the experimental and the control groups. Presented in Table 3.2 is a listing of the variables and their units of measurement.

TABLE 3.2

Research Variables and Their
Units of Measurement

Variable	Unit of Measurement
Attendance	Number of days absent
Compensatory Education Service	Number of years of service
Group Membership	Nominal 1 = no preschool 2 = preschool only 3 = Head Start plus Follow Through
Michigan Educational Assessment Program Scores in Reading and Mathematics	Number of objectives mastered
Norm-referenced Test Scores in Reading and Mathematics	Raw scores Grade equivalent scores
Report Card Marks in Reading and Mathematics	For grades 1 and 2 O = 4 (Outstanding) S = 2 (Shows progress) N = 0 (Needs to improve) For grades 3, 4, 5, and 6 A = 4 B = 3 C = 2 D = 1 E = 0

Data collected from the schools and the Research Department relating to the experimental and the control students were coded and then entered into a computer file. The raw data file was then used to create a Statistical Package for the Social Sciences (SPSS) system file which was accessed for analyses.

The count of the number of years of compensatory education services received by the pupils in the three groups for kindergarten through grade six was subjected to a chi-square test of independence. Knowledge of whether statistically significant differences existed in the amount of Title I and/or Article 3 services, other than Head Start or Follow Through was expected to be useful in the interpretation of other analyses.

An analysis of variance was applied to the six sets of norm-referenced raw test scores in reading to determine whether statistically significant differences existed among the means at the end of each grade level. Similarly, an analysis of variance was applied to other variables as follows:

1. norm-referenced mathematics test raw scores at each grade level,
2. attendance at each grade level,
3. report card marks in reading at each grade level,
4. report card marks in mathematics at each grade level,

5. overall grade point average,

6. number of MEAP reading objectives mastered at the fourth grade and at the seventh grade levels,

7. number of MEAP mathematics objectives mastered at the fourth grade and at the seventh grade levels, and,

8. number of compensatory education services.

To provide additional perspectives to the research, three supplementary analyses were performed, rate of gain, regression analysis, and discriminant analysis. A rate of gain in reading was computed for each group of subjects for each test administration. Grade equivalent units from the tests and the time interval between testing periods were used to calculate an average annual rate of gain. These data were then tabularized and graphically depicted. The same procedure was followed to portray rates of gain for mathematics.

The concept being addressed by the rate of gain analysis is Deutsch's cumulative deficit hypothesis. The hypothesis states,

> Because of prior deprivation--psychological, physical, and cultural--children who are disadvantaged come to school with a deficit in their readiness to learn and to profit from the traditional academic program as measured by standardized intelligence and achievement tests; and as they continue in school, this gap widens. In short, the deficit becomes

> cumulatively greater with each successive year.[11]

One purpose of compensatory education programs, in general, is to stop or reverse this downward trend in the rates of learning gains.

Multiple regression analysis was utilized to analyze the relationship between the Michigan Educational Assessment Program fourth grade reading mastery score as the dependent variable and the grade point average through the end of the third grade, the third grade norm-referenced test raw score in reading, and the third grade norm-referenced test raw score in mathematics as predictor variables. For the MEAP fourth grade mathematics mastery score the predictor variables were the grade point average through the end of the third grade and the third grade mathematics and reading achievement test raw scores. A similar procedure was followed for each of the other two MEAP scores.

Discriminant analysis was conducted to determine which variables, if any, might discriminate most between the groups and could best be used to determine group membership. That is, the analysis formed a linear combination of the variables in such a way as to produce a discriminant score for each case. It was hoped that the discriminant scores would be more similar for cases within a group than they would be between groups. Once a set of variables was found

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[11]Nicholas Rayder, et al, "Assessing Follow Through," Journal of Experimental Education, 47 (Fall, 1978), 60.

which would provide satisfactory discrimination for cases with known group memberships, then the same linear combination of variables could be used to classify new cases of unknown group memberships. Attendance, number of compensatory education services, MEAP scores, norm-referenced test raw scores, and cumulative grade point average were used as the discriminating variables with group membership as the predicted variable. The analysis was carried out for each grade level.

Limitations of the Study

An assumption as to the appropriateness of the analysis of variance procedure was randomization of assignment of pupils to the experimental group and to the control group as in the implementation of a true experimental design. In the development of a non-equivalent control group design for this research, care was given in the determination of two schools which would be as similar as possible to the two schools with the Follow Through Program and also from which non-Follow Through subjects were to be selected. Attention was given to geographic location, socio-economic factors, type and size of schools and services offered, as well as perceived mobility of school population.

Another caution should be observed in the interpretation of the analyses of the data. This research is an *ex post facto* study covering a seven-year period beginning with the 1974-75 school year. The sample of Follow Through pupils and the sample of pupils with a preschool experience only included records of all pupils in these categories which were available through a search of school files. Lists of names of all students who were in kindergarten in the two categories during 1974-75 were not available either from school records or from other sources. As a consequence, it was not possible to investigate experimental mortality bias in the data which might have been effected by pupil mobility.

Also, an underlying threat to the internal validity of the study was a possible effect of self-selection. Pupils with a prekindergarten experience were self-selected in the sense that their parents sought preschool services for them. Because a control group was not available from this population, an assumption of uniform regression among the experimental group and the control groups is less likely. Even though the design is quasi-experimental, the control groups provided valuable comparative data for use in the analysis of the data relating to the cognitive growth of the experimental group.

Summary

The primary purpose of this research was to investigate the effects of a Head Start experience which had been augmented by planned followup services from a Follow Through Program on the long-range cognitive growth of pupils in reading and mathematics. Subjects for the study, both experimental and control pupils, were selected from neighboring elementary schools. The schools were similar on several dimensions except that two offered the Follow Through Program.

However, it was realized that the self-selection concept could jeopardize the validity of any significant differences which might be found to exist among the means of test scores or other group data. In general, parents who requested preschool for their children were able to enroll them in the program. As a consequence, it was necessary to select a nonparticipant group of pupils whose parents did not take advantage of the program for a variety of reasons.

After the groups had been defined, their school records were reviewed. Norm-referenced test scores in reading and mathematics for the end of each grade, one through six, were compared using analysis of variance. Other data included report card marks in reading and mathematics, the Michigan Educational Assessment Program scores, attendance, and number of compensatory education services. Deutsch's cumulative deficit hypothesis was numerically and graphically compared against rates of gain indices. In addition, regression analysis was carried out to look for variables which might be predictive of Michigan Educational Achievement Program scores. Discriminant analysis was also performed to ascertain variables which might be useful in predicting group membership. Overall, the cognitive growth of experimental and control subjects was analyzed and put into perspective with respect to other compensatory education services.

CHAPTER 4

ANALYSIS OF THE DATA

Introduction

All data for the research were obtained from school records and from records of the Research Department of the Detroit Public Schools. Subjects were categorized as belonging to one of three groups according to their school experiential background. These groups were defined as follow:

1. pupils with no preschool experience,
2. pupils with a preschool experience, and
3. pupils with a Head Start experience augmented by followup services from the Follow Through Program.

The intent of the study was to compare the relative cognitive performance of the pupils in these groups.

Data on each subject were comprised of the following variables:

1. attendance at each grade level, kindergarten through grade six,
2. report card marks in reading and mathematics at each grade level, grades one through six,
3. norm-referenced test scores in reading and mathematics at each grade level, grades one through six,
4. Michigan Educational Achievement Program scores in reading and in mathematics at the grade four and grade seven levels, and

5. the number of years of Title I and/or Article 3 compensatory education services from kindergarten through grade six.

Analyses of the data were performed through the use of the Statistical Package for the Social Sciences (SPSS). Included were one-way analyses of variance, crosstabulations and chi-square tests of independence, regression analyses, and discriminant analyses. Output from the statistical package procedures appear in the appendices. In addition, rates of gain were calculated using a formula developed by the Michigan Department of Education. These analyses were conducted to look into the comparative long-range effects, especially the effects of a Head Start experience reinforced by the Follow Through Program.

Analyses of Variance

Presented in Tables 4.1 to 4.7[12] are the means and the standard deviations for the number of days absent, the report card marks in reading and in mathematics, the grade point average at the end of grade six, the norm-referenced test raw scores in reading and in mathematics, and the number of objectives achieved in reading and in mathematics on the Michigan Educational Achievement Program. To determine whether significant differences existed among the means for each dependent variable a one-way analysis of variance was computed. Results of these analyses of variance are displayed in Tables 4.8 to 4.44.

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[12]Because of the large number of tables, all tables for Chapter 4 appear at the end of the chapter.

Tables 4.8 through 4.14 present the statistical comparisons of the attendance by grade of the three groups of subjects. No significant differences were found among any of the group means for the number of days absent from school in kindergarten and in grades one through six. The average number of days absent from school per year was calculated and also subjected to a one-way analysis of variance. Data are presented in Table 4.15. No significant differences among these group means were found. Even though there were no statistically significant differences in school attendance, a review of the means for the number of days absent as shown in Table 4.1 reveal that

1. pupils with a preschool experience only averaged fewer absences every year than either of the other two groups, and

2. Follow Through students consistently averaged more absences each year than either of the other two groups with the single exception of the kindergarten year.

In Table 4.2 the means and standard deviations of the report card marks in reading for each grade are displayed. Data in this table disclose that the group of subjects with a preschool only experience had the highest marks in four of the six grades and equalled the highest in grade four with the Follow Through group. Only in grade three did the Follow Through students, as a group, attain the best report card marks in reading over both of the other groups.

The means of the report card marks in reading at each grade level were subjected to an analysis of variance to ascertain whether the observed differences were significant. Tables 4.16 to 4.21 present the results of each analysis. The F ratios and the F probabilities indicate that there were no significant differences among the means at any of the grade levels.

The means for the report card marks in mathematics, exhibited in Table 4.3, indicate that the Follow Through group had a higher mean than either of the other two groups in grade one only. In four of the other five grades they had the lowest means. No definite pattern or trend appeared evident for either the group that had no preschool or the group that had a preschool experience. The analyses of variance which were performed on these sets of group means again indicated no significant differences. Tables 4.22 to 4.27 present the one-way analyses of variance data for grades one through six, respectively.

To establish an overall appraisal of pupil performance as measured by the report card marks in reading and mathematics, their grade point averages at the end of grade six were calculated. The group means appear in Table 4.4. The group that had a preschool experience only, Group 2, had the best grade point average at 2.4. The Follow Through group, Group 3, and the group that had no preschool experience, Group 1, each attained a grade point average of 2.2.

The means of the group grade point averages were subjected to a one-way analysis of variance. The analysis of variance data, displayed in Table 4.28, suggest that the observed differences in means could be due to chance.

The MEAP is a statewide minimum competency testing program which assesses reading and mathematics skills. It is administered annually in the early fall to all fourth and seventh grade students. Table 4.5 presents the means and the standard deviations for the number of objectives in reading and mathematics attained by the pupils in this study. In fourth grade reading the Follow Through group had the highest mean, whereas the group that had only a preschool experience achieved the highest means in the remaining three categories, fourth grade mathematics and seventh grade reading and mathematics.

A one-way analysis of variance was conducted on each of the four sets of means. Data are presented in Tables 4.29 to 4.32. No significant differences existed on any of the four measures.

Presented in Table 4.6 are the means of the raw scores attained by the three groups on norm-referenced reading tests in grades one through six. These tests were administered to all pupils in these grades as part of a regular annual testing program conducted by the Detroit Public Schools. The means at each grade level were compared using a one-way analysis of variance. Data are displayed in Tables 4.33 to 4.38.

According to the analyses of variance data, significant differences existed among the means of raw scores on the norm-referenced reading tests administered in grades two, three, and four. These significant differences are implied by the F probability values of less than alpha=.05. Further analyses using Scheffe's contrast test for comparing group means were conducted. In grade two, a significant difference in favor of Group 2 over Group 1 existed. That is, pupils with a preschool only experience outperformed pupils who did not participate in a preschool program. The value of the mean for the Follow Through group fell between the other two and was not significantly different from either. In grades three and four the means of the norm-referenced reading raw scores for the Follow Through pupils were significantly different only from those of the pupils with no preschool. In grades one, five, and six no real differences prevailed.

In Table 4.7 the means of the raw scores attained by the three groups on norm-referenced mathematics tests are shown. The analyses of variance results appear in Tables 4.39 to 4.44. Significant differences were indicated for the means of the scores at grade one only. No significant differences were indicated for the sets of means for grade two through grade six. The Scheffe procedure applied to the grade one means established that the means for the students with no preschool and for the students with preschool only were significantly higher than the mean for the Follow Through group.

Rate of Gain

The expected rate of growth of students as measured by norm-referenced instruments is one-tenth of a grade equivalent unit for each month in school. Rates of gain reports are mandated by the State of Michigan Department of Education on certain schools which receive Article 3 compensatory education funds. The formula developed by the State Department of Education to calculate a rate of gain is,

$$\text{rate of gain} = \frac{10(\text{posttest-pretest})}{\text{time interval}}$$

where the pretest and the posttest are measured in grade equivalent units and the time interval is given in number of school months. Rates of gain were calculated for reading and mathematics at each grade level beginning with the grade one test as the first pretest and using the grade six test results as the final posttest.

The calculated rates of gain in reading and mathematics are shown in Tables 4.45 and 4.46, respectively. For reading, the rates of gain are mixed with no particular group standing out or revealing a trend. At grade three the Follow Through group had the best rate of gain, whereas Group 2 exhibited the best rates in grades two and six. On the other hand, Group 1 had the best rate in grade five, and in the same grade the Follow Through subjects actually regressed. Only in grades three and six did any of the groups achieve a rate of gain that equalled or exceeded the expected rate of 1.0. In grade three, Group 2 matched the expected rate and Group 3 exceeded it. In grade six, both Group 2 and Group 3, surpassed the expected rate. Overall, none of the three groups attained the expected rate. The best overall rate of gain in reading was achieved by Group 2 at 0.9 grade equivalent unit for each year in school.

For mathematics the rates are also mixed with no apparent trend obvious for any group. In grade four, Group 1 equalled the expected rate and in grade five, Group 2 exceeded the rate by 0.1 grade equivalent unit. The Follow Through subjects surpassed the rate by 0.2 unit in grade four and equalled it in grade six. Overall, all three groups had an average rate of gain equal to 0.8 grade equivalent unit per school year over the five-year time interval.

Figures 4.1 and 4.2 are graphical representations of the calculated rates of gain. The rate of gain of a normative group, 1.0 grade equivalent unit for each year in school, is depicted by the solid line. If the rate of gain of one of the groups in the research is equal to 1.0, then its rate of growth line will parallel that of the normative group. If the rate is less than 1.0, its rate of growth line will be less steep and it will diverge from that of the normative group, indicating a slower rate of growth for the group than would be desired. This trend, if it were to continue, would tend to be a confirmation of Deutsch's cumulative deficit hypothesis. On the other hand, if the calculated rate of gain were greater than 1.0, then the trend line would be steeper than the one for the normative group. Hence, a rate of 1.0 or more, even though the mean of the test scores were still below the norms, would indicate a narrowing of the deficit gap.

The rates of growth lines in reading for the Follow Through group, Figure 4.1, tended to parallel the normative group line through grade four. In grade five there was definite regression, but for grade six the group assumed a greater than 1.0 growth rate. The growth line for Group 2 is similar to that of the Follow Through group except that it did not regress as much in grade five. It, also, took on a greater than unity rate of growth in grade six. The no treatment group, Group 1, exhibited a definite slow rate of growth trend beginning in grade two as it continued to digress from the norm.

As illustrated in Figure 4.2, the rate of growth lines for mathematics for the three groups tended to parallel each other. Comparison of the rates on an annual basis present a mixed picture. In general, though, the rates show a digression from that of the normative group.

<u>Compensatory Education Services</u>

The students in all three groups were eligible for compensatory education services, ESEA Title I and State Aid Article 3, in kindergarten and in grades one through six. Students could receive both Title I and Article 3 service in the same school year. As a result, because the study spans a seven-year period, a student could have received a maximum of fourteen units of service if he received both Title I and Article services in each of the seven years. Data relating to the number of services received by the pupils in each group are presented in Tables 4.47 to 4.49.

Table 4.47 is a two-way frequency distribution table showing the frequencies of the number of services received by each group. For Table 4.48 the number of services were grouped and classified as low (0 - 3 services), medium (4 - 7 services), and high (8 - 11 services). A chi-square test of independence was applied to the grouped data, and it was found that there was a systematic relationship between the number of services and group membership. An examination of the frequencies and the percents indicates that about 45 percent of the pupils in Group 2 received 4 or more compensatory education services, whereas over 88 percent of Group 1 students received medium and high numbers of services. Approximately one-half of the Follow Through pupils were given a medium number of compensatory education services, and the other half was divided almost evenly between the low and the high categories.

An attempt was made to determine whether a trend existed in the number of students in any group who received compensatory services. Table 4.49 presents the number of services for each group by grade. An analysis of the percent of services actually delivered revealed no apparent trend toward either increasing or decreasing numbers of services for any of the groups.

Multiple Regression Analysis

Multiple regression analyses were used to examine the problem of predicting Michigan Educational Assessment Program test scores using available norm-referenced test scores and grade point averages. A by-product of the procedure would be an analysis of the strength of the relationship among some of the variables in the study. Because MEAP tests are administered at the beginning of the fourth and the seventh grades, one set of analyses were performed using third grade norm-referenced test scores and grade point averages at the end of third grade as predictor variables for the fourth grade MEAP scores, and a second set of analyses were carried out using sixth grade norm-referenced test scores and grade point averages at the end of the sixth grade as predictor variables for the seventh grade MEAP scores. All analyses were first completed for the combined groups and then for each group separately.

Selected statistics from the multiple regression analyses are provided in Tables 4.50 to 4.53. An examination of these tables revealed that, in general, the relationship between the MEAP scores and the independent variables was stronger for a unique group than it was for the combined groups. The strongest relationship occurred in the regression of the Group 2 seventh grade MEAP reading scores on their norm-referenced test reading and mathematics scores and their grade point averages. In this instance, 69 percent of the variation (R^2) in the MEAP scores was explained by the regression on the three independent variables. The listing that follows indicates the four strongest linear dependencies of MEAP scores on the independent variables.

Group	Grade	Dependent Variable	Independent Variables	Total R Square	Beta
2	4	MEAP Read	Read Raw Score	0.58	0.61
			Grade Point Average		0.13
			Math Raw Score		0.06
2	7	MEAP Read	Read Raw Score	0.69	0.41
			Grade Point Average		0.60
			Math Raw Score		0.24
3	7	MEAP Read	Read Raw Score	0.58	0.50
			Grade Point Average		0.35
3	7	MEAP Math	Grade Point Average	0.59	0.48
			Math Raw Score		0.33
			Read Raw Score		0.03

In each of these four cases, most of the proportion of variation was contributed by the first two independent variables; namely, reading raw score and grade point average for the first three cases, and mathematics raw score and grade point average in the fourth instance. The third named independent variable contributed relatively little to the prediction.

The four cited examples confirm what might be intuitively expected. As can be seen in the above list or from Tables 4.50 to 4.53, MEAP reading scores were more strongly related to norm-referenced reading test scores than they were to norm-referenced mathematics test scores. Similarly, MEAP mathematics scores were more strongly related to norm-referenced mathematics test scores and to grade point averages. In addition, the corresponding Beta weights are a confirmation of the relative importance of the predictors.

Discriminant Analyses

Discriminant analyses were conducted for each grade level to determine which variables, if any, might discriminate most among the groups and could best be used to determine group membership. Variables used in the analyses included the total number of compensatory education services received by the students from kindergarten through the end of the grade under consideration, the mean number of absences calculated from kindergarten to the end of the grade being considered, the norm-referenced test scores in reading and mathematics for the grade, and the grade point average calculated from grade one through the end of the grade being considered. Results of the discriminant analyses for grades one through six are given in Tables 4.54 to 4.59, respectively.

Standardized discriminant function coefficients resulting from the first grade analysis, Table 4.54, indicated that the norm-referenced test score in mathematics, grade point average, and norm-referenced reading test score as a set formed the best discriminant function at that level. The relative size of the standardized coefficients also indicate that the first two mentioned variables contributed nearly twice as much to the discrimination as the third variable. The value of Wilks' Lambda, 0.78, the canonical correlation of 0.44, and the eigenvalue of 0.24 all point to a less than satisfactory discriminant function. This conclusion is borne out by a limited number of cases, 45.6 percent, being correctly categorized by the classification function.

In the second grade analysis the reading test score and the number of compensatory education services with discriminant function coefficients of 0.65 and -0.58, respectively, were the variables which provided the greatest discrimination. Other variables in the function included the grade point average and the mathematics test score. Wilks' Lambda, the canonical correlation, and the eigenvalue all indicate another unsatisfactory discriminant function which correctly classified 44.4 percent of the cases.

For grade three the mathematics test score with a standardized coefficient of -1.04 and the reading test score with a coefficient of 0.99 were the most discriminating. The resulting function correctly classified 52.3 percent of the cases. A similar analysis resulted for grade four.

Again the reading and the mathematics test scores were the most important discriminating variables. The resultant discriminant function classified 53.9 percent of the cases correctly.

The analyses for grades five and six exhibited similar results. At both grade levels the number of compensatory education services and the mathematics test scores were the most discriminating variables. At grade five 45.1 percent of the cases were classified correctly, and at grade six only 41.1 percent of the cases.

Overall, the discriminant analyses provided little new information regarding relationships among the variables. The discriminant functions were not robust and the percents of correct classification of cases were relatively small. Such results, though, might have been anticipated from prior analyses, particularly the one-way analyses of variance. It would seem that the lack of robust significant differences in nearly every test of means would have portended inconclusive results with the discriminant analyses.

Findings

The findings as they relate to the research questions which were to be answered by this study follow.

Question 1.

> Do Follow Through students sustain fewer absences than students in either comparison group in kindergarten and in each of the grades, one through six?

Data on the number of days absent are presented in Table 4.1. On average, Group 2, the students who had a preschool experience <u>only</u>, sustained the least number of absences per school year than the other two groups, specifically 4.6 days less than the Follow Through pupils and 3.1 days less than the students who had had no treatment. One-way analyses of variance data, as shown in Tables 4.8 to 4.15, indicated no statistically significant differences in the means of the number of absences in kindergarten and in each of the grades, one through six. Therefore, the Follow Through pupils did not sustain fewer absences than pupils in either comparison group.

<u>Question 2</u>.

> Do Follow Through students attain higher report card marks in reading than students in either comparison group in each of the grades, one through six?

Presented in Table 4.2 are the group means of the report card marks in reading and in Tables 4.16 to 4.21 the corresponding analyses of variance tables. There are some observable differences which appear to favor the students who had a preschool experience only. However, the analyses of variance determined that there were no statistically significant differences in favor of any of the three groups at any of the grade levels. Hence, Follow Through students did not attain higher report card marks in reading than the students in the comparison groups.

Question 3.

> Do Follow Through students attain higher report card marks in mathematics than students in either comparison group in each of the grades, one through six?

As shown in Table 4.3 the means of report card marks in mathematics did not appear to display any noteworthy empirical information about the groups. According to the analyses of variance tabular data in Tables 4.22 to 4.27, no statistically significant differences existed among the means for any grade, one through six. Therefore, the Follow Through pupils did not attain higher report card marks in mathematics than the pupils in the comparison groups.

Question 4.

> Do Follow Through students attain a higher overall grade point average than students in either comparison group?

The means of the overall grade point average for each of the three groups, as given in Table 4.4, are 2.20, 2.41, and 2.23. The analysis of variance procedure indicated no significant differences among the means. Therefore, the Follow Through pupils did not attain a higher overall grade point average than the pupils in either comparison group.

Question 5.

> Do Follow Through students master more Michigan Educational Achievement Program objectives in reading than students in either comparison group in grades four and seven?

The means for the number of MEAP reading objectives attained by the groups of pupils in this study are shown in

Table 4.5, and the analyses of variance results are shown in Tables 4.29 and 4.31. There were no statistically significant differences in the means at either the fourth or seventh grade levels. Therefore, Follow Through students did not master more fourth or seventh grade MEAP objectives in reading than the students in either comparison group.

<u>Question</u> <u>6</u>.

> Do Follow Through students master more Michigan Educational Achievement Program objectives in mathematics than students in either comparison group in grades four and seven?

No statistically significant differences existed among the sets of means of the number of objectives attained by the three groups in either grade four or grade seven on the mathematics subtest of the Michigan Educational Achievement Program test, Tables 4.5, 4.30, and 4.32. Therefore, Follow Through pupils did not master more fourth or seventh grade MEAP objectives in mathematics than the pupils in either comparison.

<u>Question</u> <u>7</u>.

> Do Follow Through students achieve at a higher level than students in either comparison group in reading as measured by norm-referenced tests in each of the grades, one through six?

The means of the norm-referenced test scores in reading appear in Table 4.6, and the corresponding analyses of variance data are reported in Tables 4.33 to 4.38. The data show that statistically significant differences existed at grades two, three, and four. At grade two the mean for

Group 2 (preschool only) was significantly higher than the mean for Group 1 (no preschool). The mean for the Follow Through group was not significantly different from either group at grade two.

The Follow Through students scored significantly higher than Group 1 in grade three. However, their mean of reading test scores was not significantly higher than that of Group 2. In turn, the mean of scores for Group 2 was not significantly different from the mean of scores for Group 1.

For grade four, the same relative differences existed for the three groups as in grade three. The mean of reading scores for the Follow Through group was significantly higher than the mean of scores for those subjects in Group 1. The students with a preschool experience had a mean of scores which was not significantly different from either Group 1 or Group 3.

In summary, no significant differences existed among the means at grades one, five, and six. In five of the six grades the no preschool group had the lowest means. In only two grades, three and four, were there significant differences in favor of the Follow Through group. Even then the difference was over only one group, the pupils with no preschool experience. Therefore, the Follow Through group did not achieve at a higher level than the comparison groups in reading as measured by norm-referenced tests.

Question 8.

> Do Follow Through students achieve at a higher level than students in either comparison group in mathematics as measured by norm-referenced test in each of the grades, one through six?

Data relative to this question are presented in Tables 4.7 and 4.39 to 4.44. Statistically significant differences among the means of the mathematics test scores existed in grade one only. The means for Group 1 and Group 2 were both significantly higher than the mean for Group 3, the Follow Through pupils. Of note also, and though not statistically significant, the Follow Through group had the lowest means of mathematics test scores at every grade level. Therefore, the Follow Through group did not achieve at a higher level than either comparison group in mathematics as measured by norm-referenced tests.

Question 9.

> Are the total number of compensatory education services, Title I and State funded Article 3, received through grade six independent of group membership?

Since it was possible for a pupil to receive compensatory education services from both ESEA Title I and State funded Article 3, conceivably a subject could have received two units of such service every school year, kindergarten through grade six, for a maximum of fourteen units. The actual range was zero to eleven with two pupils in Group 1 receiving eleven services and one pupil in each group receiving none.

The numbers of services were trichotomized into low, medium, and high categories of concentrations of service, and a chi-square test of independence was applied to the two-way frequency table, Table 4.48. The chi-square statistic of 14.9 with 4 degrees of freedom was statistically significant at the alpha=.05 level, indicating a systematic relationship between group membership and number of compensatory education education services received. From Table 4.48 it can be seen that 88.6 percent of Group 1 subjects received medium to high numbers of compensatory education services, and for Group 3 the concentration was 80.0 percent. On the other hand, only 45.4 percent of the pupils in Group 2 were in the medium and high categories.

Summary

The research literature abounds with conflicting conclusions about the efficacy of preschool programs and of the federally funded Follow Through Program. Two patterns have emerged from the research. In one, exemplified by the Westinghouse study, modest or robust immediate gains would be followed by a phenomenon known as "fade-out". In the other, typified by the Weikart study of the Perry Preschool Project, differences between experimental and control groups became greater over time and were in favor of pupils who had had a preschool experience.

The purpose of this study was to investigate the long-range effects on the achievement of pupils as a consequence of a preschool experience reinforced by planned followup compensatory education services. Several cognitive measures were singled out for study and three groups of subjects were identified for comparative analyses.

Results of analyses indicated no significant differences among the group means in attendance, report card marks in reading and in mathematics, grade point average, and in number of objectives attained in reading and in mathematics on the Michigan Educational Assessment Program test. On the norm-referenced tests there were no significant differences in the means of reading scores for grades one, five, and six. On the mathematics tests there were no significant differences at grades two through six. Significant differences on the norm-referenced reading test at grade two were in favor of Group 2 pupils over the Group 1 pupils only. At grades three and four the differences were in favor of the Follow Through students over the Group 1 pupils only. The significant difference on the grade one mathematics test scores was in favor of the Group 1 pupils and the Group 2 pupils over the Follow Through group.

Analysis of year to year rates of gain in reading indicated a mixed pattern for Group 2 and Group 3, both either attaining or exceeding the expected rate of 1.0 at grades three and six. At grade three the rates were 1.0 and 1.5, respectively, and at grade six they were 1.3 and 1.2, respectively. For Group 1 the rates were 0.8 or less at every grade level.

The rates of gain in mathematics also displayed a mixed pattern. In only four instances out of a possible fifteen was the expected rate of 1.0 equalled or exceeded. In grade four Group 1 students had a rate of growth of 1.0, and the Follow Through pupils had a rate of 1.2. The rate for Group 2 in grade five was 1.1, and the rate was 1.0 for Group 3 in the sixth grade.

Significant differences existed in the amount of compensatory education services received by the groups of subjects. The least number of services per pupil, 4.4, were given to Group 2, and the largest number, 6.6, was received by pupils in Group 1.

Overall, statistical differences among the three groups of subjects were not found. The five real differences that surfaced were inundated by the overwhelming number of comparisons of means which indicated no significant differences.

TABLE 4.1

Means of the Number of Days Absent
Kindergarten Through Grade 6

Grade	Group	N	Mean	Standard Deviation
kdg	No preschool	35	21.7	16.6
kdg	Preschool only	22	14.0	15.1
kdg	Follow Through	35	17.9	19.8
1	No preschool	35	17.6	14.2
1	Preschool only	22	12.8	15.4
1	Follow Through	35	18.0	18.4
2	No preschool	35	13.2	9.9
2	Preschool only	22	10.5	9.4
2	Follow Through	35	18.9	19.9
3	No preschool	35	14.9	10.1
3	Preschool only	22	11.2	9.2
3	Follow Through	35	16.0	17.8
4	No preschool	35	10.1	8.4
4	Preschool only	22	9.9	9.5
4	Follow Through	35	11.7	11.5
5	No preschool	35	12.2	10.1
5	Preschool only	22	8.3	8.6
5	Follow Through	35	12.7	13.2
6	No preschool	35	10.0	10.2
6	Preschool only	22	11.3	8.5
6	Follow Through	35	14.4	13.1
Total	No preschool	35	14.2	8.3
Total	Preschool only	22	11.1	7.4
Total	Follow Through	35	15.7	13.2

TABLE 4.2

Means of Report Card Marks in Reading
Grade 1 Through Grade 6

Grade	Group	N	Mean	Standard Deviation
1	No preschool	35	2.1	0.8
1	Preschool only	22	2.8	1.0
1	Follow Through	35	2.4	1.2
2	No preschool	35	2.3	1.1
2	Preschool only	22	2.9	1.0
2	Follow Through	35	2.4	1.0
3	No preschool	35	2.3	0.7
3	Preschool only	22	2.4	0.9
3	Follow Through	35	2.5	0.8
4	No preschool	35	2.2	0.8
4	Preschool only	22	2.6	0.7
4	Follow Through	35	2.6	0.9
5	No preschool	35	2.1	0.6
5	Preschool only	22	2.4	0.7
5	Follow Through	35	2.1	0.8
6	No preschool	35	2.2	0.9
6	Preschool only	22	2.4	0.9
6	Follow Through	35	2.0	0.8

TABLE 4.3

Means of Report Card Marks in Mathematics
Grade 1 Through Grade 6

Grade	Group	N	Mean	Standard Deviation
1	No preschool	35	1.9	1.1
1	Preschool only	22	2.1	1.1
1	Follow Through	35	2.3	1.0
2	No preschool	35	2.3	1.0
2	Preschool only	22	2.5	0.9
2	Follow Through	35	2.2	0.9
3	No preschool	35	2.4	0.9
3	Preschool only	22	2.4	1.0
3	Follow Through	35	2.3	1.2
4	No preschool	35	2.5	0.9
4	Preschool only	22	2.6	0.9
4	Follow Through	35	2.3	1.2
5	No preschool	35	2.3	1.1
5	Preschool only	22	2.0	0.8
5	Follow Through	35	2.1	1.0
6	No preschool	35	1.7	1.0
6	Preschool only	22	1.7	1.2
6	Follow Through	35	1.5	0.9

TABLE 4.4

Means of the Grade Point Average
at the End of Grade 6

Group	N	Mean	Standard Deviation
No preschool	35	2.20	0.47
Preschool only	22	2.41	0.62
Follow Through	35	2.23	0.66

TABLE 4.5

Means of the Number of Objectives Attained on the Michigan Educational Achievement Program Grade 4 and Grade 7

Grade	Group	N	Skill	Mean	Standard Deviation
4	No preschool	35	Read	8.3	5.2
4	Preschool only	20	Read	10.3	6.1
4	Follow Through	35	Read	10.6	5.6
4	No preschool	35	Math	20.3	8.8
4	Preschool only	20	Math	23.7	7.3
4	Follow Through	35	Math	22.0	7.5
7	No preschool	35	Read	13.9	5.8
7	Preschool only	22	Read	14.5	6.3
7	Follow Through	33	Read	14.2	6.7
7	No preschool	35	Math	17.3	4.8
7	Preschool only	22	Math	19.5	4.9
7	Follow Through	33	Math	17.0	5.8

TABLE 4.6

Means of the Raw Scores Attained on
Norm-referenced Reading Tests
Grade 1 Through Grade 6

Grade	Group	N	Mean	Standard Deviation
1	No preschool	35	18.8	8.8
1	Preschool only	22	21.3	7.9
1	Follow Through	33	16.4	7.8
2	No preschool	35	21.7[1]	7.0
2	Preschool only	22	27.4[1]	8.3
2	Follow Through	34	23.5	8.8
3	No preschool	35	20.6[2]	6.5
3	Preschool only	22	27.4	11.1
3	Follow Through	33	29.0[2]	13.0
4	No preschool	35	25.3[2]	10.0
4	Preschool only	22	29.7	10.9
4	Follow Through	35	32.8[2]	12.4
5	No preschool	35	18.3	6.4
5	Preschool only	22	21.9	11.2
5	Follow Through	34	19.6	9.8
6	No preschool	35	19.4	5.8
6	Preschool only	22	22.7	7.1
6	Follow Through	35	20.5	7.3

[1]Scheffe's contrast test indicates that the mean for Group 2 is significantly higher than the mean for Group 1 at the alpha=.05 level

[2]Scheffe's contrast test indicates that the mean for Group 3 is significantly higher than the mean for Group 1 at the alpha=.05 level

TABLE 4.7

Means of the Raw Scores Attained on Norm-referenced Mathematics Tests Grade 1 Through Grade 6

Grade	Group	N	Mean	Standard Deviation
1	No preschool	35	38.2[1]	9.1
1	Preschool only	22	39.2[1]	9.3
1	Follow Through	33	31.8[1]	11.1
2	No preschool	35	16.8	5.4
2	Preschool only	22	18.7	6.4
2	Follow Through	33	15.5	5.6
3	No preschool	35	24.4	9.7
3	Preschool only	22	27.5	9.3
3	Follow Through	33	22.4	9.8
4	No preschool	35	25.9	8.1
4	Preschool only	22	28.0	12.4
4	Follow Through	35	25.9	10.4
5	No preschool	35	39.2	13.0
5	Preschool only	22	41.4	12.5
5	Follow through	34	34.7	13.8
6	No preschool	35	40.5	15.2
6	Preschool only	22	39.3	14.2
6	Follow Through	35	37.7	11.4

[1]Scheffe's contrast test indicates that the means for Group 1 and Group 2 are significantly higher than the mean for Group 3 at the alpha=.05 level

TABLE 4.8
Analysis of Variance
Kindergarten Absences

Source of Variation	df	Sum of Squares	Mean Square	F Ratio	F Prob
Between	2	812.20	406.10	1.31	0.27[1]
Within	89	27568.52	309.76		
Total	91	28380.72			

[1]Not significant

TABLE 4.9
Analysis of Variance
Grade 1 Absences

Source of Variation	df	Sum of Squares	Mean Square	F Ratio	F Prob
Between	2	425.85	212.93	0.81	0.45[1]
Within	89	23360.66	262.48		
Total	91	23786.51			

[1]Not significant

TABLE 4.10
Analysis of Variance
Grade 2 Absences

Source of Variation	df	Sum of Squares	Mean Square	F Ratio	F Prob
Between	2	1033.71	516.85	2.47	0.09[1]
Within	89	18632.43	209.35		
Total	91	19666.13			

[1]Not significant

TABLE 4.11
Analysis of Variance
Grade 3 Absences

Source of Variation	df	Sum of Squares	Mean Square	F Ratio	F Prob
Between	2	341.45	170.72	0.95	0.39[1]
Within	89	16016.18	179.96		
Total	91	16357.63			

[1]Not significant

TABLE 4.12
Analysis of Variance
Grade 4 Absences

Source of Variation	df	Sum of Squares	Mean Square	F Ratio	F Prob
Between	2	62.76	31.38	0.32	0.73[1]
Within	89	8800.51	98.88		
Total	91	8863.27			

[1]Not significant

TABLE 4.13
Analysis of Variance
Grade 5 Absences

Source of Variation	df	Sum of Squares	Mean Square	F Ratio	F Prob
Between	2	290.47	145.23	1.18	0.31[1]
Within	89	10991.98	123.51		
Total	91	11282.45			

[1]Not significant

TABLE 4.14
Analysis of Variance
Grade 6 Absences

Source of Variation	df	Sum of Squares	Mean Square	F Ratio	F Prob
Between	2	357.58	178.79	1.45	0.24[1]
Within	89	10956.89	123.11		
Total	91	11314.46			

[1]Not significant

TABLE 4.15
Analysis of Variance
Means of Absences

Source of Variation	df	Sum of Squares	Mean Square	F Ratio	F Prob
Between	2	278.38	139.19	1.31	0.27[1]
Within	89	9445.38	106.13		
Total	91	9723.76			

[1]Not significant

TABLE 4.16
Analysis of Variance
Grade 1 Reading Mark

Source of Variation	df	Sum of Squares	Mean Square	F Ratio	F Prob
Between	2	5.94	2.97	2.81	0.07[1]
Within	89	93.98	1.06		
Total	91	99.91			

[1]Not significant

TABLE 4.17
Analysis of Variance
Grade 2 Reading Mark

Source of Variation	df	Sum of Squares	Mean Square	F Ratio	F Prob
Between	2	5.42	2.71	2.64	0.08[1]
Within	89	91.53	1.03		
Total	91	96.96			

[1]Not significant

TABLE 4.18
Analysis of Variance
Grade 3 Reading Mark

Source of Variation	df	Sum of Squares	Mean Square	F Ratio	F Prob
Between	2	0.75	0.37	0.63	0.54[1]
Within	89	52.69	0.59		
Total	91	53.43			

[1]Not significant

TABLE 4.19
Analysis of Variance
Grade 4 Reading Mark

Source of Variation	df	Sum of Squares	Mean Square	F Ratio	F Prob
Between	2	3.52	1.76	2.73	0.07[1]
Within	89	57.43	0.65		
Total	91	60.96			

[1]Not significant

TABLE 4.20
Analysis of Variance
Grade 5 Reading Mark

Source of Variation	df	Sum of Squares	Mean Square	F Ratio	F Prob
Between	2	1.81	0.90	1.80	0.17[1]
Within	89	44.75	0.50		
Total	91	46.55			

[1]Not significant

TABLE 4.21
Analysis of Variance
Grade 6 Reading Mark

Source of Variation	df	Sum of Squares	Mean Square	F Ratio	F Prob
Between	2	2.37	1.18	1.56	0.22[1]
Within	89	67.49	0.76		
Total	91	69.86			

[1]Not significant

TABLE 4.22
Analysis of Variance
Grade 1 Mathematics Mark

Source of Variation	df	Sum of Squares	Mean Square	F Ratio	F Prob
Between	2	2.42	1.21	1.05	0.35[1]
Within	89	102.02	1.15		
Total	91	104.43			

[1]Not significant

TABLE 4.23
Analysis of Variance
Grade 2 Mathematics Mark

Source of Variation	df	Sum of Squares	Mean Square	F Ratio	F Prob
Between	2	1.91	0.95	1.12	0.33[1]
Within	89	75.57	0.85		
Total	91	77.48			

[1]Not significant

TABLE 4.24
Analysis of Variance
Grade 3 Mathematics Mark

Source of Variation	df	Sum of Squares	Mean Square	F Ratio	F Prob
Between	2	0.14	0.07	0.06	0.94[1]
Within	89	97.78	1.10		
Total	91	97.91			

[1]Not significant

TABLE 4.25
Analysis of Variance
Grade 4 Mathematics Mark

Source of Variation	df	Sum of Squares	Mean Square	F Ratio	F Prob
Between	2	1.86	0.93	0.89	0.41[1]
Within	89	92.75	1.04		
Total	91	94.61			

[1]Not significant

TABLE 4.26
Analysis of Variance
Grade 5 Mathematics Mark

Source of Variation	df	Sum of Squares	Mean Square	F Ratio	F Prob
Between	2	1.03	0.51	0.52	0.60[1]
Within	89	88.84	1.00		
Total	91	89.87			

[1]Not significant

TABLE 4.27
Analysis of Variance
Grade 6 Mathematics Mark

Source of Variation	df	Sum of Squares	Mean Square	F Ratio	F Prob
Between	2	0.56	0.28	0.27	0.76[1]
Within	89	92.60	1.04		
Total	91	93.16			

[1]Not significant

TABLE 4.28
Analysis of Variance
Grade Point Average

Source of Variation	df	Sum of Squares	Mean Square	F Ratio	F Prob
Between	2	0.69	0.35	1.01	0.37[1]
Within	89	30.57	0.34		
Total	91	31.26			

[1]Not significant

TABLE 4.29
Analysis of Variance
Grade 4 MEAP Reading Score

Source of Variation	df	Sum of Squares	Mean Square	F Ratio	F Prob
Between	2	107.11	53.55	1.75	0.18[1]
Within	87	2663.51	30.62		
Total	89	2770.62			

[1]Not significant

TABLE 4.30
Analysis of Variance
Grade 4 MEAP Mathematics Score

Source of Variation	df	Sum of Squares	Mean Square	F Ratio	F Prob
Between	2	148.08	74.04	1.16	0.32[1]
Within	87	5549.05	63.78		
Total	89	5697.13			

[1]Not significant

TABLE 4.31
Analysis of Variance
Grade 7 MEAP Reading Score

Source of Variation	df	Sum of Squares	Mean Square	F Ratio	F Prob
Between	2	6.70	3.35	0.09	0.92[1]
Within	87	3427.79	39.40		
Total	89	3434.49			

[1]Not significant

TABLE 4.32
Analysis of Variance
Grade 7 MEAP Mathematics Score

Source of Variation	df	Sum of Squares	Mean Square	F Ratio	F Prob
Between	2	98.49	49.25	1.82	0.17[1]
Within	87	2353.56	27.05		
Total	89	2452.05			

[1]Not significant

TABLE 4.33
Analysis of Variance
Grade 1 Reading Score

Source of Variation	df	Sum of Squares	Mean Square	F Ratio	F Prob
Between	2	324.15	162.07	2.39	0.10[1]
Within	87	5906.24	67.89		
Total	89	6230.39			

[1]Not significant

TABLE 4.34
Analysis of Variance
Grade 2 Reading Score

Source of Variation	df	Sum of Squares	Mean Square	F Ratio	F Prob
Between	2	429.90	214.95	3.34	0.05[2]
Within	88	5666.24	64.39		
Total	90	6096.13			

[2]Significant

TABLE 4.35
Analysis of Variance
Grade 3 Reading Score

Source of Variation	df	Sum of Squares	Mean Square	F Ratio	F Prob
Between	2	1310.55	655.27	6.05	0.05[2]
Within	87	9420.75	108.28		
Total	89	10731.29			

[2]Significant

TABLE 4.36
Analysis of Variance
Grade 4 Reading Score

Source of Variation	df	Sum of Squares	Mean Square	F Ratio	F Prob
Between	2	964.98	482.49	3.87	0.05[2]
Within	88	10972.19	124.68		
Total	90	11937.18			

[2]Significant

TABLE 4.37
Analysis of Variance
Grade 5 Reading Score

Source of Variation	df	Sum of Squares	Mean Square	F Ratio	F Prob
Between	2	177.69	88.84	1.08	0.34[1]
Within	88	7223.34	82.04		
Total	90	7401.02			

[1]Not significant

TABLE 4.38
Analysis of Variance
Grade 6 Reading Score

Source of Variation	df	Sum of Squares	Mean Square	F Ratio	F Prob
Between	2	152.82	76.41	1.69	0.19[1]
Within	89	4021.27	45.18		
Total	91	4174.09			

[1]Not significant

TABLE 4.39
Analysis of Variance
Grade 1 Mathematics Score

Source of Variation	df	Sum of Squares	Mean Square	F Ratio	F Prob
Between	2	1007.16	503.58	5.11	0.05[2]
Within	87	8579.21	98.61		
Total	89	9586.37			

[2]Significant

TABLE 4.40
Analysis of Variance
Grade 2 Mathematics Score

Source of Variation	df	Sum of Squares	Mean Square	F Ratio	F Prob
Between	2	106.68	53.34	1.64	0.20[1]
Within	87	2836.61	32.60		
Total	89	2943.28			

[1]Not significant

TABLE 4.41
Analysis of Variance
Grade 3 Mathematics Score

Source of Variation	df	Sum of Squares	Mean Square	F Ratio	F Prob
Between	2	346.22	173.11	1.86	0.16[1]
Within	87	8120.08	93.33		
Total	89	8466.30			

[1]Not significant

TABLE 4.42
Analysis of Variance
Grade 4 Mathematics Score

Source of Variation	df	Sum of Squares	Mean Square	F Ratio	F Prob
Between	2	80.14	40.07	0.39	0.68[1]
Within	89	9133.52	102.62		
Total	91	9213.65			

[1]Not significant

TABLE 4.43
Analysis of Variance
Grade 5 Mathematics Score

Source of Variation	df	Sum of Squares	Mean Square	F Ratio	F Prob
Between	2	665.84	332.92	1.91	0.15[1]
Within	88	15312.86	174.01		
Total	90	15978.70			

[1]Not significant

TABLE 4.44
Analysis of Variance
Grade 6 Mathematics Score

Source of Variation	df	Sum of Squares	Mean Square	F Ratio	F Prob
Between	2	135.11	67.55	0.36	0.70[1]
Within	89	16490.52	185.29		
Total	91	16625.63			

[1]Not significant

TABLE 4.45

Comparisons of Average Rates of Gain
in Reading, Grade 2 to Grade 6

Grade	Group	N	Pretest Mean	Posttest Mean	Average Rate of Gain
2	No preschool	35	1.8	2.3	0.5
2	Preschool only	22	1.9	2.7	0.8
2	Follow Through	35	1.7	2.4	0.7
3	No preschool	35	2.3	3.1	0.8
3	Preschool only	22	2.7	3.7	1.0
3	Follow Through	35	2.4	3.9	1.5
4	No preschool	35	3.1	3.9	0.8
4	Preschool only	22	3.7	4.3	0.6
4	Follow Through	35	3.9	4.6	0.7
5	No preschool	35	3.9	4.6	0.7
5	Preschool only	22	4.3	4.9	0.6
5	Follow Through	35	4.6	4.5	-0.1
6	No preschool	35	4.6	5.4	0.8
6	Preschool only	22	4.9	6.2	1.3
6	Follow Through	35	4.5	5.7	1.2
Total	No preschool	35	1.8	5.4	0.7
Total	Preschool only	22	1.9	6.2	0.9
Total	Follow Through	35	1.7	5.7	0.8

TABLE 4.46

Comparisons of Average Rates of Gain in Mathematics, Grade 2 to Grade 6

Grade	Group	N	Pretest Mean	Posttest Mean	Average Rate of Gain
2	No preschool	35	1.9	2.6	0.7
2	Preschool	22	1.9	2.8	0.9
2	Follow Through	35	1.7	2.5	0.8
3	No preschool	35	2.6	3.1	0.5
3	Preschool only	22	2.8	3.4	0.6
3	Follow Through	35	2.5	2.9	0.4
4	No preschool	35	3.1	4.1	1.0
4	Preschool only	22	3.4	4.3	0.9
4	Follow Through	35	2.9	4.1	1.2
5	No preschool	35	4.1	5.0	0.9
5	Preschool only	22	4.3	5.4	1.1
5	Follow Through	35	4.1	4.7	0.6
6	No preschool	35	5.0	5.8	0.8
6	Preschool only	22	5.4	5.9	0.5
6	Follow Through	35	4.7	5.7	1.0
Total	No preschool	35	1.9	5.8	0.8
Total	Preschool only	22	1.9	5.9	0.8
Total	Follow Through	35	1.7	5.7	0.8

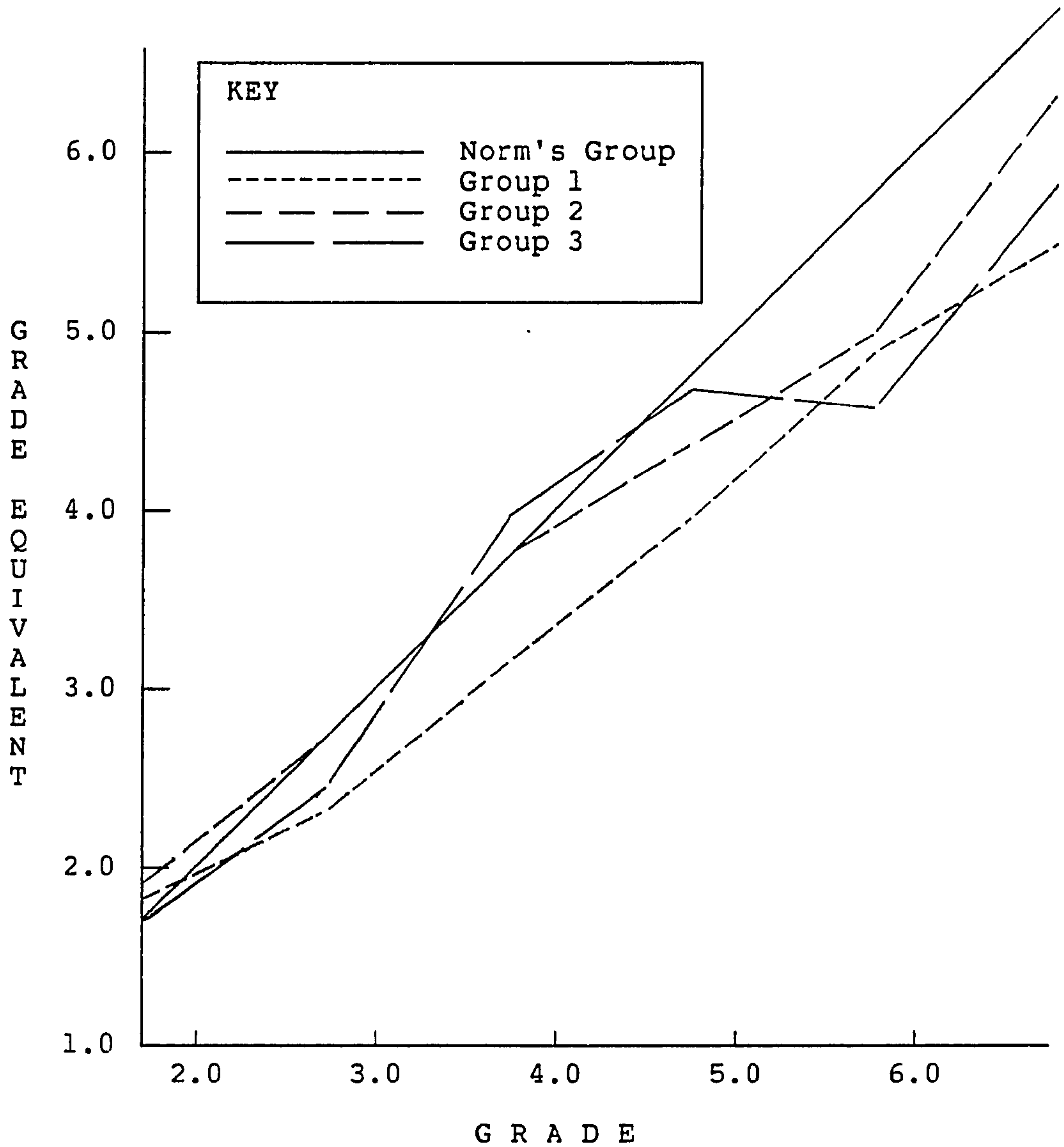

Figure 4.1. Rates of gain in reading.

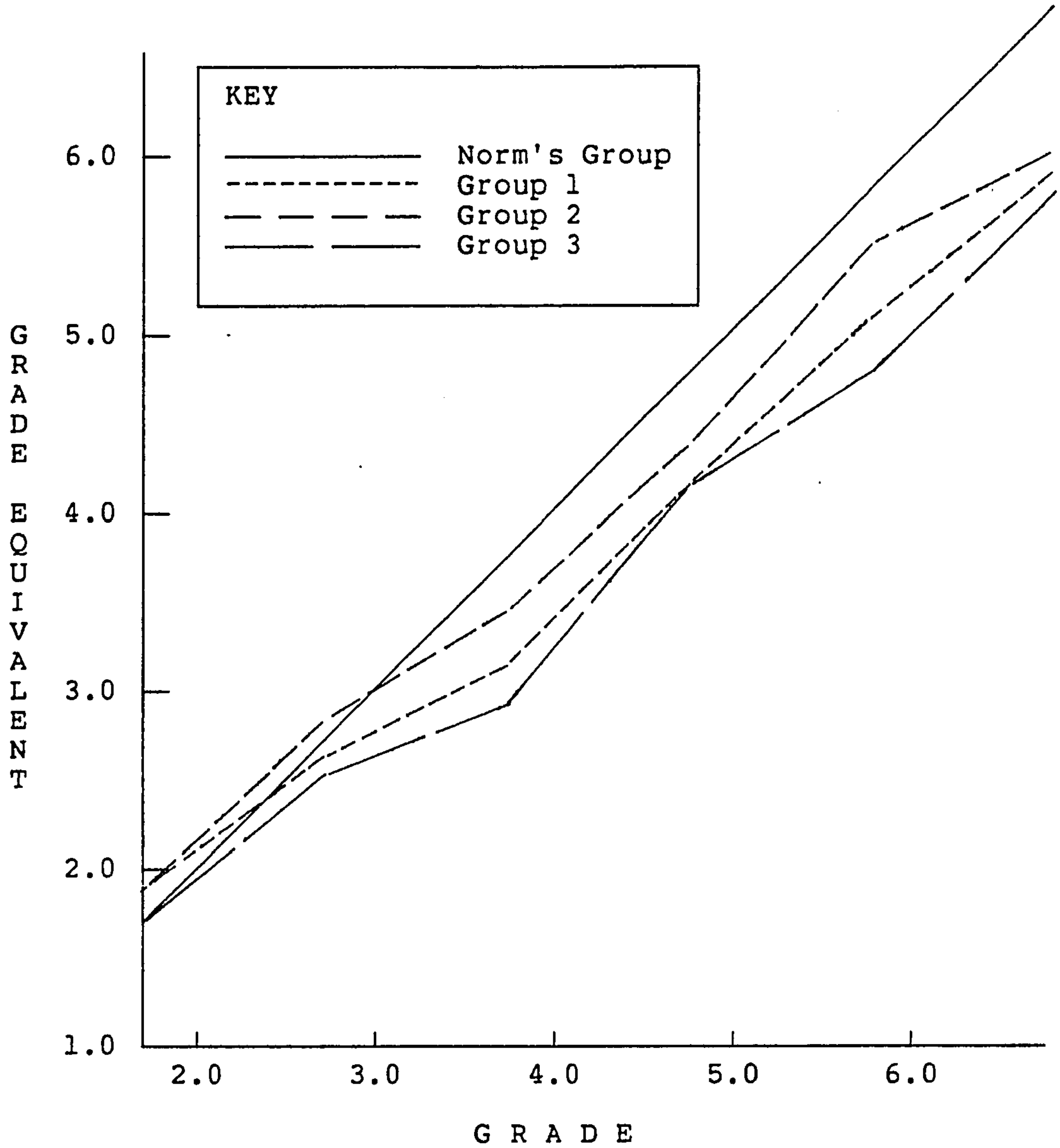

Figure 4.2. Rates of gain in mathematics.

TABLE 4.47

Frequency of Compensatory Education Services by Group

Number of Services	Group					
	No Preschool		Preschool Only		Follow Through	
	f	Pct	f	Pct	f	Pct
0	1	2.9	1	4.5	1	2.9
1	0	0.0	5	22.7	3	8.6
2	1	2.9	2	9.1	2	5.7
3	2	5.7	4	18.2	1	2.9
4	3	8.6	1	4.5	3	8.6
5	4	11.4	0	0.0	3	8.6
6	5	14.3	2	9.1	7	20.0
7	5	14.3	2	9.1	5	14.3
8	6	17.1	1	4.5	6	17.1
9	3	8.6	2	9.1	4	11.4
10	3	8.6	2	9.1	0	0.0
11	2	5.7	0	0.0	0	0.0
Total	35	100.0	22	100.0	35	100.0

TABLE 4.48

Crosstabulation of Low, Medium, and High Concentrations of Compensatory Education Service by Group

Number of Services	Group					
	No Preschool		Preschool Only		Follow Through	
	f	Pct	f	Pct	f	Pct
Low (0-3)	4	11.4	12	54.5	7	20.0
Medium (4-7)	17	48.6	5	22.7	18	51.4
High (8-11)	14	40.0	5	22.7	10	28.6
Total	35	100.0	22	100.0	35	100.0

Chi-square of 14.9 significant at alpha=.05 level with 4 degrees of freedom

TABLE 4.49

Comparison of the Number of Compensatory Education Services, Title I and Article, Received by Each Group at Each Grade Level

Gde	Group	N	Number of Pupils Receiving Service		Number of TI and A3 Services		
			Either TI or A3	Both TI & A3	Total Possible	f	Pct
kdg	No preschool	35	10	0	70	10	14
kdg	Preschool only	22	2	0	44	2	5
kdg	Follow Through	35	3	0	70	3	4
1	No preschool	35	15	3	70	21	30
1	Preschool only	22	10	3	44	16	36
1	Follow Through	35	15	6	70	27	39
2	No preschool	35	12	15	70	42	60
2	Preschool only	22	3	3	44	9	20
2	Follow Through	35	8	12	70	32	46
3	No preschool	35	4	19	70	42	60
3	Preschool only	22	6	6	44	18	41
3	Follow Through	35	14	10	70	34	49
4	No preschool	35	8	18	70	44	63
4	Preschool only	22	4	7	44	18	41
4	Follow Through	35	7	13	70	33	47
5	No preschool	35	12	17	70	46	66
5	Preschool only	22	2	8	44	18	41
5	Follow Through	35	13	8	70	29	41
6	No preschool	35	5	11	70	27	39
6	Preschool only	22	6	5	44	16	36
6	Follow Through	35	20	10	70	40	57

Means of the number of compensatory education services per student:

Group 1 -- 6.6
Group 2 -- 4.4
Group 3 -- 5.7

TABLE 4.50

Regression of Fourth Grade MEAP Reading Scores on Reading and Mathematics Test Scores and Grade Point Average

Independent Variable	R Square	B	Beta	Standard Error of Estimate
Combined Groups				
Grade Point Average	0.32	2.41	0.29	4.23
Math Raw Score	0.41	0.16	0.27	
Reading Raw Score	0.45	0.13	0.24	
(constant)		-3.12		
Group 1 (no preschool)				
Math Raw Score	0.58	0.38	0.72	3.44
Reading Raw Score	0.58	0.07	0.08	
(constant)		-2.36		
Group 2 (preschool only)				
Reading Raw Score	0.57	0.34	0.61	4.29
Grade Point Average	0.58	1.10	0.13	
Math Raw Score	0.58	0.04	0.06	
(constant)		-3.56		
Group 3 (Follow Through)				
Grade Point Average	0.52	4.94	0.65	3.99
Reading Raw Score	0.53	0.07	0.15	
(constant)		-2.77		

TABLE 4.51

Regression of Fourth Grade MEAP Mathematics Scores
on Reading and Mathematics Test Scores
and Grade Point Average

Independent Variable	R Square	B	Beta	Standard Error of Estimate
Combined Groups				
Grade Point Average	0.31	4.16	0.35	3.79
Math Raw Score	0.40	0.26	0.32	
Reading Raw Score	0.40	0.06	0.09	
(constant)		3.79		
Group 1 (no preschool)				
Math Raw Score	0.31	0.42	0.48	7.30
Grade Point Average	0.37	3.79	0.25	
Reading Raw Score	0.37	-0.03	-0.02	
(constant)		2.12		
Group 2 (preschool only)				
Grade Point Average	0.37	4.12	0.40	6.50
Math Raw Score	0.40	0.17	0.20	
Reading Raw Score	0.40	0.06	0.08	
(constant)		6.50		
Group 3 (Follow Through)				
Grade Point Average	0.42	5.10	0.48	5.97
Math Raw Score	0.47	0.15	0.18	
Reading Raw Score	0.48	0.09	0.15	
(constant)		4.04		

TABLE 4.52

Regression of Seventh Grade MEAP Reading Scores on Reading and Mathematics Test Scores and Grade Point Average

Independent Variable	R Square	B	Beta	Standard Error of Estimate
Combined Groups				
Reading Raw Score	0.47	0.40	0.45	4.24
Grade Point Average	0.54	3.07	0.30	
Math Raw Score	0.55	0.04	0.10	
(constant)		-2.81		
Group 1 (no preschool)				
Reading Raw Score	0.36	0.30	0.30	4.39
Math Raw Score	0.44	0.12	0.31	
Grade Point Average	0.48	2.93	0.24	
(constant)		-3.31		
Group 2 (preschool only)				
Reading Raw Score	0.59	0.33	0.41	3.57
Grade Point Average	0.66	5.76	0.60	
Math Raw Score	0.69	0.10	-0.24	
(constant)		-2.70		
Group 3 (Follow Through)				
Reading Raw Score	0.51	0.45	0.50	4.54
Grade Point Average	0.58	3.44	0.35	
(constant)		-2.80		

TABLE 4.53

Regression of Seventh Grade MEAP Mathematics Scores on Reading and Mathematics Test Scores and Grade Point Average

Independent Variable	R Square	B	Beta	Standard Error of Estimate
Combined Groups				
Grade Point Average	0.38	4.10	0.46	3.97
Math Raw Score	0.45	0.13	0.33	
Reading Raw Score	0.45	-0.04	-0.05	
(constant)		4.09		
Group 1 (no preschool)				
Grade Point Average	0.37	5.02	0.49	3.56
Math Raw Score	0.48	0.15	0.47	
Reading Raw Score	0.50	-0.15	-0.18	
(constant)		3.10		
Group 2 (preschool only)				
Math Raw Score	0.23	0.15	0.44	4.68
Reading Raw Score	0.24	0.05	0.07	
(constant)		12.21		
Group 3 (Follow Through)				
Grade Point Average	0.53	3.99	0.48	3.90
Math Raw Score	0.59	0.17	0.33	
Reading Raw Score	0.59	0.03	0.03	
(constant)		1.31		

TABLE 4.54

Discriminant Analysis
Grade 1

Eigenvalue	Percent of Variance	Canonical Correlation
0.24	87.0	0.44

Wilks' Lambda	Chi-Square	df	Significance
0.78	21.7	6	0.05

Standardized Canonical Discriminant
Function Coefficients

Variable	Coefficient
Mathematics Score	0.91
Grade Point Avg	-0.88
Reading Score	0.49

Classification Results

		Predicted Group Membership					
		Group 1		Group 2		Group 3	
Actual Group	N	f	Pct	f	Pct	f	Pct
1	35	18	51.4	8	22.9	9	25.7
2	22	10	45.5	3	13.6	9	40.9
3	33	6	18.2	7	21.2	20	60.6

Percent of cases correctly classified: 45.6

TABLE 4.55

Discriminant Analysis
Grade 2

Eigenvalue	Percent of Variance	Canonical Correlation
0.18	82.8	0.39

Wilks' Lambda	Chi-Square	df	Significance
0.82	17.0	8	0.05

Standardized Canonical Discriminant
Function Coefficients

Variable	Coefficient
Reading Score	0.65
Comp Ed Service	-0.58
Grade Point Avg	0.42
Mathematics Score	-0.27

Classification Results

		Predicted Group Membership					
		Group 1		Group 2		Group 3	
Actual Group	N	f	Pct	f	Pct	f	Pct
1	35	21	60.0	5	14.3	9	25.7
2	22	5	22.7	14	63.6	3	13.6
3	33	16	48.5	12	36.4	5	15.2

Percent of cases correctly classified: 44.4

TABLE 4.56

Discriminant Analysis
Grade 3

Eigenvalue	Percent of Variance	Canonical Correlation
0.31	68.3	0.49

Wilks' Lambda	Chi-Square	df	Significance
0.67	33.9	8	0.05

Standardized Canonical Discriminant
Function Coefficients

Variable	Coefficient
Mathematics Score	-1.04
Reading Score	0.99
MEAP Reading	0.42
Comp Ed Service	-0.12

Classification Results

		Predicted Group Membership					
		Group 1		Group 2		Group 3	
Actual Group	N	f	Pct	f	Pct	f	Pct
1	35	20	57.1	11	31.4	4	11.4
2	20	6	30.0	7	35.0	7	35.0
3	33	8	24.2	6	18.2	19	57.6

Percent of cases correctly classified: 52.7

TABLE 4.57

Discriminant Analysis
Grade 4

Eigenvalue	Percent of Variance	Canonical Correlation
0.20	77.9	0.41

Wilks' Lambda	Chi-Square	df	Significance
0.79	21.0	6	0.05

Standardized Canonical Discriminant
Function Coefficients

Variable	Coefficient
Reading Score	-0.90
Mathematics Score	0.78
Comp Ed Service	0.75

Classification Results

		Predicted Group Membership					
		Group 1		Group 2		Group 3	
Actual Group	N	f	Pct	f	Pct	f	Pct
1	35	25	71.4	5	14.3	5	14.3
2	22	6	27.3	6	27.3	10	45.5
3	34	12	35.3	4	11.8	18	52.9

Percent of cases correctly classified: 53.9

TABLE 4.58

Discriminant Analysis
Grade 5

Eigenvalue	Percent of Variance	Canonical Correlation
0.19	82.2	0.40

Wilks' Lambda	Chi-Square	df	Significance
0.81	18.4	4	0.05

Standardized Canonical Discriminant
Function Coefficients

Variable	Coefficient
Comp Ed Service	1.11
Mathematics Score	0.65

Classification Results

		Predicted Group Membership					
		Group 1		Group 2		Group 3	
Actual Group	N	f	Pct	f	Pct	f	Pct
1	35	25	71.4	7	20.0	3	8.6
2	22	7	31.8	12	54.5	3	13.6
3	34	13	38.2	17	50.0	4	11.8

Percent of cases correctly classified: 45.1

TABLE 4.59

Discriminant Analysis
Grade 6

Eigenvalue	Percent of Variance	Canonical Correlation
0.15	88.7	0.36

Wilks' Lambda	Chi-Square	df	Significance
0.85	13.6	6	0.05

Standardized Canonical Discriminant
Function Coefficients

Variable	Coefficient
Comp Ed Service	0.88
Mathematics Score	0.70
MEAP Mathematics	-0.51

Classification Results

		Predicted Group Membership					
		Group 1		Group 2		Group 3	
Actual Group	N	f	Pct	f	Pct	f	Pct
1	35	18	51.4	10	28.6	7	20.0
2	22	6	27.3	14	63.6	2	9.1
3	33	15	45.5	13	39.4	5	15.2

Percent of cases correctly classified: 41.1

CHAPTER 5

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

The Head Start Project, which was organized in 1965, was initiated on the concept that early intervention into the educational lives of disadvantaged children would result in lasting benefits for the children and for society. Project Follow Through, also federally funded, evolved from a perceived need to extend the early childhood support instituted by Head Start into kindergarten and grades one, two, and three.

Several events led to the creation and funding of both programs, Head Start and Follow Through. First, even though prosperity seemed widespread during the 1950's and early 1960's, poverty was just as prevalent. It was also becoming evident at that time that children of poverty achieved poorly in school. Third, space exploration was fostering a national concern for support of educational programs in order that the United States might maintain technological advantages. Moreover, the Civil Rights movement was picking up momentum with its emphasis on equal educational opportunities for children of minority groups. These factors along with a crumbling concept of fixed intelligence and the emerging belief that something could be done about a child's intellectual development lent impetus to the funding of early childhood educational intervention programs.

A purpose of Head Start and other compensatory education programs serving economically disadvantaged children was to help break a cyclical life-style pattern which seemed to perpetuate lack of school success. Besides stressing the teaching of reading and arithmetic, both Head Start and Follow Through placed strong emphasis on parent education, health and nutrition education, as well as psychological and social service support. The parent education and the health and social services components were designed to give parents of the participating children the needed support in order to develop more positive attitudes and to establish higher expectations for themselves and their children.

However, conflicting results emanated from the research on Head Start and Follow Through. Studies on Head Start by Westinghouse/Ohio University, Booth, Scott, and Wolff and Stein concluded that gains from structured programs were frequent, but that just as often the gains would erode shortly after the children left the program. Others, notably Weikart, Lazar and Darlington, and Bereiter and Engleman conducted research in which long-range cognitive gains for students with a preschool experience were significantly higher than those of comparison students. For the Follow Through Program research results generated similar patterns of inconclusiveness. Hodges and Cooper in a report on Follow Through described situations in which data analyzed a second time contradicted original findings. They concluded that since the researchers were fair-minded and yet disagreed so strongly about the interpretation of the same data base, then there was still a great deal unknown about the effects on disadvantaged children.

The purpose of this study was to investigate the long-range effects of a preschool experience reinforced by planned followup compensatory education services on the achievement of pupils. Several cognitive measures were singled out for study and three groups of subjects were identified for comparative analyses. One of the comparison groups had no preschool experience, another had prekindergarten schooling, and the third group participated in both a Head Start and a Follow Through Program. Data covering the subjects' first seven years of schooling were gathered on the cognitive measures, attendance, report card marks in reading and in mathematics, Michigan Educational Achievement Program test scores in reading and in mathematics, number of compensatory education services, and norm-referenced test scores in reading and mathematics.

Thirty-seven one-way analyses of variance were performed. Only four of the analyses indicated significant differences in the means of the measures; namely, grades two, three, and four norm-referenced reading scores, and grade one norm-referenced mathematics scores. Two of the four measures, grade two reading scores and grade one mathematics scores, favored the subjects who had had a preschool experience only, and the other two favored the Follow Through pupils. The means of the Follow Through pupils' norm-referenced reading test scores in grades three and four were significantly better than the means of scores for Group 1 subjects. However, there were no significant differences between means for the Follow Through group and the Group 2 pupils at the same grade levels.

Discriminant analyses were also conducted in an attempt to obtain additional information about relationships among the variables. In the analyses intended to statistically distinguish the groups, all of the variables, attendance, number of compensatory education services, norm-referenced test scores, MEAP test scores, report card marks, and grade point average were used. Results showed that reading test scores were important discriminating variables at grades three and four, findings consistent with the analyses of variance outcomes. Also consonant with other analyses, the discriminant function produced modest percentages of correctly classified cases at all grade levels.

Multiple regression analyses were employed as supplementary studies of the possibility of predicting Michigan Educational Achievement Program test scores from known pupil data. Variables included in the analyses were norm-referenced test scores and grade point average. Grade point average appeared in the four strongest regression relationships, MEAP fourth and seventh grade reading for Group 2, and MEAP seventh grade reading and mathematics for Group 3. Norm-referenced mathematics test scores were more predictive of mathematics scores on the MEAP than norm-referenced reading scores, and similarly norm-referenced reading scores contributed more to the prediction of MEAP reading scores than did norm-referenced mathematics scores.

On average the rates of growth of the three groups as measured by norm-referenced tests did not attain the expected rate of one grade equivalent unit for every school year of ten months. In reading the Group 2 pupils had the highest average rate of gain at 0.9 of a grade equivalent unit for each school year, and the Group 1 pupils had the lowest rate at 0.7. In mathematics all three groups achieved at the same average rate of gain, 0.8 of a grade equivalent unit.

Additionally, the frequencies of compensatory education services for the groups were tabulated and subjected to a chi-square test of independence. This statistic indicated a systematic relationship between the number of services and group membership. An analysis of the frequencies showed substantial differences in concentrations of services with the Group 2 subjects receiving significantly fewer services per pupil than the Group 1 pupils.

Conclusions

The results of this study in many ways appear to support research conducted by the Westinghouse/Ohio University group (1969) on Head Start and by Abt Associates on Follow Through (1977) in which erosion of gains was evidenced and the effectiveness of the programs was questioned. Except for significant differences in the third and fourth grade reading test scores in favor of the Follow Through subjects over only one of the two comparison groups in each instance, there were no other differences in their favor on any of the other measures. Group 2 subjects who had a preschool experience only also attained two significant differences in their favor, one on the second grade reading test and the other on the first grade mathematics tests. By the fifth and the sixth grades, differences on all selected measures were not significant, leading to the conclusion that the statistical differences were not robust and that they might have been chance occurrences.

One of the findings from research conducted by Weikart, Lazar and Darlington, and Sevigny may be supported by this research. Longitudinal studies by these researchers have shown that students who have had a preschool experience required significantly fewer compensatory education services over a period of time than their comparison counterparts. Data from this research showed that Group 2 pupils, those who had a preschool experience only, had significantly fewer compensatory education services per pupil than the group of students with no prekindergarten schooling. In this respect, the study appears to endorse the hypothesis of reduced special educational services for students who have undergone a preschool education.

The support from this research to the reduced special services hypothesis is not necessarily uncontestable. Follow Through students also had completed a prekindergarten program. The number of compensatory services received by the Follow Through group over the seven-year period averaged 5.7 per pupil, 1.3 more than the mean for Group 2, and only 0.9 less than the mean for the students without a preschool education. On the surface, at least, it would seem that the mean for the Follow Through pupils should also have been significantly better than that for Group 1 in order for the data to be fully supportive of the finding by Weikart and others.

Analysis of the rates of gain show the Follow Through students to have performed no better than the other two groups. In reading, the average rate for the Follow Through group was 0.8 grade equivalent unit, 0.1 less than that for Group 2 and 0.1 better than that for Group 1. The average rates of gain in mathematics for all three groups were the same at 0.8 grade equivalent unit. The rates of gain display an ever increasing digression from the norm and a continuation of a cumulative deficit as defined by Deutsch, the Follow Through experience notwithstanding.

The strength and the persistence of statistically similar means of the cognitive measures in this research certainly imply that the students would have done just as well without either a preschool experience or a Follow Through Program. However, a survey of the descriptive data and statistical summaries reveal the following information about the group of students who had a prekindergarten background only. Students in this group:

1. averaged the best attendance in every grade.

2. had the highest means of report card marks in reading in grades one, two, five, and six, and were equalled for the highest in grade four.

3. had the highest means of report card marks in mathematics in two grades and were equalled for the highest in two others.

4. had the best grade point average.

5. averaged the highest MEAP scores on the grade four mathematics test, the grade seven reading and mathematics tests, and averaged second highest on the grade four reading test.

6. had the best average of scores on the norm-referenced reading tests in four of the six grades, and the second best in the other two grades.

7. had the best average of scores on the norm-referenced mathematics tests in five grades and the second best average in the other grade.

8. averaged the fewest number of compensatory education services.

In spite of the conclusions to be drawn from the tests for statistical differences, the edge for performance, if one may be permitted to exist, belongs to those students who have had an <u>exposure to preschool only</u>.

<u>Recommendations</u>

If a major goal of compensatory education is to help students reach the point where such services were no longer necessary, then there is clearly a need for serious consideration of expansion of prekindergarten programs in the Detroit Public School system. Presently, Preschool and Head Start are offered in about one-half of Detroit's elementary schools, those which qualify for Title I compensatory education funds. The evidence from other research as well as the findings from this study are sufficiently strong in demonstrating that early educational intervention at the prekindergarten level has proved valuable in reducing the need for special services.

Costs of including full-year prekindergarten schooling in every Detroit elementary building would be a formidable deterrent. However, one possible alternative could be a short-term preschool program required of all children eligible for Title I compensatory education services. It could be offered either as an eight-week summer program or as an eight-week course during the spring semester. Confining the expansion to Title I eligible school attendance areas would also permit the continued use of available federal funds rather than local school district monies.

Although the data do not support a recommendation that the program be continued, realistically, discontinuance of Follow Through is not necessarily the optimal alternative. The Detroit Public Schools, unlike most Follow Through centers, does not have a sponsor to oversee the implementation of a model. Under these circumstances, a viable alternative might be to consider redirecting the thrust of the program and to adopt a model which has the support of a sponsor as well as implications for improved learning for Detroit children.

As described in the conclusions, the data on cognitive measures point to an edge in favor of the preschool only group and to a flat performance on the part of the Follow Through group. Hence, another option would be to limit Follow Through services to those pupils who have completed Head Start, but for whom there are indications that additional prekindergarten experiences are needed. Limiting the selection to pupils who are most in need of special services should provide for concentrated effort and greater impact at the early childhood level. This concept does not appear to be at variance with the intent of Follow Through as reinforcement for Head Start experiences.

Finally, the rather strong performance by the preschool only group in requiring the fewest compensatory education services and yet achieving well on academic measures serves to suggest a need for study into outcomes other than the academic. An Abt Associates (1980) study investigated the possibility of using available Follow Through data bases in assessing delayed effects of the program on former participants. This research tends to support the contention that there might not be strong evidence for "sleeper" or delayed effects on academic outcomes. However, the Abt report points out that research on preschool programs by Lazar and others gives promise of significant positive effects on life chances variables such as reduced special education placement and reduced grade retention. In addition, a study by Cloud (1979) based on Follow Through data replicated the Lazar findings on life chances variables. If additional studies are conducted on either Follow Through or preschool programs, it is suggested that life chances variables be investigated in depth.

APPENDIX 1

RAW DATA FILE

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3	1103	36542530538543041O	222321	221321	0706	1817	081510131513	27501	1
4	1103	141917234041	242222253134	153030404554	020	001010	1948	001110	2
5	1104	020075075060015005	222224	222333	1123	2317	191923272830	08000	1
6	1104	172135436480	351530214499	172535385367	112	111000	0052	011010	2
7	1108	555120130190295090	022212	222213	1014	2219	111121231821	31000	1
8	1108	151733394656	320822203442	171630344760	116	111010	0048	011000	2
9	1110	210210450240315420	242222	223320	0606	2719	203019161214	24001	1
10	1110	172830273543	412018314040	192824465159	012	000110	1932	000110	2
11	1111	050280040025040060	223212	222242	0118	0019	181717252311	67000	1
12	1111	172027415437	331224164727	172231305547	028	001110	0062	011111	2
13	1112	265070175150270070	201111	222211	0204	0109	183213000806	22000	1
14	1112	172921002220	402413132218	193223293636	042	010101	0046	010111	2
15	1113	490140310125200125	221224	021322	1410	1812	141519280916	51000	1
16	1113	161930442547	291013242541	161921403960	126	111111	0122	111101	2
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19	1116	020010095095015015	222122	423222	0303	0219	302124241015	08000	1
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25	1119	090315230190070080	243211	243321	0317	1722	142511281414	13500	1
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27	1120	020015040040080000	243322	224443	1618	2924	343340473429	08000	1
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29	1121	010010020010045190	222222	444442	1022	1627	172723162720	02000	1
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33	1124	460180145175145035	022222	022223	0917	2517	153016322019	14001	1
34	1124	162825474953	372317133634	183124284854	046	010111	1966	010111	2
35	1125	090070045045050040	223222	223233	0513	1719	091615261518	16000	1
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57	1144	150160135115090125	223232	233342	1517	3021	331924272525	09000	1
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119	3303	100100125175035120	021322	223120	0408	2116	083319242113	10000	1
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177   3332 320090185170040030  222312  223320  1621  2413  063323512032 06000   1
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   182      3334 172242476258  462440333029  223243475249  032 010000  0008 000100          2
   183      3335 090100095065035050  222123  220112  0919  2417   151922334118 13000          1
   184      3335 162134475951  281318262234  162326414454  116 111010  0122 111101          2
End of file
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APPENDIX 2

DESCRIPTIVE STATISTICS

```
SPSS BATCH SYSTEM                                                                    10/27/82        PAGE    1

MTS/SPSS, VERSION H, RELEASE 9.1, FEBRUARY 1, 1982

                                CURRENT DOCUMENTATION FOR THE SPSS BATCH SYSTEM
ORDER FROM MCGRAW-HILL:  SPSS, 2ND ED. (PRINCIPAL TEXT)       ORDER FROM SPSS INC.:  SPSS STATISTICAL ALGORITHMS
                         SPSS UPDATE 7-9 (USE W/SPSS,2ND FOR REL. 7, 8, 9)           KEYWORDS: THE SPSS INC. NEWSLETTER
                         SPSS POCKET GUIDE, RELEASE 9
                         SPSS PRIMER (BRIEF INTRO TO SPSS)


DEFAULT SPACE ALLOCATION..     ALLOWS FOR..   102 TRANSFORMATIONS
WORKSPACE      71680 BYTES                    409 RECODE VALUES + LAG VARIABLES
TRANSPACE      10240 BYTES                   1641 IF/COMPUTE OPERATIONS

                 1 RUN NAME       DESCRIPTIVE STATS
                 2 GET FILE       SYSFILE


                           FILE SYSFILE  HAS  69 VARIABLES

                           THE SUBFILES ARE..

                                      NO OF
                           NAME       CASES

                           SYSFILE       92


CPU TIME REQUIRED..    0.27 SECONDS


                 3 COUNT          DIVISOR6=READM1 TO READM6
                 4                         MATHM1 TO MATHM6 (0,1,2,3,4)
                 5 COMPUTE        SUM6=READM1+READM2+READM3+
                 6                     READM4+READM5+READM6+
                 7                     MATHM1+MATHM2+MATHM3+
                 8                     MATHM4+MATHM5+MATHM6
                 9 COMPUTE        GPA6=SUM6/DIVISOR6     .
                10 COUNT          ABSDIV=ATTENDK, ATTEND1 TO ATTEND6(0 THRU HI)
                11 COMPUTE        SUMABS=ATTENDK+ATTEND1+ATTEND2+ATTEND3+
                12                       ATTEND4+ATTEND5+ATTEND6
                13 COMPUTE        AVGABS=SUMABS/ABSDIV
                14 VAR LABELS     GPA6 GRADE POINT AVERAGE AT END OF GRADE 6/
                15                AVGABS AVERAGE NUMBER OF ABSENCES PER YEAR/
                16 *SELECT IF     (GROUP=1)
                17 CONDESCRIPTIVE ATTENDK, ATTEND1 TO ATTEND6, AVGABS

 ***** GIVEN WORKSPACE ALLOWS FOR 1433 VARIABLES FOR CONDESCRIPTIVE PROBLEM *****


                18                READM1 TO READM6
```

```
19                  MATHM1 TO MATHM6
20                  MEAPR4, MEAPR7
21                  MEAPM4, MEAPM7
22                  READRAW1 TO READRAW6
23                  READGEQ1 TO READGEQ6
24                  MATHRAW1 TO MATHRAW6
25                  MATHGEQ1 TO MATHGEQ6
26                  GPAG NSERVCES
27 STATISTICS       1,5,6,10,11
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FILE SYSFILE (CREATION DATE = 10/27/82)

VARIABLE ATTENDK KINDERGARTEN ABSENCES

MEAN 21.671 STD DEV 16.613 VARIANCE 275.999
MINIMUM 2.000 MAXIMUM 67.000

VALID OBSERVATIONS - 35 MISSING OBSERVATIONS - 0

- -

VARIABLE ATTEND1 GRADE 1 ABSENCES

MEAN 17.600 STD DEV 14.213 VARIANCE 202.012
MINIMUM 1.000 MAXIMUM 55.500

VALID OBSERVATIONS - 35 MISSING OBSERVATIONS - 0

- -

VARIABLE ATTEND2 GRADE 2 ABSENCES

MEAN 13.171 STD DEV 9.933 VARIANCE 98.661
MINIMUM 1.000 MAXIMUM 42.500

VALID OBSERVATIONS - 35 MISSING OBSERVATIONS - 0

- -

VARIABLE ATTEND3 GRADE 3 ABSENCES

MEAN 14.871 STD DEV 10.138 VARIANCE 102.770
MINIMUM 2.000 MAXIMUM 45.000

VALID OBSERVATIONS - 35 MISSING OBSERVATIONS - 0

- -

VARIABLE ATTEND4 GRADE 4 ABSENCES

MEAN 10.114 STD DEV 8.431 VARIANCE 71.075
MINIMUM 0.0 MAXIMUM 38.500

VALID OBSERVATIONS - 35 MISSING OBSERVATIONS - 0

- -

VARIABLE ATTEND5 GRADE 5 ABSENCES

MEAN 12.243 STD DEV 10.130 VARIANCE 102.623
MINIMUM 0.0 MAXIMUM 43.000

VALID OBSERVATIONS - 35 MISSING OBSERVATIONS - 0

VARIABLE ATTEND6 GRADE 6 ABSENCES

MEAN	9.971	STD DEV	10.222	VARIANCE	104.499
MINIMUM	0.0	MAXIMUM	42.000		
VALID OBSERVATIONS -	35	MISSING OBSERVATIONS -	0		

VARIABLE AVGABS AVERAGE NUMBER OF ABSENCES PER YEAR

MEAN	14.235	STD DEV	8.307	VARIANCE	68.998
MINIMUM	3.929	MAXIMUM	37.071		
VALID OBSERVATIONS -	35	MISSING OBSERVATIONS -	0		

VARIABLE READM1 GRADE 1 READING MARK

MEAN	2.114	STD DEV	0.796	VARIANCE	0.634
MINIMUM	0.0	MAXIMUM	4.000		
VALID OBSERVATIONS -	35	MISSING OBSERVATIONS -	0		

VARIABLE READM2 GRADE 2 READING MARK

MEAN	2.314	STD DEV	1.051	VARIANCE	1.104
MINIMUM	0.0	MAXIMUM	4.000		
VALID OBSERVATIONS -	35	MISSING OBSERVATIONS -	0		

VARIABLE READM3 GRADE 3 READING MARK

MEAN	2.257	STD DEV	0.657	VARIANCE	0.432
MINIMUM	1.000	MAXIMUM	4.000		
VALID OBSERVATIONS -	35	MISSING OBSERVATIONS -	0		

FILE SYSFILE (CREATION DATE = 10/27/82)

VARIABLE READM4 GRADE 4 READING MARK

MEAN	2.229	STD DEV	0.770	VARIANCE	0.593
MINIMUM	1.000	MAXIMUM	4.000		

VALID OBSERVATIONS - 35 MISSING OBSERVATIONS - 0

- -

VARIABLE READM5 GRADE 5 READING MARK

MEAN	2.057	STD DEV	0.639	VARIANCE	0.408
MINIMUM	1.000	MAXIMUM	3.000		

VALID OBSERVATIONS - 35 MISSING OBSERVATIONS - 0

- -

VARIABLE READM6 GRADE 6 READING MARK

MEAN	2.229	STD DEV	0.877	VARIANCE	0.770
MINIMUM	1.000	MAXIMUM	4.000		

VALID OBSERVATIONS - 35 MISSING OBSERVATIONS - 0

- -

VARIABLE MATHM1 GRADE 1 MATH MARK

MEAN	1.943	STD DEV	1.136	VARIANCE	1.291
MINIMUM	0.0	MAXIMUM	4.000		

VALID OBSERVATIONS - 35 MISSING OBSERVATIONS - 0

- -

VARIABLE MATHM2 GRADE 2 MATH MARK

MEAN	2.286	STD DEV	0.987	VARIANCE	0.975
MINIMUM	0.0	MAXIMUM	4.000		

VALID OBSERVATIONS - 35 MISSING OBSERVATIONS - 0

- -

```
FILE    SYSFILE  (CREATION DATE = 10/27/82)

VARIABLE  MATHM3    GRADE 3 MATH MARK

MEAN             2.429               STD DEV        0.917             VARIANCE        0.840
MINIMUM          1.000               MAXIMUM        4.000

VALID OBSERVATIONS -      35                   MISSING OBSERVATIONS -      0

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

VARIABLE  MATHM4    GRADE 4 MATH MARK

MEAN             2.514               STD DEV        0.887             VARIANCE        0.787
MINIMUM          1.000               MAXIMUM        4.000

VALID OBSERVATIONS -      35                   MISSING OBSERVATIONS -      0

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

VARIABLE  MATHM5    GRADE 5 MATH MARK

MEAN             2.286               STD DEV        1.126             VARIANCE        1.269
MINIMUM          0.0                 MAXIMUM        4.000

VALID OBSERVATIONS -      35                   MISSING OBSERVATIONS -      0

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

VARIABLE  MATHM6    GRADE 6 MATH MARK

MEAN             1.714               STD DEV        1.017             VARIANCE        1.034
MINIMUM          0.0                 MAXIMUM        3.000

VALID OBSERVATIONS -      35                   MISSING OBSERVATIONS -      0

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

VARIABLE  MEAPR4    GRADE 4 MEAP READING SCORE

MEAN             8.286               STD DEV        5.160             VARIANCE       26.622
MINIMUM          1.000               MAXIMUM       16.000

VALID OBSERVATIONS -      35                   MISSING OBSERVATIONS -      0

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
```

FILE SYSFILE (CREATION DATE = 10/27/82)

VARIABLE MEAPR7 GRADE 7 MEAP READING SCORE

MEAN	13.857	STD DEV	5.837	VARIANCE	34.067
MINIMUM	2.000	MAXIMUM	23.000		

VALID OBSERVATIONS - 35 MISSING OBSERVATIONS - 0

- -

VARIABLE MEAPM4 GRADE 4 MEAP MATH SCORE

MEAN	20.343	STD DEV	8.751	VARIANCE	76.585
MINIMUM	0.0	MAXIMUM	31.000		

VALID OBSERVATIONS - 35 MISSING OBSERVATIONS - 0

- -

VARIABLE MEAPM7 GRADE 7 MEAP MATH SCORE

MEAN	17.286	STD DEV	4.812	VARIANCE	23.151
MINIMUM	6.000	MAXIMUM	27.000		

VALID OBSERVATIONS - 35 MISSING OBSERVATIONS - 0

- -

VARIABLE READRAW1 GRADE 1 READING RAW SCORE

MEAN	18.800	STD DEV	8.824	VARIANCE	77.871
MINIMUM	7.000	MAXIMUM	35.000		

VALID OBSERVATIONS - 35 MISSING OBSERVATIONS - 0

- -

VARIABLE READRAW2 GRADE 2 READING RAW SCORE

MEAN	21.743	STD DEV	7.014	VARIANCE	49.197
MINIMUM	8.000	MAXIMUM	35.000		

VALID OBSERVATIONS - 35 MISSING OBSERVATIONS - 0

- -

FILE SYSFILE (CREATION DATE = 10/27/82)

VARIABLE READRAW3 GRADE 3 READING RAW SCORE

MEAN	20.600	STD DEV	6.468	VARIANCE	41.835
MINIMUM	10.000	MAXIMUM	40.000		

VALID OBSERVATIONS - 35 MISSING OBSERVATIONS - 0

- -

VARIABLE READRAW4 GRADE 4 READING RAW SCORE

MEAN	25.343	STD DEV	9.985	VARIANCE	99.703
MINIMUM	0.0	MAXIMUM	47.000		

VALID OBSERVATIONS - 35 MISSING OBSERVATIONS - 0

- -

VARIABLE READRAW5 GRADE 5 READING RAW SCORE

MEAN	18.286	STD DEV	6.429	VARIANCE	41.328
MINIMUM	8.000	MAXIMUM	34.000		

VALID OBSERVATIONS - 35 MISSING OBSERVATIONS - 0

- -

VARIABLE READRAW6 GRADE 6 READING RAW SCORE

MEAN	19.371	STD DEV	5.841	VARIANCE	34.123
MINIMUM	6.000	MAXIMUM	30.000		

VALID OBSERVATIONS - 35 MISSING OBSERVATIONS - 0

- -

VARIABLE READGEQ1 GRADE 1 READING GEQ

MEAN	1.820	STD DEV	0.442	VARIANCE	0.196
MINIMUM	1.300	MAXIMUM	2.900		

VALID OBSERVATIONS - 35 MISSING OBSERVATIONS - 0

- -

FILE SYSFILE (CREATION DATE = 10/27/82)

VARIABLE READGEQ2 GRADE 2 READING GEQ

MEAN	2.306	STD DEV	0.421	VARIANCE	0.177
MINIMUM	1.600	MAXIMUM	3.100		

VALID OBSERVATIONS - 35 MISSING OBSERVATIONS - 0

- -

VARIABLE READGEQ3 GRADE 3 READING GEQ

MEAN	3.117	STD DEV	0.718	VARIANCE	0.516
MINIMUM	1.700	MAXIMUM	4.800		

VALID OBSERVATIONS - 35 MISSING OBSERVATIONS - 0

- -

VARIABLE READGEQ4 GRADE 4 READING GEQ

MEAN	3.911	STD DEV	1.208	VARIANCE	1.460
MINIMUM	0.0	MAXIMUM	6.000		

VALID OBSERVATIONS - 35 MISSING OBSERVATIONS - 0

- -

VARIABLE READGEQ5 GRADE 5 READING GEQ

MEAN	4.557	STD DEV	1.339	VARIANCE	1.793
MINIMUM	2.200	MAXIMUM	8.100		

VALID OBSERVATIONS - 35 MISSING OBSERVATIONS - 0

- -

VARIABLE READGEQ6 GRADE 6 READING GEQ

MEAN	5.400	STD DEV	1.294	VARIANCE	1.675
MINIMUM	2.000	MAXIMUM	8.000		

VALID OBSERVATIONS - 35 MISSING OBSERVATIONS - 0

- -

FILE SYSFILE (CREATION DATE = 10/27/82)

VARIABLE MATHRAW1 GRADE 1 MATH RAW SCORE

MEAN	38.343	STD DEV	9.130	VARIANCE	83.350
MINIMUM	14.000	MAXIMUM	56.000		

VALID OBSERVATIONS - 35 MISSING OBSERVATIONS - 0

- -

VARIABLE MATHRAW2 GRADE 2 MATH RAW SCORE

MEAN	16.800	STD DEV	5.390	VARIANCE	29.047
MINIMUM	8.000	MAXIMUM	28.000		

VALID OBSERVATIONS - 35 MISSING OBSERVATIONS - 0

- -

VARIABLE MATHRAW3 GRADE 3 MATH RAW SCORE

MEAN	24.429	STD DEV	9.745	VARIANCE	94.958
MINIMUM	8.000	MAXIMUM	45.000		

VALID OBSERVATIONS - 35 MISSING OBSERVATIONS - 0

- -

VARIABLE MATHRAW4 GRADE 4 MATH RAW SCORE

MEAN	25.857	STD DEV	8.063	VARIANCE	65.008
MINIMUM	12.000	MAXIMUM	43.000		

VALID OBSERVATIONS - 35 MISSING OBSERVATIONS - 0

- -

VARIABLE MATHRAW5 GRADE 5 MATH RAW SCORE

MEAN	39.171	STD DEV	12.967	VARIANCE	168.146
MINIMUM	20.000	MAXIMUM	71.000		

VALID OBSERVATIONS - 35 MISSING OBSERVATIONS - 0

- -

FILE SYSFILE (CREATION DATE = 10/27/82)

VARIABLE MATHRAW6 GRADE 6 MATH RAW SCORE

MEAN	40.457	STD DEV	15.197	VARIANCE	230.961
MINIMUM	18.000	MAXIMUM	99.000		

VALID OBSERVATIONS - 35 MISSING OBSERVATIONS - 0

VARIABLE MATHGEQ1 GRADE 1 MATH GEQ

MEAN	1.903	STD DEV	0.333	VARIANCE	0.111
MINIMUM	1.200	MAXIMUM	2.700		

VALID OBSERVATIONS - 35 MISSING OBSERVATIONS - 0

VARIABLE MATHGEQ2 GRADE 2 MATH GEQ

MEAN	2.571	STD DEV	0.490	VARIANCE	0.240
MINIMUM	1.600	MAXIMUM	3.800		

VALID OBSERVATIONS - 35 MISSING OBSERVATIONS - 0

VARIABLE MATHGEQ3 GRADE 3 MATH GEQ

MEAN	3.109	STD DEV	0.819	VARIANCE	0.671
MINIMUM	1.600	MAXIMUM	5.000		

VALID OBSERVATIONS - 35 MISSING OBSERVATIONS - 0

VARIABLE MATHGEQ4 GRADE 4 MATH GEQ

MEAN	4.103	STD DEV	0.712	VARIANCE	0.507
MINIMUM	2.800	MAXIMUM	5.500		

VALID OBSERVATIONS - 35 MISSING OBSERVATIONS - 0

FILE SYSFILE (CREATION DATE = 10/27/82)

VARIABLE MATHGEQ5 GRADE 5 MATH GEQ

MEAN	5.003	STD DEV	1.022	VARIANCE	1.045
MINIMUM	3.500	MAXIMUM	7.700		

VALID OBSERVATIONS - 35 MISSING OBSERVATIONS - 0

- -

VARIABLE MATHGEQ6 GRADE 6 MATH GEQ

MEAN	5.837	STD DEV	1.153	VARIANCE	1.330
MINIMUM	3.600	MAXIMUM	8.000		

VALID OBSERVATIONS - 35 MISSING OBSERVATIONS - 0

- -

VARIABLE GPA6 GRADE POINT AVERAGE AT END OF GRADE 6

MEAN	2.198	STD DEV	0.470	VARIANCE	0.221
MINIMUM	1.167	MAXIMUM	3.167		

VALID OBSERVATIONS - 35 MISSING OBSERVATIONS - 0

- -

VARIABLE NSERVCES NUMBER OF COMP ED SERVICES

MEAN	6.629	STD DEV	2.579	VARIANCE	6.652
MINIMUM	0.0	MAXIMUM	11.000		

VALID OBSERVATIONS - 35 MISSING OBSERVATIONS - 0

```
TRANSPACE REQUIRED..      700 BYTES
      7 TRANSFORMATIONS
     10 RECODE VALUES + LAG VARIABLES
     30 IF/COMPUTE OPERATIONS

CPU TIME REQUIRED..    0.87 SECONDS


                 28 *SELECT IF       (GROUP=2)
                 29 CONDESCRIPTIVE ATTENDK, ATTEND1 TO ATTEND6, AVGABS

 ***** GIVEN WORKSPACE ALLOWS FOR 1433 VARIABLES FOR CONDESCRIPTIVE PROBLEM *****

                 30                  READM1 TO READM6
                 31                  MATHM1 TO MATHM6
                 32                  MEAPR4, MEAPR7
                 33                  MEAPM4, MEAPM7
                 34                  READRAW1 TO READRAW6
                 35                  READGEQ1 TO READGEQ6
                 36                  MATHRAW1 TO MATHRAW6
                 37                  MATHGEQ1 TO MATHGEQ6
                 38                  GPA6 NSERVCES
                 39 STATISTICS       1,5,6,10,11
```

FILE SYSFILE (CREATION DATE = 10/27/82)

VARIABLE ATTENDK KINDERGARTEN ABSENCES

MEAN	13.977	STD DEV	15.119	VARIANCE	228.583
MINIMUM	0.0	MAXIMUM	50.000		

VALID OBSERVATIONS - 22 MISSING OBSERVATIONS - 0

- -

VARIABLE ATTEND1 GRADE 1 ABSENCES

MEAN	12.773	STD DEV	15.367	VARIANCE	236.136
MINIMUM	0.0	MAXIMUM	65.500		

VALID OBSERVATIONS - 22 MISSING OBSERVATIONS - 0

- -

VARIABLE ATTEND2 GRADE 2 ABSENCES

MEAN	10.455	STD DEV	9.425	VARIANCE	88.831
MINIMUM	0.0	MAXIMUM	38.000		

VALID OBSERVATIONS - 22 MISSING OBSERVATIONS - 0

- -

VARIABLE ATTEND3 GRADE 3 ABSENCES

MEAN	11.182	STD DEV	9.225	VARIANCE	85.108
MINIMUM	0.500	MAXIMUM	34.500		

VALID OBSERVATIONS - 22 MISSING OBSERVATIONS - 0

- -

VARIABLE ATTEND4 GRADE 4 ABSENCES

MEAN	9.909	STD DEV	9.513	VARIANCE	90.491
MINIMUM	0.500	MAXIMUM	30.000		

VALID OBSERVATIONS - 22 MISSING OBSERVATIONS - 0

- -

VARIABLE ATTEND5 GRADE 5 ABSENCES

MEAN	8.341	STD DEV	8.556	VARIANCE	73.200
MINIMUM	0.0	MAXIMUM	29.500		

VALID OBSERVATIONS - 22 MISSING OBSERVATIONS - 0

```
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

VARIABLE  ATTEND6    GRADE 6 ABSENCES

MEAN            11.341                  STD DEV          8.507                  VARIANCE        72.366
MINIMUM          1.000                  MAXIMUM         28.000

VALID OBSERVATIONS -       22                    MISSING OBSERVATIONS -        0

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

VARIABLE  AVGABS     AVERAGE NUMBER OF ABSENCES PER YEAR

MEAN            11.140                  STD DEV          7.418                  VARIANCE        55.024
MINIMUM          0.500                  MAXIMUM         31.214

VALID OBSERVATIONS -       22                    MISSING OBSERVATIONS -        0

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

VARIABLE  READM1     GRADE 1 READING MARK

MEAN             2.773                  STD DEV          0.973                  VARIANCE         0.946
MINIMUM          1.000                  MAXIMUM          4.000

VALID OBSERVATIONS -       22                    MISSING OBSERVATIONS -        0

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

VARIABLE  READM2     GRADE 2 READING MARK

MEAN             2.909                  STD DEV          0.971                  VARIANCE         0.944
MINIMUM          2.000                  MAXIMUM          4.000

VALID OBSERVATIONS -       22                    MISSING OBSERVATIONS -        0

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

VARIABLE  READM3     GRADE 3 READING MARK

MEAN             2.409                  STD DEV          0.908                  VARIANCE         0.825
MINIMUM          0.0                    MAXIMUM          4.000

VALID OBSERVATIONS -       22                    MISSING OBSERVATIONS -        0

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
```

FILE SYSFILE (CREATION DATE = 10/27/82)

VARIABLE READM4 GRADE 4 READING MARK

MEAN	2.636	STD DEV	0.658	VARIANCE	0.433
MINIMUM	2.000	MAXIMUM	4.000		

VALID OBSERVATIONS - 22 MISSING OBSERVATIONS - 0

- -

VARIABLE READM5 GRADE 5 READING MARK

MEAN	2.409	STD DEV	0.666	VARIANCE	0.444
MINIMUM	1.000	MAXIMUM	4.000		

VALID OBSERVATIONS - 22 MISSING OBSERVATIONS - 0

- -

VARIABLE READM6 GRADE 6 READING MARK

MEAN	2.409	STD DEV	0.908	VARIANCE	0.825
MINIMUM	1.000	MAXIMUM	4.000		

VALID OBSERVATIONS - 22 MISSING OBSERVATIONS - 0

- -

VARIABLE MATHM1 GRADE 1 MATH MARK

MEAN	2.136	STD DEV	1.125	VARIANCE	1.266
MINIMUM	0.0	MAXIMUM	4.000		

VALID OBSERVATIONS - 22 MISSING OBSERVATIONS - 0

- -

VARIABLE MATHM2 GRADE 2 MATH MARK

MEAN	2.545	STD DEV	0.912	VARIANCE	0.831
MINIMUM	1.000	MAXIMUM	4.000		

VALID OBSERVATIONS - 22 MISSING OBSERVATIONS - 0

- -

FILE SYSFILE (CREATION DATE = 10/27/82)

VARIABLE MATHM3 GRADE 3 MATH MARK

MEAN	2.409	STD DEV	1.008	VARIANCE	1.015
MINIMUM	0.0	MAXIMUM	4.000		

VALID OBSERVATIONS - 22 MISSING OBSERVATIONS - 0

- -

VARIABLE MATHM4 GRADE 4 MATH MARK

MEAN	2.591	STD DEV	0.854	VARIANCE	0.729
MINIMUM	1.000	MAXIMUM	4.000		

VALID OBSERVATIONS - 22 MISSING OBSERVATIONS - 0

- -

VARIABLE MATHM5 GRADE 5 MATH MARK

MEAN	2.045	STD DEV	0.844	VARIANCE	0.712
MINIMUM	1.000	MAXIMUM	4.000		

VALID OBSERVATIONS - 22 MISSING OBSERVATIONS - 0

- -

VARIABLE MATHM6 GRADE 6 MATH MARK

MEAN	1.682	STD DEV	1.211	VARIANCE	1.465
MINIMUM	0.0	MAXIMUM	4.000		

VALID OBSERVATIONS - 22 MISSING OBSERVATIONS - 0

- -

VARIABLE MEAPR4 GRADE 4 MEAP READING SCORE

MEAN	10.300	STD DEV	6.088	VARIANCE	37.063
MINIMUM	0.0	MAXIMUM	18.000		

VALID OBSERVATIONS - 20 MISSING OBSERVATIONS - 2

- -

FILE SYSFILE (CREATION DATE = 10/27/82)

VARIABLE MEAPR7 GRADE 7 MEAP READING SCORE

MEAN	14.545	STD DEV	6.300	VARIANCE	39.688
MINIMUM	2.000	MAXIMUM	22.000		

VALID OBSERVATIONS - 22 MISSING OBSERVATIONS - 0

- -

VARIABLE MEAPM4 GRADE 4 MEAP MATH SCORE

MEAN	23.700	STD DEV	7.284	VARIANCE	53.063
MINIMUM	6.000	MAXIMUM	31.000		

VALID OBSERVATIONS - 20 MISSING OBSERVATIONS - 2

- -

VARIABLE MEAPM7 GRADE 7 MEAP MATH SCORE

MEAN	19.545	STD DEV	4.857	VARIANCE	23.593
MINIMUM	9.000	MAXIMUM	28.000		

VALID OBSERVATIONS - 22 MISSING OBSERVATIONS - 0

- -

VARIABLE READRAW1 GRADE 1 READING RAW SCORE

MEAN	21.318	STD DEV	7.894	VARIANCE	62.323
MINIMUM	6.000	MAXIMUM	37.000		

VALID OBSERVATIONS - 22 MISSING OBSERVATIONS - 0

- -

VARIABLE READRAW2 GRADE 2 READING RAW SCORE

MEAN	27.364	STD DEV	8.261	VARIANCE	68.242
MINIMUM	13.000	MAXIMUM	46.000		

VALID OBSERVATIONS - 22 MISSING OBSERVATIONS - 0

- -

FILE SYSFILE (CREATION DATE = 10/27/82)

VARIABLE READRAW3 GRADE 3 READING RAW SCORE

MEAN	27.273	STD DEV	11.141	VARIANCE	124.113
MINIMUM	12.000	MAXIMUM	49.000		

VALID OBSERVATIONS - 22 MISSING OBSERVATIONS - 0

- -

VARIABLE READRAW4 GRADE 4 READING RAW SCORE

MEAN	29.682	STD DEV	10.864	VARIANCE	118.037
MINIMUM	10.000	MAXIMUM	47.000		

VALID OBSERVATIONS - 22 MISSING OBSERVATIONS - 0

- -

VARIABLE READRAW5 GRADE 5 READING RAW SCORE

MEAN	21.909	STD DEV	11.199	VARIANCE	125.420
MINIMUM	5.000	MAXIMUM	53.000		

VALID OBSERVATIONS - 22 MISSING OBSERVATIONS - 0

- -

VARIABLE READRAW6 GRADE 6 READING RAW SCORE

MEAN	22.727	STD DEV	7.072	VARIANCE	50.017
MINIMUM	6.000	MAXIMUM	34.000		

VALID OBSERVATIONS - 22 MISSING OBSERVATIONS - 0

- -

VARIABLE READGEQ1 GRADE 1 READING GEQ

MEAN	1.905	STD DEV	0.515	VARIANCE	0.265
MINIMUM	1.200	MAXIMUM	3.600		

VALID OBSERVATIONS - 22 MISSING OBSERVATIONS - 0

- -

FILE SYSFILE (CREATION DATE = 10/27/82)

VARIABLE READGEQ2 GRADE 2 READING GEQ

MEAN	2.650	STD DEV	0.536	VARIANCE	0.287
MINIMUM	1.800	MAXIMUM	4.000		

VALID OBSERVATIONS - 22 MISSING OBSERVATIONS - 0

- -

VARIABLE READGEQ3 GRADE 3 READING GEQ

MEAN	3.686	STD DEV	1.070	VARIANCE	1.145
MINIMUM	1.900	MAXIMUM	5.700		

VALID OBSERVATIONS - 22 MISSING OBSERVATIONS - 0

- -

VARIABLE READGEQ4 GRADE 4 READING GEQ

MEAN	4.336	STD DEV	1.169	VARIANCE	1.366
MINIMUM	1.900	MAXIMUM	6.000		

VALID OBSERVATIONS - 22 MISSING OBSERVATIONS - 0

- -

VARIABLE READGEQ5 GRADE 5 READING GEQ

MEAN	4.923	STD DEV	1.564	VARIANCE	2.447
MINIMUM	1.500	MAXIMUM	7.900		

VALID OBSERVATIONS - 22 MISSING OBSERVATIONS - 0

- -

VARIABLE READGEQ6 GRADE 6 READING GEQ

MEAN	6.218	STD DEV	1.929	VARIANCE	3.723
MINIMUM	2.000	MAXIMUM	9.900		

VALID OBSERVATIONS - 22 MISSING OBSERVATIONS - 0

- -

FILE SYSFILE (CREATION DATE = 10/27/82)

VARIABLE MATHRAW1 GRADE 1 MATH RAW SCORE

MEAN	39.182	STD DEV	9.323	VARIANCE	86.918
MINIMUM	20.000	MAXIMUM	59.000		

VALID OBSERVATIONS - 22 MISSING OBSERVATIONS - 0

- -

VARIABLE MATHRAW2 GRADE 2 MATH RAW SCORE

MEAN	18.682	STD DEV	6.357	VARIANCE	40.418
MINIMUM	9.000	MAXIMUM	30.000		

VALID OBSERVATIONS - 22 MISSING OBSERVATIONS - 0

- -

VARIABLE MATHRAW3 GRADE 3 MATH RAW SCORE

MEAN	27.545	STD DEV	9.272	VARIANCE	85.974
MINIMUM	13.000	MAXIMUM	46.000		

VALID OBSERVATIONS - 22 MISSING OBSERVATIONS - 0

- -

VARIABLE MATHRAW4 GRADE 4 MATH RAW SCORE

MEAN	28.045	STD DEV	12.408	VARIANCE	153.950
MINIMUM	8.000	MAXIMUM	55.000		

VALID OBSERVATIONS - 22 MISSING OBSERVATIONS - 0

- -

VARIABLE MATHRAW5 GRADE 5 MATH RAW SCORE

MEAN	41.409	STD DEV	12.493	VARIANCE	156.063
MINIMUM	24.000	MAXIMUM	69.000		

VALID OBSERVATIONS - 22 MISSING OBSERVATIONS - 0

- -

FILE SYSFILE (CREATION DATE = 10/27/82)

VARIABLE MATHRAW6 GRADE 6 MATH RAW SCORE

MEAN	39.273	STD DEV	14.160	VARIANCE	200.494
MINIMUM	13.000	MAXIMUM	72.000		

VALID OBSERVATIONS - 22 MISSING OBSERVATIONS - 0

- -

VARIABLE MATHGEQ1 GRADE 1 MATH GEQ

MEAN	1.945	STD DEV	0.390	VARIANCE	0.152
MINIMUM	1.400	MAXIMUM	3.100		

VALID OBSERVATIONS - 22 MISSING OBSERVATIONS - 0

- -

VARIABLE MATHGEQ2 GRADE 2 MATH GEQ

MEAN	2.764	STD DEV	0.631	VARIANCE	0.398
MINIMUM	1.700	MAXIMUM	4.100		

VALID OBSERVATIONS - 22 MISSING OBSERVATIONS - 0

- -

VARIABLE MATHGEQ3 GRADE 3 MATH GEQ

MEAN	3.359	STD DEV	0.784	VARIANCE	0.614
MINIMUM	2.300	MAXIMUM	5.000		

VALID OBSERVATIONS - 22 MISSING OBSERVATIONS - 0

- -

VARIABLE MATHGEQ4 GRADE 4 MATH GEQ

MEAN	4.255	STD DEV	1.130	VARIANCE	1.278
MINIMUM	2.200	MAXIMUM	6.700		

VALID OBSERVATIONS - 22 MISSING OBSERVATIONS - 0

- -

FILE SYSFILE (CREATION DATE = 10/27/82)

VARIABLE MATHGEQ5 GRADE 5 MATH GEQ

MEAN	5.364	STD DEV	0.965	VARIANCE	0.932
MINIMUM	3.800	MAXIMUM	8.200		

VALID OBSERVATIONS - 22 MISSING OBSERVATIONS - 0

- -

VARIABLE MATHGEQ6 GRADE 6 MATH GEQ

MEAN	5.891	STD DEV	1.460	VARIANCE	2.132
MINIMUM	2.900	MAXIMUM	9.400		

VALID OBSERVATIONS - 22 MISSING OBSERVATIONS - 0

- -

VARIABLE GPA6 GRADE POINT AVERAGE AT END OF GRADE 6

MEAN	2.413	STD DEV	0.622	VARIANCE	0.387
MINIMUM	1.167	MAXIMUM	3.750		

VALID OBSERVATIONS - 22 MISSING OBSERVATIONS - 0

- -

VARIABLE NSERVCES NUMBER OF COMP ED SERVICES

MEAN	4.409	STD DEV	3.333	VARIANCE	11.110
MINIMUM	0.0	MAXIMUM	10.000		

VALID OBSERVATIONS - 22 MISSING OBSERVATIONS - 0

```
DESCRIPTIVE STATS                                                                     10/27/82       PAGE   24

TRANSPACE REQUIRED..       100 BYTES
      1 TRANSFORMATIONS
      O RECODE VALUES + LAG VARIABLES
      3 IF/COMPUTE OPERATIONS

CPU TIME REQUIRED..    O.65 SECONDS


                 40 *SELECT IF      (GROUP=3)
                 41 CONDESCRIPTIVE ATTENDK, ATTEND1 TO ATTEND6, AVGABS

 ***** GIVEN WORKSPACE ALLOWS FOR 1433 VARIABLES FOR CONDESCRIPTIVE PROBLEM *****

                 42                 READM1 TO READM6
                 43                 MATHM1 TO MATHM6
                 44                 MEAPR4, MEAPR7
                 45                 MEAPM4, MEAPM7
                 46                 READRAW1 TO READRAW6
                 47                 READGEQ1 TO READGEQ6
                 48                 MATHRAW1 TO MATHRAW6
                 49                 MATHGEQ1 TO MATHGEQ6
                 50                 GPA6 NSERVCES
                 51 STATISTICS      1,5,6,10,11
```

FILE SYSFILE (CREATION DATE = 10/27/82)

VARIABLE ATTENDK KINDERGARTEN ABSENCES

MEAN	17.943	STD DEV	19.841	VARIANCE	393.658
MINIMUM	0.0	MAXIMUM	99.500		

VALID OBSERVATIONS - 35 MISSING OBSERVATIONS - 0

- -

VARIABLE ATTEND1 GRADE 1 ABSENCES

MEAN	18.000	STD DEV	18.418	VARIANCE	339.221
MINIMUM	0.0	MAXIMUM	77.500		

VALID OBSERVATIONS - 35 MISSING OBSERVATIONS - 0

- -

VARIABLE ATTEND2 GRADE 2 ABSENCES

MEAN	18.686	STD DEV	19.862	VARIANCE	394.487
MINIMUM	0.0	MAXIMUM	93.000		

VALID OBSERVATIONS - 35 MISSING OBSERVATIONS - 0

- -

VARIABLE ATTEND3 GRADE 3 ABSENCES

MEAN	16.143	STD DEV	17.769	VARIANCE	315.729
MINIMUM	0.0	MAXIMUM	80.000		

VALID OBSERVATIONS - 35 MISSING OBSERVATIONS - 0

- -

VARIABLE ATTEND4 GRADE 4 ABSENCES

MEAN	11.729	STD DEV	11.484	VARIANCE	131.873
MINIMUM	0.0	MAXIMUM	44.500		

VALID OBSERVATIONS - 35 MISSING OBSERVATIONS - 0

- -

VARIABLE ATTEND5 GRADE 5 ABSENCES

MEAN	12.714	STD DEV	13.246	VARIANCE	175.460
MINIMUM	0.0	MAXIMUM	65.000		

VALID OBSERVATIONS - 35 MISSING OBSERVATIONS - 0

VARIABLE ATTEND6 GRADE 6 ABSENCES

MEAN	14.414	STD DEV	13.155	VARIANCE	173.066
MINIMUM	0.0	MAXIMUM	60.000		

VALID OBSERVATIONS - 35 MISSING OBSERVATIONS - 0

VARIABLE AVGABS AVERAGE NUMBER OF ABSENCES PER YEAR

MEAN	15.661	STD DEV	13.222	VARIANCE	174.823
MINIMUM	1.500	MAXIMUM	61.286		

VALID OBSERVATIONS - 35 MISSING OBSERVATIONS - 0

VARIABLE READM1 GRADE 1 READING MARK

MEAN	2.429	STD DEV	1.243	VARIANCE	1.546
MINIMUM	0.0	MAXIMUM	4.000		

VALID OBSERVATIONS - 35 MISSING OBSERVATIONS - 0

VARIABLE READM2 GRADE 2 READING MARK

MEAN	2.371	STD DEV	1.003	VARIANCE	1.005
MINIMUM	0.0	MAXIMUM	4.000		

VALID OBSERVATIONS - 35 MISSING OBSERVATIONS - 0

VARIABLE READM3 GRADE 3 READING MARK

MEAN	2.457	STD DEV	0.780	VARIANCE	0.608
MINIMUM	1.000	MAXIMUM	4.000		

VALID OBSERVATIONS - 35 MISSING OBSERVATIONS - 0

FILE SYSFILE (CREATION DATE = 10/27/82)

VARIABLE READM4 GRADE 4 READING MARK

MEAN	2.629	STD DEV	0.910	VARIANCE	0.829
MINIMUM	1.000	MAXIMUM	4.000		

VALID OBSERVATIONS - 35 MISSING OBSERVATIONS - 0

- -

VARIABLE READM5 GRADE 5 READING MARK

MEAN	2.114	STD DEV	0.796	VARIANCE	0.634
MINIMUM	1.000	MAXIMUM	4.000		

VALID OBSERVATIONS - 35 MISSING OBSERVATIONS - 0

- -

VARIABLE READM6 GRADE 6 READING MARK

MEAN	2.000	STD DEV	0.840	VARIANCE	0.706
MINIMUM	1.000	MAXIMUM	4.000		

VALID OBSERVATIONS - 35 MISSING OBSERVATIONS - 0

- -

VARIABLE MATHM1 GRADE 1 MATH MARK

MEAN	2.314	STD DEV	0.963	VARIANCE	0.928
MINIMUM	0.0	MAXIMUM	4.000		

VALID OBSERVATIONS - 35 MISSING OBSERVATIONS - 0

- -

VARIABLE MATHM2 GRADE 2 MATH MARK

MEAN	2.171	STD DEV	0.857	VARIANCE	0.734
MINIMUM	1.000	MAXIMUM	4.000		

VALID OBSERVATIONS - 35 MISSING OBSERVATIONS - 0

- -

FILE SYSFILE (CREATION DATE = 10/27/82)

VARIABLE MATHM3 GRADE 3 MATH MARK

MEAN	2.343	STD DEV	1.187	VARIANCE	1.408
MINIMUM	0.0	MAXIMUM	4.000		

VALID OBSERVATIONS - 35 MISSING OBSERVATIONS - 0

VARIABLE MATHM4 GRADE 4 MATH MARK

MEAN	2.257	STD DEV	1.221	VARIANCE	1.491
MINIMUM	0.0	MAXIMUM	4.000		

VALID OBSERVATIONS - 35 MISSING OBSERVATIONS - 0

VARIABLE MATHM5 GRADE 5 MATH MARK

MEAN	2.086	STD DEV	0.951	VARIANCE	0.904
MINIMUM	1.000	MAXIMUM	4.000		

VALID OBSERVATIONS - 35 MISSING OBSERVATIONS - 0

VARIABLE MATHM6 GRADE 6 MATH MARK

MEAN	1.543	STD DEV	0.886	VARIANCE	0.785
MINIMUM	0.0	MAXIMUM	4.000		

VALID OBSERVATIONS - 35 MISSING OBSERVATIONS - 0

VARIABLE MEAPR4 GRADE 4 MEAP READING SCORE

MEAN	10.629	STD DEV	5.568	VARIANCE	31.005
MINIMUM	1.000	MAXIMUM	19.000		

VALID OBSERVATIONS - 35 MISSING OBSERVATIONS - 0

FILE SYSFILE (CREATION DATE = 10/27/82)

VARIABLE MEAPR7 GRADE 7 MEAP READING SCORE

MEAN	14.242	STD DEV	6.699	VARIANCE	44.877
MINIMUM	3.000	MAXIMUM	23.000		

VALID OBSERVATIONS - 33 MISSING OBSERVATIONS - 2

- -

VARIABLE MEAPM4 GRADE 4 MEAP MATH SCORE

MEAN	22.029	STD DEV	7.548	VARIANCE	56.970
MINIMUM	2.000	MAXIMUM	32.000		

VALID OBSERVATIONS - 35 MISSING OBSERVATIONS - 0

- -

VARIABLE MEAPM7 GRADE 7 MEAP MATH SCORE

MEAN	16.970	STD DEV	5.785	VARIANCE	33.468
MINIMUM	5.000	MAXIMUM	26.000		

VALID OBSERVATIONS - 33 MISSING OBSERVATIONS - 2

- -

VARIABLE READRAW1 GRADE 1 READING RAW SCORE

MEAN	16.394	STD DEV	7.806	VARIANCE	60.934
MINIMUM	5.000	MAXIMUM	33.000		

VALID OBSERVATIONS - 33 MISSING OBSERVATIONS - 2

- -

VARIABLE READRAW2 GRADE 2 READING RAW SCORE

MEAN	23.529	STD DEV	8.809	VARIANCE	77.590
MINIMUM	6.000	MAXIMUM	38.000		

VALID OBSERVATIONS - 34 MISSING OBSERVATIONS - 1

- -

FILE SYSFILE (CREATION DATE = 10/27/82)

VARIABLE READRAW3 GRADE 3 READING RAW SCORE

MEAN	29.000	STD DEV	12.981	VARIANCE	168.500
MINIMUM	11.000	MAXIMUM	59.000		

VALID OBSERVATIONS - 33 MISSING OBSERVATIONS - 2

VARIABLE READRAW4 GRADE 4 READING RAW SCORE

MEAN	32.794	STD DEV	12.436	VARIANCE	154.653
MINIMUM	14.000	MAXIMUM	53.000		

VALID OBSERVATIONS - 34 MISSING OBSERVATIONS - 1

VARIABLE READRAW5 GRADE 5 READING RAW SCORE

MEAN	19.559	STD DEV	9.823	VARIANCE	96.496
MINIMUM	5.000	MAXIMUM	44.000		

VALID OBSERVATIONS - 34 MISSING OBSERVATIONS - 1

VARIABLE READRAW6 GRADE 6 READING RAW SCORE

MEAN	20.486	STD DEV	7.298	VARIANCE	53.257
MINIMUM	10.000	MAXIMUM	33.000		

VALID OBSERVATIONS - 35 MISSING OBSERVATIONS - 0

VARIABLE READGEQ1 GRADE 1 READING GEQ

MEAN	1.676	STD DEV	0.332	VARIANCE	0.110
MINIMUM	1.200	MAXIMUM	2.600		

VALID OBSERVATIONS - 33 MISSING OBSERVATIONS - 2

FILE SYSFILE (CREATION DATE = 10/27/82)

VARIABLE READGEQ2 GRADE 2 READING GEQ

MEAN	2.400	STD DEV	0.519	VARIANCE	0.270
MINIMUM	1.500	MAXIMUM	3.200		

VALID OBSERVATIONS - 34 MISSING OBSERVATIONS - 1

VARIABLE READGEQ3 GRADE 3 READING GEQ

MEAN	3.900	STD DEV	1.288	VARIANCE	1.660
MINIMUM	1.800	MAXIMUM	7.400		

VALID OBSERVATIONS - 33 MISSING OBSERVATIONS - 2

VARIABLE READGEQ4 GRADE 4 READING GEQ

MEAN	4.615	STD DEV	1.255	VARIANCE	1.575
MINIMUM	2.400	MAXIMUM	6.600		

VALID OBSERVATIONS - 34 MISSING OBSERVATIONS - 1

VARIABLE READGEQ5 GRADE 5 READING GEQ

MEAN	4.532	STD DEV	1.568	VARIANCE	2.459
MINIMUM	1.500	MAXIMUM	8.100		

VALID OBSERVATIONS - 34 MISSING OBSERVATIONS - 1

VARIABLE READGEQ6 GRADE 6 READING GEQ

MEAN	5.731	STD DEV	1.686	VARIANCE	2.841
MINIMUM	3.400	MAXIMUM	9.100		

VALID OBSERVATIONS - 35 MISSING OBSERVATIONS - 0

FILE SYSFILE (CREATION DATE = 10/27/82)

VARIABLE MATHRAW1 GRADE 1 MATH RAW SCORE

MEAN	31.758	STD DEV	11.068	VARIANCE	122.502
MINIMUM	12.000	MAXIMUM	51.000		

VALID OBSERVATIONS - 33 MISSING OBSERVATIONS - 2

VARIABLE MATHRAW2 GRADE 2 MATH RAW SCORE

MEAN	15.848	STD DEV	5.591	VARIANCE	31.258
MINIMUM	7.000	MAXIMUM	28.000		

VALID OBSERVATIONS - 33 MISSING OBSERVATIONS - 2

VARIABLE MATHRAW3 GRADE 3 MATH RAW SCORE

MEAN	22.424	STD DEV	9.820	VARIANCE	96.439
MINIMUM	8.000	MAXIMUM	44.000		

VALID OBSERVATIONS - 33 MISSING OBSERVATIONS - 2

VARIABLE MATHRAW4 GRADE 4 MATH RAW SCORE

MEAN	25.857	STD DEV	10.418	VARIANCE	108.538
MINIMUM	12.000	MAXIMUM	47.000		

VALID OBSERVATIONS - 35 MISSING OBSERVATIONS - 0

VARIABLE MATHRAW5 GRADE 5 MATH RAW SCORE

MEAN	34.735	STD DEV	13.837	VARIANCE	191.473
MINIMUM	14.000	MAXIMUM	61.000		

VALID OBSERVATIONS - 34 MISSING OBSERVATIONS - 1

FILE SYSFILE (CREATION DATE = 10/27/82)

VARIABLE MATHRAW6 GRADE 6 MATH RAW SCORE

MEAN	37.686	STD DEV	11.411	VARIANCE	130.222
MINIMUM	22.000	MAXIMUM	65.000		

VALID OBSERVATIONS - 35 MISSING OBSERVATIONS - 0

- -

VARIABLE MATHGEQ1 GRADE 1 MATH GEQ

MEAN	1.697	STD DEV	0.333	VARIANCE	0.111
MINIMUM	1.200	MAXIMUM	2.400		

VALID OBSERVATIONS - 33 MISSING OBSERVATIONS - 2

- -

VARIABLE MATHGEQ2 GRADE 2 MATH GEQ

MEAN	2.482	STD DEV	0.554	VARIANCE	0.307
MINIMUM	1.500	MAXIMUM	3.800		

VALID OBSERVATIONS - 33 MISSING OBSERVATIONS - 2

- -

VARIABLE MATHGEQ3 GRADE 3 MATH GEQ

MEAN	2.936	STD DEV	0.819	VARIANCE	0.671
MINIMUM	1.600	MAXIMUM	4.700		

VALID OBSERVATIONS - 33 MISSING OBSERVATIONS - 2

- -

VARIABLE MATHGEQ4 GRADE 4 MATH GEQ

MEAN	4.106	STD DEV	0.962	VARIANCE	0.925
MINIMUM	2.600	MAXIMUM	5.800		

VALID OBSERVATIONS - 35 MISSING OBSERVATIONS - 0

- -

FILE SYSFILE (CREATION DATE = 10/27/82)

VARIABLE MATHGEQ5 GRADE 5 MATH GEQ

MEAN	4.732	STD DEV	1.037	VARIANCE	1.074
MINIMUM	2.600	MAXIMUM	6.600		

VALID OBSERVATIONS - 34 MISSING OBSERVATIONS - 1

- -

VARIABLE MATHGEQ6 GRADE 6 MATH GEQ

MEAN	5.709	STD DEV	1.112	VARIANCE	1.236
MINIMUM	4.100	MAXIMUM	8.400		

VALID OBSERVATIONS - 35 MISSING OBSERVATIONS - 0

- -

VARIABLE GPA6 GRADE POINT AVERAGE AT END OF GRADE 6

MEAN	2.226	STD DEV	0.663	VARIANCE	0.439
MINIMUM	1.333	MAXIMUM	3.667		

VALID OBSERVATIONS - 35 MISSING OBSERVATIONS - 0

- -

VARIABLE NSERVCES NUMBER OF COMP ED SERVICES

MEAN	5.657	STD DEV	2.589	VARIANCE	6.703
MINIMUM	0.0	MAXIMUM	9.000		

VALID OBSERVATIONS - 35 MISSING OBSERVATIONS - 0

```
TRANSPACE REQUIRED..      100 BYTES
      1 TRANSFORMATIONS
      0 RECODE VALUES + LAG VARIABLES
      3 IF/COMPUTE OPERATIONS

CPU TIME REQUIRED..    0.58 SECONDS


                 52 FINISH

         NORMAL END OF JOB.
            52 CONTROL CARDS WERE PROCESSED.
             0 ERRORS WERE DETECTED.
```

APPENDIX 3

ANALYSES OF VARIANCE

```
SPSS BATCH SYSTEM                                                                      11/07/82       PAGE    1

MTS/SPSS, VERSION H, RELEASE 9.1, FEBRUARY 1, 1982

                              CURRENT DOCUMENTATION FOR THE SPSS BATCH SYSTEM
ORDER FROM MCGRAW-HILL:  SPSS, 2ND ED. (PRINCIPAL TEXT)       ORDER FROM SPSS INC.:  SPSS STATISTICAL ALGORITHMS
                         SPSS UPDATE 7-9 (USE W/SPSS,2ND FOR REL. 7, 8, 9)           KEYWORDS: THE SPSS INC. NEWSLETTER
                         SPSS POCKET GUIDE, RELEASE 9
                         SPSS PRIMER (BRIEF INTRO TO SPSS)


DEFAULT SPACE ALLOCATION..     ALLOWS FOR..   102 TRANSFORMATIONS
WORKSPACE      71680 BYTES                    409 RECODE VALUES + LAG VARIABLES
TRANSPACE      10240 BYTES                   1641 IF/COMPUTE OPERATIONS

                      RUN NAME       ONEWAY ANALYSES OF VARIANCE
                      GET FILE       SYSFILE


                              FILE SYSFILE  HAS  69 VARIABLES

                              THE SUBFILES ARE..

                                        NO OF
                              NAME      CASES

                              SYSFILE      92


CPU TIME REQUIRED..    0.29 SECONDS


                      COUNT          DIVISOR6=READM1 TO READM6
                                              MATHM1 TO MATHM6(0,1,2,3,4)
                      COMPUTE        SUM6=READM1+READM2+READM3+
                                          READM4+READM5+READM6+
                                          MATHM1+MATHM2+MATHM3+
                                          MATHM4+MATHM5+MATHM6
                      COMPUTE        GPA6=SUM6/DIVISOR6
                      COUNT          ABSDIV=ATTENDK, ATTEND1 TO ATTEND6(0 THRU HI)
                      COMPUTE        SUMABS=ATTENDK+ATTEND1+ATTEND2+ATTEND3+
                                            ATTEND4+ATTEND5+ATTEND6
                      COMPUTE        AVGABS=SUMABS/ABSDIV
                      VAR LABELS     GPA6 GRADE POINT AVERAGE AT END OF GRADE 6/
                                     AVGABS AVERAGE NUMBER OF ABSENCES PER YEAR/
                      ONEWAY         ATTENDK, ATTEND1 TO ATTEND6, AVGABS BY GROUP(1,3)/

 ***** ONEWAY PROBLEM REQUIRES      512 BYTES WORKSPACE *****
```

FILE SYSFILE (CREATION DATE = 10/27/82)

- O N E W A Y -

VARIABLE ATTENDK KINDERGARTEN ABSENCES
BY VARIABLE GROUP

ANALYSIS OF VARIANCE

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	2	812.2046	406.1021	1.311	0.2747
WITHIN GROUPS	89	27568.5195	309.7585		
TOTAL	91	28380.7227			

FILE SYSFILE (CREATION DATE = 10/27/82)

- O N E W A Y -

VARIABLE ATTEND1 GRADE 1 ABSENCES
BY VARIABLE GROUP

ANALYSIS OF VARIANCE

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	2	425.8533	212.9266	0.811	0.4476
WITHIN GROUPS	89	23360.6563	262.4792		
TOTAL	91	23786.5078			

ONEWAY ANALYSES OF VARIANCE 11/07/82 PAGE 4

FILE SYSFILE (CREATION DATE = 10/27/82)

- O N E W A Y -

VARIABLE ATTEND2 GRADE 2 ABSENCES
BY VARIABLE GROUP

ANALYSIS OF VARIANCE

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	2	1033.7060	516.8528	2.469	0.0905
WITHIN GROUPS	89	18632.4292	209.3531		
TOTAL	91	19666.1328			

ONEWAY ANALYSES OF VARIANCE 11/07/82 PAGE 5

FILE SYSFILE (CREATION DATE = 10/27/82)

- O N E W A Y -

VARIABLE ATTEND3 GRADE 3 ABSENCES
BY VARIABLE GROUP

ANALYSIS OF VARIANCE

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	2	341.4498	170.7249	0.949	0.3911
WITHIN GROUPS	89	16016.1848	179.9571		
TOTAL	91	16357.6328			

FILE SYSFILE (CREATION DATE = 10/27/82)

- O N E W A Y -

VARIABLE ATTEND4 GRADE 4 ABSENCES
BY VARIABLE GROUP

ANALYSIS OF VARIANCE

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	2	62.7586	31.3793	0.317	0.7289
WITHIN GROUPS	89	8800.5120	98.8822		
TOTAL	91	8863.2695			

ONEWAY ANALYSES OF VARIANCE 11/07/82 PAGE 7

FILE SYSFILE (CREATION DATE = 10/27/82)

- O N E W A Y -

VARIABLE ATTEND5 GRADE 5 ABSENCES
BY VARIABLE GROUP

ANALYSIS OF VARIANCE

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	2	290.4674	145.2337	1.176	0.3133
WITHIN GROUPS	89	10991.9829	123.5054		
TOTAL	91	11282.4492			

ONEWAY ANALYSES OF VARIANCE 11/07/82 PAGE 8

FILE SYSFILE (CREATION DATE = 10/27/82)

- O N E W A Y -

VARIABLE ATTEND6 GRADE 6 ABSENCES
BY VARIABLE GROUP

ANALYSIS OF VARIANCE

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	2	357.5818	178.7909	1.452	0.2395
WITHIN GROUPS	89	10956.8862	123.1111		
TOTAL	91	11314.4648			

ONEWAY ANALYSES OF VARIANCE 11/07/82 PAGE 9

FILE SYSFILE (CREATION DATE = 10/27/82)

\- O N E W A Y -

VARIABLE AVGABS AVERAGE NUMBER OF ABSENCES PER YEAR
BY VARIABLE GROUP

ANALYSIS OF VARIANCE

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	2	278.3831	139.1916	1.312	0.2746
WITHIN GROUPS	89	9445.3787	106.1278		
TOTAL	91	9723.7617			

```
TRANSPACE REQUIRED..      600 BYTES
      6 TRANSFORMATIONS
     10 RECODE VALUES + LAG VARIABLES
     27 IF/COMPUTE OPERATIONS

CPU TIME REQUIRED..    0.54 SECONDS


                 17 ONEWAY         READM1 TO READM6 BY GROUP(1,3)/

 ***** ONEWAY PROBLEM REQUIRES      392 BYTES WORKSPACE *****
```

FILE SYSFILE (CREATION DATE = 10/27/82)

- - - - - - - - - - - - - - - - O N E W A Y - - - - - - - - - - - - - - - -

VARIABLE READM1 GRADE 1 READING MARK
BY VARIABLE GROUP

ANALYSIS OF VARIANCE

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	2	5.9351	2.9676	2.810	0.0655
WITHIN GROUPS	89	93.9777	1.0559		
TOTAL	91	99.9128			

ONEWAY ANALYSES OF VARIANCE 11/07/82 PAGE 12

FILE SYSFILE (CREATION DATE = 10/27/82)

- O N E W A Y -

VARIABLE READM2 GRADE 2 READING MARK
BY VARIABLE GROUP

ANALYSIS OF VARIANCE

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	2	5.4241	2.7121	2.637	0.0772
WITHIN GROUPS	89	91.5321	1.0285		
TOTAL	91	96.9563			

ONEWAY ANALYSES OF VARIANCE 11/07/82 PAGE 13

FILE SYSFILE (CREATION DATE = 10/27/82)

\- O N E W A Y -

VARIABLE READM3 GRADE 3 READING MARK
BY VARIABLE GROUP

ANALYSIS OF VARIANCE

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	2	0.7451	0.3726	0.629	0.5353
WITHIN GROUPS	89	52.6895	0.5920		
TOTAL	91	53.4346			

ONEWAY ANALYSES OF VARIANCE 11/07/82 PAGE 14

FILE SYSFILE (CREATION DATE = 10/27/82)

- - - - - - - - - - - - - - - - O N E W A Y - - - - - - - - - - - - - - - -

VARIABLE READM4 GRADE 4 READING MARK
BY VARIABLE GROUP

ANALYSIS OF VARIANCE

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	2	3.5228	1.7614	2.729	0.0707
WITHIN GROUPS	89	57.4336	0.6453		
TOTAL	91	60.9564			

ONEWAY ANALYSES OF VARIANCE 11/07/82 PAGE 15

FILE SYSFILE (CREATION DATE = 10/27/82)

- O N E W A Y -

VARIABLE READM5 GRADE 5 READING MARK
BY VARIABLE GROUP

ANALYSIS OF VARIANCE

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	2	1.8076	0.9038	1.798	0.1717
WITHIN GROUPS	89	44.7467	0.5028		
TOTAL	91	46.5542			

ONEWAY ANALYSES OF VARIANCE 11/07/82 PAGE 16

FILE SYSFILE (CREATION DATE = 10/27/82)

- O N E W A Y -

VARIABLE READM6 GRADE 6 READING MARK
BY VARIABLE GROUP

ANALYSIS OF VARIANCE

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	2	2.3691	1.1846	1.562	0.2154
WITHIN GROUPS	89	67.4894	0.7583		
TOTAL	91	69.8585			

```
CPU TIME REQUIRED..    0.26 SECONDS

                 18 ONEWAY         MATHM1 TO MATHM6 BY GROUP(1,3)/

 ***** ONEWAY PROBLEM REQUIRES      392 BYTES WORKSPACE *****
```

FILE SYSFILE (CREATION DATE = 10/27/82)

- O N E W A Y -

VARIABLE MATHM1 GRADE 1 MATH MARK
BY VARIABLE GROUP

ANALYSIS OF VARIANCE

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	2	2.4154	1.2077	1.054	0.3530
WITHIN GROUPS	89	102.0191	1.1463		
TOTAL	91	104.4344			

FILE SYSFILE (CREATION DATE = 10/27/82)

- O N E W A Y -

VARIABLE MATHM2 GRADE 2 MATH MARK
BY VARIABLE GROUP

ANALYSIS OF VARIANCE

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	2	1.9095	0.9547	1.124	0.3294
WITHIN GROUPS	89	75.5686	0.8491		
TOTAL	91	77.4781			

ONEWAY ANALYSES OF VARIANCE 11/07/82 PAGE 20

FILE SYSFILE (CREATION DATE = 10/27/82)

\- O N E W A Y -

VARIABLE MATHM3 GRADE 3 MATH MARK
BY VARIABLE GROUP

ANALYSIS OF VARIANCE

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	2	0.1376	0.0688	0.063	0.9393
WITHIN GROUPS	89	97.7750	1.0986		
TOTAL	91	97.9126			

ONEWAY ANALYSES OF VARIANCE 11/07/82 PAGE 21

FILE SYSFILE (CREATION DATE = 10/27/82)

- O N E W A Y -

VARIABLE MATHM4 GRADE 4 MATH MARK
BY VARIABLE GROUP

ANALYSIS OF VARIANCE

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	2	1.8619	0.9310	0.893	0.4129
WITHIN GROUPS	89	92.7465	1.0421		
TOTAL	91	94.6084			

ONEWAY ANALYSES OF VARIANCE 11/07/82 PAGE 22

FILE SYSFILE (CREATION DATE = 10/27/82)

- - - - - - - - - - - - O N E W A Y - - - - - - - - - - - -

VARIABLE MATHM5 GRADE 5 MATH MARK
BY VARIABLE GROUP

ANALYSIS OF VARIANCE

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	2	1.0294	0.5147	0.516	0.5989
WITHIN GROUPS	89	88.8400	0.9982		
TOTAL	91	89.8694			

ONEWAY ANALYSES OF VARIANCE 11/07/82 PAGE 23

FILE SYSFILE (CREATION DATE = 10/27/82)

\- O N E W A Y -

VARIABLE MATHM6 GRADE 6 MATH MARK
BY VARIABLE GROUP

ANALYSIS OF VARIANCE

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	2	0.5617	0.2808	0.270	0.7641
WITHIN GROUPS	89	92.6010	1.0405		
TOTAL	91	93.1627			

```
CPU TIME REQUIRED..    0.29 SECONDS

            19 ONEWAY        GPA6 BY GROUP(1,3)/

 ***** ONEWAY PROBLEM REQUIRES      112 BYTES WORKSPACE *****
```

ONEWAY ANALYSES OF VARIANCE 11/07/82 PAGE 25

FILE SYSFILE (CREATION DATE = 10/27/82)

\- O N E W A Y -

VARIABLE GPA6 GRADE POINT AVERAGE AT END OF GRADE 6
BY VARIABLE GROUP

ANALYSIS OF VARIANCE

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	2	0.6903	0.3452	1.005	0.3702
WITHIN GROUPS	89	30.5713	0.3435		
TOTAL	91	31.2616			

```
CPU TIME REQUIRED..    0.16 SECONDS

                 20 ONEWAY         READRAW1 TO READRAW6 BY GROUP(1,3)/

 ***** ONEWAY PROBLEM REQUIRES      392 BYTES WORKSPACE *****
```

FILE SYSFILE (CREATION DATE = 10/27/82)

- O N E W A Y -

VARIABLE READRAW1 GRADE 1 READING RAW SCORE
BY VARIABLE GROUP

ANALYSIS OF VARIANCE

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	2	324.1497	162.0748	2.387	0.0979
WITHIN GROUPS	87	5906.2429	67.8878		
TOTAL	89	6230.3906			

FILE SYSFILE (CREATION DATE = 10/27/82)

- O N E W A Y -

VARIABLE READRAW2 GRADE 2 READING RAW SCORE
BY VARIABLE GROUP

ANALYSIS OF VARIANCE

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	2	429.8975	214.9488	3.338	0.0400
WITHIN GROUPS	88	5666.2383	64.3891		
TOTAL	90	6096.1328			

ONEWAY ANALYSES OF VARIANCE 11/07/82 PAGE 29

FILE SYSFILE (CREATION DATE = 10/27/82)

- O N E W A Y -

VARIABLE READRAW3 GRADE 3 READING RAW SCORE
BY VARIABLE GROUP

ANALYSIS OF VARIANCE

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	2	1310.5485	655.2742	6.051	0.0035
WITHIN GROUPS	87	9420.7473	108.2844		
TOTAL	89	10731.2930			

ONEWAY ANALYSES OF VARIANCE 11/07/82 PAGE 30

FILE SYSFILE (CREATION DATE = 10/27/82)

- O N E W A Y -

VARIABLE READRAW4 GRADE 4 READING RAW SCORE
BY VARIABLE GROUP

ANALYSIS OF VARIANCE

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	2	964.9846	482.4922	3.870	0.0245
WITHIN GROUPS	88	10972.1929	124.6840		
TOTAL	90	11937.1758			

ONEWAY ANALYSES OF VARIANCE 11/07/82 PAGE 31

FILE SYSFILE (CREATION DATE = 10/27/82)

- O N E W A Y -

VARIABLE READRAW5 GRADE 5 READING RAW SCORE
BY VARIABLE GROUP

ANALYSIS OF VARIANCE

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	2	177.6875	88.8437	1.082	0.3433
WITHIN GROUPS	88	7223.3352	82.0833		
TOTAL	90	7401.0195			

ONEWAY ANALYSES OF VARIANCE 11/07/82 PAGE 32

FILE SYSFILE (CREATION DATE = 10/27/82)

- O N E W A Y -

VARIABLE READRAW6 GRADE 6 READING RAW SCORE
BY VARIABLE GROUP

ANALYSIS OF VARIANCE

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	2	152.8231	76.4115	1.691	0.1902
WITHIN GROUPS	89	4021.2700	45.1828		
TOTAL	91	4174.0898			

CPU TIME REQUIRED.. 0.26 SECONDS

21 ONEWAY MATHRAW1 TO MATHRAW6 BY GROUP(1,3)/

***** ONEWAY PROBLEM REQUIRES 392 BYTES WORKSPACE *****

ONEWAY ANALYSES OF VARIANCE 11/07/82 PAGE 34

FILE SYSFILE (CREATION DATE = 10/27/82)

- O N E W A Y -

VARIABLE MATHRAW1 GRADE 1 MATH RAW SCORE
BY VARIABLE GROUP

ANALYSIS OF VARIANCE

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	2	1007.1615	503.5806	5.107	0.0080
WITHIN GROUPS	87	8579.2095	98.6116		
TOTAL	89	9586.3672			

FILE SYSFILE (CREATION DATE = 10/27/82)

- O N E W A Y -

VARIABLE MATHRAW2 GRADE 2 MATH RAW SCORE
BY VARIABLE GROUP

ANALYSIS OF VARIANCE

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	2	106.6756	53.3378	1.636	0.2007
WITHIN GROUPS	87	2836.6079	32.6047		
TOTAL	89	2943.2834			

ONEWAY ANALYSES OF VARIANCE 11/07/82 PAGE 36

FILE SYSFILE (CREATION DATE = 10/27/82)

- O N E W A Y -

VARIABLE MATHRAW3 GRADE 3 MATH RAW SCORE
BY VARIABLE GROUP

ANALYSIS OF VARIANCE

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	2	346.2240	173.1120	1.855	0.1626
WITHIN GROUPS	87	8120.0784	93.3342		
TOTAL	89	8466.3008			

ONEWAY ANALYSES OF VARIANCE 11/07/82 PAGE 37

FILE SYSFILE (CREATION DATE = 10/27/82)

- O N E W A Y -

VARIABLE MATHRAW4 GRADE 4 MATH RAW SCORE
BY VARIABLE GROUP

ANALYSIS OF VARIANCE

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	2	80.1370	40.0685	0.390	0.6779
WITHIN GROUPS	89	9133.5173	102.6238		
TOTAL	91	9213.6523			

FILE SYSFILE (CREATION DATE = 10/27/82)

- O N E W A Y -

VARIABLE MATHRAW5 GRADE 5 MATH RAW SCORE
BY VARIABLE GROUP

ANALYSIS OF VARIANCE

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	2	665.8422	332.9209	1.913	0.1537
WITHIN GROUPS	88	15312.8630	174.0098		
TOTAL	90	15978.7031			

ONEWAY ANALYSES OF VARIANCE 11/07/82 PAGE 39

FILE SYSFILE (CREATION DATE = 10/27/82)

- O N E W A Y -

VARIABLE MATHRAW6 GRADE 6 MATH RAW SCORE
BY VARIABLE GROUP

ANALYSIS OF VARIANCE

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	2	135.1056	67.5528	0.365	0.6955
WITHIN GROUPS	89	16490.5195	185.2867		
TOTAL	91	16625.6250			

```
CPU TIME REQUIRED..    0.26 SECONDS

                 22 ONEWAY         MEAPR4 MEAPM4 BY GROUP(1,3)/

 ***** ONEWAY PROBLEM REQUIRES      152 BYTES WORKSPACE *****
```

ONEWAY ANALYSES OF VARIANCE 11/07/82 PAGE 41

FILE SYSFILE (CREATION DATE = 10/27/82)

- O N E W A Y -

VARIABLE MEAPR4 GRADE 4 MEAP READING SCORE
BY VARIABLE GROUP

ANALYSIS OF VARIANCE

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	2	107.1082	53.5541	1.749	0.1800
WITHIN GROUPS	87	2663.5076	30.6150		
TOTAL	89	2770.6157			

ONEWAY ANALYSES OF VARIANCE 11/07/82 PAGE 42

FILE SYSFILE (CREATION DATE = 10/27/82)

- O N E W A Y -

VARIABLE MEAPM4 GRADE 4 MEAP MATH SCORE
BY VARIABLE GROUP

ANALYSIS OF VARIANCE

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	2	148.0802	74.0401	1.161	0.3180
WITHIN GROUPS	87	5549.0491	63.7822		
TOTAL	89	5697.1289			

```
CPU TIME REQUIRED..    0.17 SECONDS

              23 ONEWAY         MEAPR7 MEAPM7 BY GROUP(1,3)/

 ***** ONEWAY PROBLEM REQUIRES      152 BYTES WORKSPACE *****
```

ONEWAY ANALYSES OF VARIANCE . 11/07/82 PAGE 44

FILE SYSFILE (CREATION DATE = 10/27/82)

- O N E W A Y -

VARIABLE MEAPR7 GRADE 7 MEAP READING SCORE
BY VARIABLE GROUP

ANALYSIS OF VARIANCE

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	2	6.6995	3.3497	0.085	0.9186
WITHIN GROUPS	87	3427.7932	39.3999		
TOTAL	89	3434.4927			

ONEWAY ANALYSES OF VARIANCE 11/07/82 PAGE 45

FILE SYSFILE (CREATION DATE = 10/27/82)

- O N E W A Y -

VARIABLE MEAPM7 GRADE 7 MEAP MATH SCORE
BY VARIABLE GROUP

ANALYSIS OF VARIANCE

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	2	98.4902	49.2451	1.820	0.1681
WITHIN GROUPS	87	2353.5598	27.0524		
TOTAL	89	2452.0498			

```
ONEWAY ANALYSES OF VARIANCE                                   11/07/82      PAGE   46

CPU TIME REQUIRED..    0.19 SECONDS


               24 ONEWAY        NSERVCES BY GROUP(1,3)/

 ***** ONEWAY PROBLEM REQUIRES      112 BYTES WORKSPACE *****
```

ONEWAY ANALYSES OF VARIANCE 11/07/82 PAGE 47

FILE SYSFILE (CREATION DATE = 10/27/82)

- O N E W A Y -

VARIABLE NSERVCES NUMBER OF COMP ED SERVICES
BY VARIABLE GROUP

ANALYSIS OF VARIANCE

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	2	66.8313	33.4156	4.327	0.0161
WITHIN GROUPS	89	687.3748	7.7233		
TOTAL	91	754.2061			

```
CPU TIME REQUIRED..    0.15 SECONDS


                 25 FINISH

         NORMAL END OF JOB.
            25 CONTROL CARDS WERE PROCESSED.
             O ERRORS WERE DETECTED.
```

```
MTS/SPSS, VERSION H, RELEASE 9.1, FEBRUARY 1, 1982

                          CURRENT DOCUMENTATION FOR THE SPSS BATCH SYSTEM
ORDER FROM MCGRAW-HILL:  SPSS, 2ND ED. (PRINCIPAL TEXT)       ORDER FROM SPSS INC.:  SPSS STATISTICAL ALGORITHMS
                         SPSS UPDATE 7-9 (USE W/SPSS,2ND FOR REL. 7, 8, 9)           KEYWORDS: THE SPSS INC. NEWSLETTER
                         SPSS POCKET GUIDE, RELEASE 9
                         SPSS PRIMER (BRIEF INTRO TO SPSS)


DEFAULT SPACE ALLOCATION..     ALLOWS FOR..   102 TRANSFORMATIONS
WORKSPACE     71680 BYTES                     409 RECODE VALUES + LAG VARIABLES
TRANSPACE     10240 BYTES                    1641 IF/COMPUTE OPERATIONS

                  1 RUN NAME       SCHEFFE CONTRASTS
                  2 GET FILE       SYSFILE


                        FILE SYSFILE  HAS  69 VARIABLES

                        THE SUBFILES ARE..

                                   NO OF
                        NAME       CASES

                        SYSFILE       92


CPU TIME REQUIRED..    0.27 SECONDS


                  3 ONEWAY         READRAW2 TO READRAW4 BY GROUP(1,3)/
                  4                  RANGES=SCHEFFE(.05)/

 ***** ONEWAY PROBLEM REQUIRES      248 BYTES WORKSPACE *****
```

FILE SYSFILE (CREATION DATE = 10/27/82)

- O N E W A Y -

VARIABLE READRAW2 GRADE 2 READING RAW SCORE
BY VARIABLE GROUP

ANALYSIS OF VARIANCE

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	2	429.8975	214.9488	3.338	0.0400
WITHIN GROUPS	88	5666.2383	64.3891		
TOTAL	90	6096.1328			

FILE SYSFILE (CREATION DATE = 10/27/82)

- O N E W A Y -

```
     VARIABLE  READRAW2   GRADE 2 READING RAW SCORE
  BY VARIABLE  GROUP
```

MULTIPLE RANGE TEST

SCHEFFE PROCEDURE
RANGES FOR THE 0.050 LEVEL -

3.52 3.52

THE RANGES ABOVE ARE TABLE RANGES. THE VALUE ACTUALLY COMPARED WITH MEAN(J)-MEAN(I) IS..
5.6740 * RANGE * SQRT(1/N(I) + 1/N(J))

(*) DENOTES PAIRS OF GROUPS SIGNIFICANTLY DIFFERENT AT THE 0.050 LEVEL

MEAN	GROUP	GRP1	GRP3	GRP2
21.7428	GRP1			
23.5294	GRP3			
27.3636	GRP2	*		

SCHEFFE CONTRASTS 11/07/82 PAGE 4

FILE SYSFILE (CREATION DATE = 10/27/82)

\- O N E W A Y -

VARIABLE READRAW3 GRADE 3 READING RAW SCORE
BY VARIABLE GROUP

ANALYSIS OF VARIANCE

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	2	1310.5485	655.2742	6.051	0.0035
WITHIN GROUPS	87	9420.7473	108.2844		
TOTAL	89	10731.2930			

FILE SYSFILE (CREATION DATE = 10/27/82)

- O N E W A Y -

VARIABLE READRAW3 GRADE 3 READING RAW SCORE
BY VARIABLE GROUP

MULTIPLE RANGE TEST

SCHEFFE PROCEDURE
RANGES FOR THE 0.050 LEVEL -

3.52 3.52

THE RANGES ABOVE ARE TABLE RANGES. THE VALUE ACTUALLY COMPARED WITH MEAN(J)-MEAN(I) IS..
7.3581 * RANGE * SQRT(1/N(I) + 1/N(J))

(*) DENOTES PAIRS OF GROUPS SIGNIFICANTLY DIFFERENT AT THE 0.050 LEVEL

MEAN	GROUP	GRP 1	GRP 2	GRP 3
20.6000	GRP1			
27.2727	GRP2			
29.0000	GRP3	*		

FILE SYSFILE (CREATION DATE = 10/27/82)

- O N E W A Y -

VARIABLE READRAW4 GRADE 4 READING RAW SCORE
BY VARIABLE GROUP

ANALYSIS OF VARIANCE

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	2	964.9846	482.4922	3.870	0.0245
WITHIN GROUPS	88	10972.1929	124.6840		
TOTAL	90	11937.1758			

```
FILE   SYSFILE  (CREATION DATE = 10/27/82)

- - - - - - - - - - - - - - - - - - - - - - - - - - O N E W A Y - - - - - - - - - - - - - - - - - - - - - - - - - -

      VARIABLE  READRAW4   GRADE 4 READING RAW SCORE
   BY VARIABLE  GROUP

MULTIPLE RANGE TEST

SCHEFFE PROCEDURE
RANGES FOR THE 0.050 LEVEL -

           3.52  3.52

THE RANGES ABOVE ARE TABLE RANGES.  THE VALUE ACTUALLY COMPARED WITH MEAN(J)-MEAN(I) IS..
        7.8957 * RANGE * SQRT(1/N(I) + 1/N(J))

  (*) DENOTES PAIRS OF GROUPS SIGNIFICANTLY DIFFERENT AT THE 0.050 LEVEL

                         G G G
                         R R R
                         P P P
     MEAN       GROUP    1 2 3

    25.3428     GRP1
    29.6818     GRP2
    32.7941     GRP3     *
```

```
CPU TIME REQUIRED..    0.50 SECONDS

                  5 ONEWAY         MATHRAW1 BY GROUP(1,3)/
                  6                  RANGES=SCHEFFE(.05)/

 ***** ONEWAY PROBLEM REQUIRES      128 BYTES WORKSPACE *****
```

SCHEFFE CONTRASTS 11/07/82 PAGE 9

FILE SYSFILE (CREATION DATE = 10/27/82)

- O N E W A Y -

VARIABLE MATHRAW1 GRADE 1 MATH RAW SCORE
BY VARIABLE GROUP

ANALYSIS OF VARIANCE

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	2	1007.1615	503.5806	5.107	0.0080
WITHIN GROUPS	87	8579.2095	98.6116		
TOTAL	89	9586.3672			

FILE SYSFILE (CREATION DATE = 10/27/82)

- O N E W A Y -

```
      VARIABLE  MATHRAW1   GRADE 1 MATH RAW SCORE
   BY VARIABLE  GROUP
```

MULTIPLE RANGE TEST

SCHEFFE PROCEDURE
RANGES FOR THE 0.050 LEVEL -

3.52 3.52

THE RANGES ABOVE ARE TABLE RANGES. THE VALUE ACTUALLY COMPARED WITH MEAN(J)-MEAN(I) IS..
7.0218 * RANGE * SQRT(1/N(I) + 1/N(J))

(*) DENOTES PAIRS OF GROUPS SIGNIFICANTLY DIFFERENT AT THE 0.050 LEVEL

MEAN	GROUP	GRP 3	GRP 1	GRP 2
31.7576	GRP3			
38.3428	GRP1	*		
39.1818	GRP2	*		

```
CPU TIME REQUIRED..    0.23 SECONDS

                  7 ONEWAY         NSERVCES BY GROUP(1,3)/
                  8                  RANGES=SCHEFFE(.05)/

 ***** ONEWAY PROBLEM REQUIRES      128 BYTES WORKSPACE *****
```

FILE SYSFILE (CREATION DATE = 10/27/82)

- O N E W A Y -

VARIABLE NSERVCES NUMBER OF COMP ED SERVICES
BY VARIABLE GROUP

ANALYSIS OF VARIANCE

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	2	66.8313	33.4156	4.327	0.0161
WITHIN GROUPS	89	687.3748	7.7233		
TOTAL	91	754.2061			

FILE SYSFILE (CREATION DATE = 10/27/82)

- O N E W A Y -

```
     VARIABLE  NSERVCES   NUMBER OF COMP ED SERVICES
  BY VARIABLE  GROUP
```

MULTIPLE RANGE TEST

SCHEFFE PROCEDURE
RANGES FOR THE 0.050 LEVEL -

3.52 3.52

THE RANGES ABOVE ARE TABLE RANGES. THE VALUE ACTUALLY COMPARED WITH MEAN(J)-MEAN(I) IS..
1.9651 * RANGE * SQRT(1/N(I) + 1/N(J))

(*) DENOTES PAIRS OF GROUPS SIGNIFICANTLY DIFFERENT AT THE 0.050 LEVEL

MEAN	GROUP	GRP 2	GRP 3	GRP 1
4.4091	GRP2			
5.6571	GRP3			
6.6286	GRP1	*		

```
CPU TIME REQUIRED..    0.20 SECONDS


                 9 FINISH

         NORMAL END OF JOB.
             9 CONTROL CARDS WERE PROCESSED.
             0 ERRORS WERE DETECTED.
```

APPENDIX 4

CROSSTABULATIONS

```
SPSS BATCH SYSTEM                                                                        10/27/82       PAGE    1

MTS/SPSS, VERSION H, RELEASE 9.1, FEBRUARY 1, 1982

                               CURRENT DOCUMENTATION FOR THE SPSS BATCH SYSTEM
ORDER FROM MCGRAW-HILL:  SPSS, 2ND ED. (PRINCIPAL TEXT)      ORDER FROM SPSS INC.:  SPSS STATISTICAL ALGORITHMS
                         SPSS UPDATE 7-9 (USE W/SPSS,2ND FOR REL. 7, 8, 9)          KEYWORDS: THE SPSS INC. NEWSLETTER
                         SPSS POCKET GUIDE, RELEASE 9
                         SPSS PRIMER (BRIEF INTRO TO SPSS)


DEFAULT SPACE ALLOCATION..     ALLOWS FOR..    102 TRANSFORMATIONS
WORKSPACE     71680 BYTES                      409 RECODE VALUES + LAG VARIABLES
TRANSPACE     10240 BYTES                     1641 IF/COMPUTE OPERATIONS

                  1 RUN NAME       CROSSTABS OF SERVICES BY GROUP
                  2 GET FILE       SYSFILE


                        FILE SYSFILE  HAS  69 VARIABLES

                        THE SUBFILES ARE..

                                   NO OF
                        NAME       CASES

                        SYSFILE       92


CPU TIME REQUIRED..    0.27 SECONDS



                  3 CROSSTABS      VARIABLES=NSERVCES(0,12)
                  4                          GROUP(1,3)/
                  5                TABLES=NSERVCES BY GROUP
                  6 STATISTICS     1

 ***** "CROSSTABS" PROBLEM REQUIRES      156 BYTES WORKSPACE NOT INCLUDING VALUE LABELS *****

 ***** GIVEN WORKSPACE ALLOWS FOR  2980 LABELLED VALUES *****
```

FILE SYSFILE (CREATION DATE = 10/27/82)

* * * * * * * * * * * * * * * * * * C R O S S T A B U L A T I O N O F * * * * * * * * * * * * * * * * * *
NSERVCES NUMBER OF COMP ED SERVICES BY GROUP
* PAGE 1 OF 2

NSERVCES	COUNT / ROW PCT / COL PCT / TOT PCT	GROUP: REGULAR 1	PRESCHL ONLY 2	FOLLOW THROUGH 3	ROW TOTAL
0	COUNT	1	1	1	3
	ROW PCT	33.3	33.3	33.3	3.3
	COL PCT	2.9	4.5	2.9	
	TOT PCT	1.1	1.1	1.1	
1	COUNT	0	5	3	8
	ROW PCT	0.0	62.5	37.5	8.7
	COL PCT	0.0	22.7	8.6	
	TOT PCT	0.0	5.4	3.3	
2	COUNT	1	2	2	5
	ROW PCT	20.0	40.0	40.0	5.4
	COL PCT	2.9	9.1	5.7	
	TOT PCT	1.1	2.2	2.2	
3	COUNT	2	4	1	7
	ROW PCT	28.6	57.1	14.3	7.6
	COL PCT	5.7	18.2	2.9	
	TOT PCT	2.2	4.3	1.1	
4	COUNT	3	1	3	7
	ROW PCT	42.9	14.3	42.9	7.6
	COL PCT	8.6	4.5	8.6	
	TOT PCT	3.3	1.1	3.3	
5	COUNT	4	0	3	7
	ROW PCT	57.1	0.0	42.9	7.6
	COL PCT	11.4	0.0	8.6	
	TOT PCT	4.3	0.0	3.3	
6	COUNT	5	2	7	14
	ROW PCT	35.7	14.3	50.0	15.2
	COL PCT	14.3	9.1	20.0	
	TOT PCT	5.4	2.2	7.6	
COLUMN TOTAL		35	22	35	92
		38.0	23.9	38.0	100.0

(CONTINUED)

FILE SYSFILE (CREATION DATE = 10/27/82)

* * * * * * * * * * * * * * * * * * * C R O S S T A B U L A T I O N O F * * * * * * * * * * * * * * * * * * *
NSERVCES NUMBER OF COMP ED SERVICES BY GROUP
* PAGE 2 OF 2

NSERVCES	GROUP: COUNT / ROW PCT / COL PCT / TOT PCT	IREGULAR 1	PRESCHL ONLY 2	FOLLOW THROUGH 3	ROW TOTAL
7	COUNT	5	2	5	12
	ROW PCT	41.7	16.7	41.7	13.0
	COL PCT	14.3	9.1	14.3	
	TOT PCT	5.4	2.2	5.4	
8	COUNT	6	1	6	13
	ROW PCT	46.2	7.7	46.2	14.1
	COL PCT	17.1	4.5	17.1	
	TOT PCT	6.5	1.1	6.5	
9	COUNT	3	2	4	9
	ROW PCT	33.3	22.2	44.4	9.8
	COL PCT	8.6	9.1	11.4	
	TOT PCT	3.3	2.2	4.3	
10	COUNT	3	2	0	5
	ROW PCT	60.0	40.0	0.0	5.4
	COL PCT	8.6	9.1	0.0	
	TOT PCT	3.3	2.2	0.0	
11	COUNT	2	0	0	2
	ROW PCT	100.0	0.0	0.0	2.2
	COL PCT	5.7	0.0	0.0	
	TOT PCT	2.2	0.0	0.0	
	COLUMN TOTAL	35	22	35	92
		38.0	23.9	38.0	100.0

34 OUT OF 36 (94.4%) OF THE VALID CELLS HAVE EXPECTED CELL FREQUENCY LESS THAN 5.0.
MINIMUM EXPECTED CELL FREQUENCY = 0.478
RAW CHI SQUARE = 26.13495 WITH 22 DEGREES OF FREEDOM. SIGNIFICANCE = 0.2459

```
CPU TIME REQUIRED..    0.32 SECONDS


                  7 FINISH

         NORMAL END OF JOB.
             7 CONTROL CARDS WERE PROCESSED.
             0 ERRORS WERE DETECTED.
```

```
MTS/SPSS, VERSION H, RELEASE 9.1, FEBRUARY 1, 1982

                                  CURRENT DOCUMENTATION FOR THE SPSS BATCH SYSTEM
ORDER FROM MCGRAW-HILL:  SPSS, 2ND ED. (PRINCIPAL TEXT)        ORDER FROM SPSS INC.:  SPSS STATISTICAL ALGORITHMS
                         SPSS UPDATE 7-9 (USE W/SPSS,2ND FOR REL. 7, 8, 9)             KEYWORDS: THE SPSS INC. NEWSLETTER
                         SPSS POCKET GUIDE, RELEASE 9
                         SPSS PRIMER (BRIEF INTRO TO SPSS)


DEFAULT SPACE ALLOCATION..      ALLOWS FOR..   102 TRANSFORMATIONS
WORKSPACE     71680 BYTES                      409 RECODE VALUES + LAG VARIABLES
TRANSPACE     10240 BYTES                     1641 IF/COMPUTE OPERATIONS

                  1 RUN NAME       CROSSTABS OF SERVICES (TRICHOTOMIZED) BY GROUP
                  2 GET FILE       SYSFILE


                              FILE SYSFILE  HAS  69 VARIABLES

                              THE SUBFILES ARE..

                                         NO OF
                              NAME       CASES

                              SYSFILE       92


CPU TIME REQUIRED..    0.27 SECONDS


                  3 COMPUTE        XNSERVS=NSERVCES;
                  4 RECODE         XNSERVS (0 THRU 3=1)
                  5                        (4 THRU 7=2)
                  6                        (8 THRU HI=3)
                  7 VALUE LABELS   XNSERVS (1)LOW
                  8                        (2)MEDIUM
                  9                        (3)HIGH
                 10 CROSSTABS      VARIABLES=XNSERVS(1,3)
                 11                          GROUP(1,3)/
                 12                TABLES=XNSERVS BY GROUP
                 13 STATISTICS     1

 ***** "CROSSTABS" PROBLEM REQUIRES       36 BYTES WORKSPACE NOT INCLUDING VALUE LABELS *****

 ***** GIVEN WORKSPACE ALLOWS FOR  2985 LABELLED VALUES *****
```

FILE SYSFILE (CREATION DATE = 10/27/82)

* * * * * * * * * * * * * * * * * * C R O S S T A B U L A T I O N O F * * * * * * * * * * * * * * * * * *
XNSERVS BY GROUP
* PAGE 1 OF 1

XNSERVS	COUNT / ROW PCT / COL PCT / TOT PCT	GROUP IREGULAR 1	PRESCHL ONLY 2	FOLLOW THROUGH 3	ROW TOTAL
LOW	1	4	12	7	23
		17.4	52.2	30.4	25.0
		11.4	54.5	20.0	
		4.3	13.0	7.6	
MEDIUM	2	17	5	18	40
		42.5	12.5	45.0	43.5
		48.6	22.7	51.4	
		18.5	5.4	19.6	
HIGH	3	14	5	10	29
		48.3	17.2	34.5	31.5
		40.0	22.7	28.6	
		15.2	5.4	10.9	
	COLUMN TOTAL	35	22	35	92
		38.0	23.9	38.0	100.0

RAW CHI SQUARE = 14.94145 WITH 4 DEGREES OF FREEDOM. SIGNIFICANCE = 0.0048

```
TRANSPACE REQUIRED..      200 BYTES
      2 TRANSFORMATIONS
      4 RECODE VALUES + LAG VARIABLES
      2 IF/COMPUTE OPERATIONS

CPU TIME REQUIRED..    0.26 SECONDS


                 14 FINISH

         NORMAL END OF JOB.
            14 CONTROL CARDS WERE PROCESSED.
             0 ERRORS WERE DETECTED.
```

```
MTS/SPSS, VERSION H, RELEASE 9.1, FEBRUARY 1, 1982

                                          CURRENT DOCUMENTATION FOR THE SPSS BATCH SYSTEM
ORDER FROM MCGRAW-HILL:  SPSS, 2ND ED. (PRINCIPAL TEXT)        ORDER FROM SPSS INC.:  SPSS STATISTICAL ALGORITHMS
                         SPSS UPDATE 7-9 (USE W/SPSS,2ND FOR REL. 7, 8, 9)            KEYWORDS: THE SPSS INC. NEWSLETTER
                         SPSS POCKET GUIDE, RELEASE 9
                         SPSS PRIMER (BRIEF INTRO TO SPSS)


DEFAULT SPACE ALLOCATION..     ALLOWS FOR..    102 TRANSFORMATIONS
WORKSPACE      71680 BYTES                     409 RECODE VALUES + LAG VARIABLES
TRANSPACE      10240 BYTES                    1641 IF/COMPUTE OPERATIONS

                    1 RUN NAME       TREND ANALYSIS OF NUMBER OF COMP ED SERVICES
                    2 GET FILE       SYSFILE


                              FILE SYSFILE  HAS  69 VARIABLES

                              THE SUBFILES ARE..

                                           NO OF
                              NAME         CASES

                              SYSFILE         92


CPU TIME REQUIRED..    0.28 SECONDS


                    3 COMPUTE        SUMK=0
                    4 COMPUTE        SUM1=0
                    5 COMPUTE        SUM2=0
                    6 COMPUTE        SUM3=0
                    7 COMPUTE        SUM4=0
                    8 COMPUTE        SUM5=0
                    9 COMPUTE        SUM6=0
                   10 DO REPEAT      X=ART3K, ART31 TO ART36/
                   11                Y=TITL1K, TITL11 TO TITL16/
                   12                SUM=SUMK, SUM1 TO SUM6/
                   13 COMPUTE        SUM=X+Y
                   14 END REPEAT


                   15 CROSSTABS      VARIABLES=SUMK, SUM1 TO SUM6 (0,2)
                   16                          GROUP (1,3)/
                   17                TABLES=SUMK, SUM1 TO SUM6 BY GROUP

 ***** "CROSSTABS" PROBLEM REQUIRES      252 BYTES WORKSPACE NOT INCLUDING VALUE LABELS *****
```

***** GIVEN WORKSPACE ALLOWS FOR 2976 LABELLED VALUES *****

```
TREND ANALYSIS OF NUMBER OF COMP ED SERVICES                                          10/27/82        PAGE    3

FILE    SYSFILE  (CREATION DATE = 10/27/82)

* * * * * * * * * * * * * * * * * * *   C R O S S T A B U L A T I O N   O F   * * * * * * * * * * * * * * * * * *
    SUMK                                                                BY  GROUP
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *  PAGE  1 OF  1

                      GROUP
              COUNT  I
            ROW PCT  IREGULAR   PRESCHL   FOLLOW     ROW
            COL PCT  I          ONLY      THROUGH    TOTAL
            TOT PCT  I      1  I      2  I      3  I
SUMK        --------I--------I--------I--------I
                   0  I     25  I     20  I     32  I     77
                      I   32.5  I   26.0  I   41.6  I   83.7
                      I   71.4  I   90.9  I   91.4  I
                      I   27.2  I   21.7  I   34.8  I
                     -I--------I--------I--------I
                   1  I     10  I      2  I      3  I     15
                      I   66.7  I   13.3  I   20.0  I   16.3
                      I   28.6  I    9.1  I    8.6  I
                      I   10.9  I    2.2  I    3.3  I
                     -I--------I--------I--------I
             COLUMN        35        22        35         92
              TOTAL      38.0      23.9      38.0      100.0
```

```
TREND ANALYSIS OF NUMBER OF COMP ED SERVICES                              10/27/82         PAGE    4

FILE    SYSFILE  (CREATION DATE = 10/27/82)

* * * * * * * * * * * * * * * * * * *   C R O S S T A B U L A T I O N   O F   * * * * * * * * * * * * * * * * * *
    SUM1                                                       BY  GROUP
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *  PAGE  1 OF  1

                    GROUP
           COUNT  I
          ROW PCT IREGULAR  PRESCHL  FOLLOW     ROW
          COL PCT I         ONLY     THROUGH   TOTAL
          TOT PCT I      1 I      2 I      3 I
SUM1      --------I--------I--------I--------I
                0 I    17  I     9  I    14  I    40
                  I  42.5  I  22.5  I  35.0  I  43.5
                  I  48.6  I  40.9  I  40.0  I
                  I  18.5  I   9.8  I  15.2  I
                 -I--------I--------I--------I
                1 I    15  I    10  I    15  I    40
                  I  37.5  I  25.0  I  37.5  I  43.5
                  I  42.9  I  45.5  I  42.9  I
                  I  16.3  I  10.9  I  16.3  I
                 -I--------I--------I--------I
                2 I     3  I     3  I     6  I    12
                  I  25.0  I  25.0  I  50.0  I  13.0
                  I   8.6  I  13.6  I  17.1  I
                  I   3.3  I   3.3  I   6.5  I
                 -I--------I--------I--------I
          COLUMN       35       22       35       92
           TOTAL     38.0     23.9     38.0    100.0
```

TREND ANALYSIS OF NUMBER OF COMP ED SERVICES 10/27/82 PAGE 5

FILE SYSFILE (CREATION DATE = 10/27/82)

* * * * * * * * * * * * * * * * * * C R O S S T A B U L A T I O N O F * * * * * * * * * * * * * * * * * *
SUM2 BY GROUP
* PAGE 1 OF 1

SUM2	COUNT / ROW PCT / COL PCT / TOT PCT	GROUP: REGULAR 1	PRESCHL ONLY 2	FOLLOW THROUGH 3	ROW TOTAL
0	COUNT	8	16	15	39
	ROW PCT	20.5	41.0	38.5	42.4
	COL PCT	22.9	72.7	42.9	
	TOT PCT	8.7	17.4	16.3	
1	COUNT	12	3	8	23
	ROW PCT	52.2	13.0	34.8	25.0
	COL PCT	34.3	13.6	22.9	
	TOT PCT	13.0	3.3	8.7	
2	COUNT	15	3	12	30
	ROW PCT	50.0	10.0	40.0	32.6
	COL PCT	42.9	13.6	34.3	
	TOT PCT	16.3	3.3	13.0	
COLUMN TOTAL		35	22	35	92
		38.0	23.9	38.0	100.0

TREND ANALYSIS OF NUMBER OF COMP ED SERVICES 10/27/82 PAGE 6

FILE SYSFILE (CREATION DATE = 10/27/82)

* * * * * * * * * * C R O S S T A B U L A T I O N O F * * * * * * * * * *
SUM3 BY GROUP
* PAGE 1 OF 1

SUM3 (COUNT / ROW PCT / COL PCT / TOT PCT)	GROUP: REGULAR 1	PRESCHL ONLY 2	FOLLOW THROUGH 3	ROW TOTAL
0	12	10	11	33
	36.4	30.3	33.3	35.9
	34.3	45.5	31.4	
	13.0	10.9	12.0	
1	4	6	14	24
	16.7	25.0	58.3	26.1
	11.4	27.3	40.0	
	4.3	6.5	15.2	
2	19	6	10	35
	54.3	17.1	28.6	38.0
	54.3	27.3	28.6	
	20.7	6.5	10.9	
COLUMN TOTAL	35	22	35	92
	38.0	23.9	38.0	100.0

FILE SYSFILE (CREATION DATE = 10/27/82)

```
* * * * * * * * * * * * * * * * * * *   C R O S S T A B U L A T I O N   O F   * * * * * * * * * * * * * * * * * * *
    SUM4                                                        BY  GROUP
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *  PAGE  1 OF  1

                       GROUP
                COUNT  I
              ROW PCT  IREGULAR  PRESCHL  FOLLOW      ROW
              COL PCT  I         ONLY     THROUGH    TOTAL
              TOT PCT  I      1  I     2  I     3  I
SUM4          ---------I---------I--------I--------I
                    0  I      9  I    11  I    15  I     35
                       I   25.7  I  31.4  I  42.9  I   38.0
                       I   25.7  I  50.0  I  42.9  I
                       I    9.8  I  12.0  I  16.3  I
                      -I---------I--------I--------I
                    1  I      8  I     4  I     7  I     19
                       I   42.1  I  21.1  I  36.8  I   20.7
                       I   22.9  I  18.2  I  20.0  I
                       I    8.7  I   4.3  I   7.6  I
                      -I---------I--------I--------I
                    2  I     18  I     7  I    13  I     38
                       I   47.4  I  18.4  I  34.2  I   41.3
                       I   51.4  I  31.8  I  37.1  I
                       I   19.6  I   7.6  I  14.1  I
                      -I---------I--------I--------I
               COLUMN        35       22       35        92
                TOTAL      38.0     23.9     38.0     100.0
```

```
TREND ANALYSIS OF NUMBER OF COMP ED SERVICES                                    10/27/82        PAGE    8

FILE    SYSFILE  (CREATION DATE = 10/27/82)

* * * * * * * * * * * * * * * * * *   C R O S S T A B U L A T I O N   O F   * * * * * * * * * * * * * * * * * *
    SUM5                                                         BY  GROUP
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *  PAGE  1 OF  1

                     GROUP
             COUNT  I
           ROW PCT  IREGULAR  PRESCHL  FOLLOW     ROW
           COL PCT  I         ONLY     THROUGH    TOTAL
           TOT PCT  I      1  I     2  I     3  I
SUM5       ---------I---------I--------I--------I
                 0  I      6  I    12  I    14  I     32
                    I   18.8  I  37.5  I  43.8  I   34.8
                    I   17.1  I  54.5  I  40.0  I
                    I    6.5  I  13.0  I  15.2  I
                   -I---------I--------I--------I
                 1  I     12  I     2  I    13  I     27
                    I   44.4  I   7.4  I  48.1  I   29.3
                    I   34.3  I   9.1  I  37.1  I
                    I   13.0  I   2.2  I  14.1  I
                   -I---------I--------I--------I
                 2  I     17  I     8  I     8  I     33
                    I   51.5  I  24.2  I  24.2  I   35.9
                    I   48.6  I  36.4  I  22.9  I
                    I   18.5  I   8.7  I   8.7  I
                   -I---------I--------I--------I
            COLUMN        35       22       35        92
             TOTAL      38.0     23.9     38.0     100.0
```

TREND ANALYSIS OF NUMBER OF COMP ED SERVICES 10/27/82 PAGE 9

FILE SYSFILE (CREATION DATE = 10/27/82)

* * * C R O S S T A B U L A T I O N O F * * *
SUMG BY GROUP
PAGE 1 OF 1

SUMG (COUNT / ROW PCT / COL PCT / TOT PCT)	GROUP: IREGULAR 1	PRESCHL ONLY 2	FOLLOW THROUGH 3	ROW TOTAL
0	19	11	5	35
	54.3	31.4	14.3	38.0
	54.3	50.0	14.3	
	20.7	12.0	5.4	
1	5	6	20	31
	16.1	19.4	64.5	33.7
	14.3	27.3	57.1	
	5.4	6.5	21.7	
2	11	5	10	26
	42.3	19.2	38.5	28.3
	31.4	22.7	28.6	
	12.0	5.4	10.9	
COLUMN TOTAL	35	22	35	92
	38.0	23.9	38.0	100.0

```
TRANSPACE REQUIRED..      1400 BYTES
     14 TRANSFORMATIONS
      0 RECODE VALUES + LAG VARIABLES
     35 IF/COMPUTE OPERATIONS

CPU TIME REQUIRED..     0.53 SECONDS


                 18 FINISH

         NORMAL END OF JOB.
            18 CONTROL CARDS WERE PROCESSED.
             0 ERRORS WERE DETECTED.
```

APPENDIX 5

REGRESSION ANALYSES

```
MTS/SPSS, VERSION H, RELEASE 9.1, FEBRUARY 1, 1982

                                      CURRENT DOCUMENTATION FOR THE SPSS BATCH SYSTEM
ORDER FROM MCGRAW-HILL:  SPSS, 2ND ED. (PRINCIPAL TEXT)       ORDER FROM SPSS INC.:  SPSS STATISTICAL ALGORITHMS
                         SPSS UPDATE 7-9 (USE W/SPSS,2ND FOR REL. 7, 8, 9)           KEYWORDS: THE SPSS INC. NEWSLETTER
                         SPSS POCKET GUIDE, RELEASE 9
                         SPSS PRIMER (BRIEF INTRO TO SPSS)


DEFAULT SPACE ALLOCATION..     ALLOWS FOR..    102 TRANSFORMATIONS
WORKSPACE      71680 BYTES                     409 RECODE VALUES + LAG VARIABLES
TRANSPACE      10240 BYTES                    1641 IF/COMPUTE OPERATIONS

                    RUN NAME        REGRESSION ANALYSES
                    GET FILE        SYSFILE


                              FILE SYSFILE  HAS  69 VARIABLES

                              THE SUBFILES ARE..

                                         NO OF
                              NAME       CASES

                              SYSFILE       92


CPU TIME REQUIRED..    0.26 SECONDS


                    COUNT           DIVISOR3=READM1 TO READM3
                                             MATHM1 TO MATHM3(0,1,2,3,4)
                    COMPUTE         SUM3=READM1+READM2+READM3+
                                         MATHM1+MATHM2+MATHM3
                    COMPUTE         GPA3=SUM3/DIVISOR3
                    COUNT           DIVISOR6=READM1 TO READM6
                                             MATHM1 TO MATHM6(0,1,2,3,4)
                    COMPUTE         SUM6=READM1+READM2+READM3+
                                         READM4+READM5+READM6+
                                         MATHM1+MATHM2+MATHM3+
                                         MATHM4+MATHM5+MATHM6
                    COMPUTE         GPA6=SUM6/DIVISOR6
                    VAR LABELS      GPA3 GRADE POINT AVERAGE AT END OF GRADE 3/
                                    GPA6 GRADE POINT AVERAGE AT END OF GRADE 6/
                    REGRESSION      VARIABLES=MEAPR4 MEAPM4 MEAPR7 MEAPM7
                                              READRAW3 READRAW6
                                              MATHRAW3 MATHRAW6
                                              GPA3 GPA6/
                                    REGRESSION=MEAPR4 WITH READRAW3 MATHRAW3 GPA3(1)
                                               RESID=0/
                                    REGRESSION=MEAPM4 WITH READRAW3 MATHRAW3 GPA3(1)
```

```
                     24                    RESID=0/
                     25       REGRESSION=MEAPR7 WITH READRAW6 MATHRAW6 GPA6(1)
                     26                    RESID=0/
                     27       REGRESSION=MEAPM7 WITH READRAW6 MATHRAW6 GPA6(1)
                     28                    RESID=0/
                     29 STATISTICS   1,2

NO RESIDUALS OUTPUT WAS REQUESTED SO RESIDUALS WILL NOT BE CALCULATED.  SEE MANUAL RE OPTIONS 11,12  AND STATISTICS 4,5,6.

NO RESIDUALS OUTPUT WAS REQUESTED SO RESIDUALS WILL NOT BE CALCULATED.  SEE MANUAL RE OPTIONS 11,12  AND STATISTICS 4,5,6.

NO RESIDUALS OUTPUT WAS REQUESTED SO RESIDUALS WILL NOT BE CALCULATED.  SEE MANUAL RE OPTIONS 11,12  AND STATISTICS 4,5,6.

NO RESIDUALS OUTPUT WAS REQUESTED SO RESIDUALS WILL NOT BE CALCULATED.  SEE MANUAL RE OPTIONS 11,12  AND STATISTICS 4,5,6.

 ***** REGRESSION PROBLEM REQUIRES   1760 BYTES WORKSPACE, NOT INCLUDING RESIDUALS *****
```

SPSS NOW CONTAINS A NEW REGRESSION PROCEDURE.
SEE CHAPTER 3, PAGES 94-121 OF THE SPSS RELEASE 7-9 UPDATE MANUAL.
NEW REGRESSION WILL REPLACE THIS (OLD) REGRESSION PROCEDURE IN THE NEXT RELEASE.

NEW REGRESSION CONTAINS MANY NEW FEATURES, INCLUDING

- TRUE STEPWISE SELECTION
- BACKWARD EXCLUSION
- REGRESSION THROUGH THE ORIGIN
- MEAN SUBSTITUTION OFMISSING DATA
- INTERNAL SELECTION FOR CROSS-VALIDATION
- MANY TYPES OF RESIDUALS, PREDICTED VALUES, AND DISTANCE MEASURES
- HISTOGRAMS, NORMAL PROBABILITY PLOTS AND OUTLIER TABLES OF RESIDUALS

THE SYNTAX OF NEW REGRESSION DIFFERS FROM (OLD) REGRESSION. MOST NOTABLY, ALL
OPTIONS AND STATISTICS ARE REQUESTED VIA KEYWORDS ON THE NEW REGRESSION CONTROL CARD.
KEYWORDS IN NEW REGRESSION MAY BE ABBREVIATED TO THE FIRST THREE CHARACTERS (OR USE
MORE FOR READABILITY). EQUALS SIGNS (=) ARE OPTIONAL.
HERE ARE EXAMPLES SHOWING COMPARABLE REQUESTS FROM (OLD) REGRESSION AND NEW REGRESSION:

```
                  OLD                           I                    NEW
                                                I
REGRESSION     VARIABLES = A TO E/              I   NEW REGRESSION  VARIABLES = A TO E/
               REGRESSION = A WITH B,C(2) D,E(1)/ I                 DEPENDENT = A/ENTER B,C/FORWARD D,E/
                                                I
                                                I SAME REQUEST, ABBREVIATED FORM:
                                                I   NEW REGRESSION  VAR A TO E/
                                                I                   DEP A/ENT B,C/FOR D,E/
                                                I
------------------------------------------------I------------------------------------------------------
                                                I
REGRESSION     VARIABLES = A, C, E TO P, R, T TO Z/ I NEW REGRESSION  VAR = A, C, E TO P, R, T TO Z/
               REGRESSION = A (999,3.84,.2)     I                   CRITERIA =  FIN(3.84) TOLERANCE(.2)/
                              WITH C TO Z/      I                   DEP = A/STEPWISE/
                                                I
                                                I (THE USER HAS SPECIFIED TRUE STEPWISE IN NEW REGRESSION.)
                                                I
------------------------------------------------I------------------------------------------------------
                                                I
REGRESSION     VARIABLES = A TO E/              I   NEW REGRESSION  VARIABLES = A TO E/MISSING = PAIRWISE/
               REGRESSION = A WITH B TO E RESIDS=0/ I               DESCRIPTIVE = MEAN STDDEV COR/
OPTIONS        2,11,12                          I                   DEP '= A/STEPWISE/
STATISTICS     1,2,4,5,6                        I                   RESIDUALS/CASEWISE = ALL/
                                                I                   SCATTER = (*RESID,*PRED)/SAVE = RESID PRED/
                                                I
                                                I DEFAULT CASEWISE PLOT IS OF OUTLIERS ONLY:  CASEWISE/
                                                I SCATTERPLOTS OF ANY VAR IN EQUATION:  SCATTER = (A,*RESID)/
```

FILE SYSFILE (CREATION DATE = 10/27/82)

VARIABLE	MEAN	STANDARD DEV	CASES
MEAPR4	9.6782	5.6208	87
MEAPM4	21.7241	8.1307	87
MEAPR7	14.3333	6.1770	87
MEAPM7	17.7701	5.2776	87
READRAW3	25.6207	11.0245	87
READRAW6	20.7356	6.9004	87
MATHRAW3	24.6322	9.8147	87
MATHRAW6	39.6437	13.6518	87
GPA3	2.3602	0.6786	87
GPA6	2.2749	0.5972	87

FILE SYSFILE (CREATION DATE = 10/27/82)

CORRELATION COEFFICIENTS

A VALUE OF 99.00000 IS PRINTED
IF A COEFFICIENT CANNOT BE COMPUTED.

	MEAPR4	MEAPM4	MEAPR7	MEAPM7	READRAW3	READRAW6	MATHRAW3	MATHRAW6	GPA3	GPA6
MEAPR4	1.00000	0.70027	0.64482	0.44669	0.54557	0.62946	0.55829	0.44082	0.56474	0.64157
MEAPM4	0.70027	1.00000	0.56770	0.55509	0.43741	0.58521	0.54440	0.49104	0.55807	0.60772
MEAPR7	0.64482	0.56770	1.00000	0.56130	0.36438	0.68683	0.47502	0.49590	0.51242	0.62976
MEAPM7	0.44669	0.55509	0.56130	1.00000	0.23730	0.41211	0.53823	0.56145	0.59534	0.61583
READRAW3	0.54557	0.43741	0.36438	0.23730	1.00000	0.47067	0.52817	0.25150	0.52904	0.54604
READRAW6	0.62946	0.58521	0.68683	0.41211	0.47067	1.00000	0.50143	0.52211	0.51307	0.61819
MATHRAW3	0.55829	0.54440	0.47502	0.53823	0.52817	0.50143	1.00000	0.50114	0.52030	0.57560
MATHRAW6	0.44082	0.49104	0.49590	0.56145	0.25150	0.52211	0.50114	1.00000	0.41963	0.54417
GPA3	0.56474	0.55807	0.51242	0.59534	0.52904	0.51307	0.52030	0.41963	1.00000	0.90218
GPA6	0.64157	0.60772	0.62976	0.61583	0.54604	0.61819	0.57560	0.54417	0.90218	1.00000

FILE SYSFILE (CREATION DATE = 10/27/82)

* M U L T I P L E R E G R E S S I O N * * * * * * * * * * * * * VARIABLE LIST 1
REGRESSION LIST 1

DEPENDENT VARIABLE.. MEAPR4 GRADE 4 MEAP READING SCORE

VARIABLE(S) ENTERED ON STEP NUMBER 1.. GPA3 GRADE POINT AVERAGE AT END OF GRADE 3

		ANALYSIS OF VARIANCE	DF	SUM OF SQUARES	MEAN SQUARE	F	P
MULTIPLE R	0.56474	REGRESSION	1.	866.52449	866.52449	39.80330	0.0000
R SQUARE	0.31893	RESIDUAL	85.	1850.46402	21.77016		
ADJUSTED R SQUARE	0.31092						
STANDARD ERROR	4.66585						

----------------- VARIABLES IN THE EQUATION ------------------

VARIABLE	B	BETA	STD ERROR B	F
GPA3	4.677571	0.56474	0.74141	39.803
(CONSTANT)	-1.361621			

------------- VARIABLES NOT IN THE EQUATION -------------

VARIABLE	BETA IN	PARTIAL	TOLERANCE	F
READRAW3	0.34272	0.35241	0.72011	11.911
MATHRAW3	0.36263	0.37524	0.72928	13.766

* *

VARIABLE(S) ENTERED ON STEP NUMBER 2.. MATHRAW3 GRADE 3 MATH RAW SCORE

		ANALYSIS OF VARIANCE	DF	SUM OF SQUARES	MEAN SQUARE	F	P
MULTIPLE R	0.64407	REGRESSION	2.	1127.08507	563.54254	29.77387	0.0000
R SQUARE	0.41483	RESIDUAL	84.	1589.90343	18.92742		
ADJUSTED R SQUARE	0.40090						
STANDARD ERROR	4.35057						

----------------- VARIABLES IN THE EQUATION ------------------

VARIABLE	B	BETA	STD ERROR B	F
GPA3	3.114811	0.37606	0.80952	14.805
MATHRAW3	0.2076729	0.36263	0.05597	13.766
(CONSTANT)	-2.788705			

------------- VARIABLES NOT IN THE EQUATION -------------

VARIABLE	BETA IN	PARTIAL	TOLERANCE	F
READRAW3	0.24523	0.25493	0.63241	5.769

FILE SYSFILE (CREATION DATE = 10/27/82)

* M U L T I P L E R E G R E S S I O N * * * * * * * * * * * * * VARIABLE LIST 1
REGRESSION LIST 1

DEPENDENT VARIABLE.. MEAPR4 GRADE 4 MEAP READING SCORE

VARIABLE(S) ENTERED ON STEP NUMBER 3.. READRAW3 GRADE 3 READING RAW SCORE

MULTIPLE R	0.67295	ANALYSIS OF VARIANCE	DF	SUM OF SQUARES	MEAN SQUARE	F	P
R SQUARE	0.45286	REGRESSION	3.	1230.41553	410.13851	22.89931	0.0000
ADJUSTED R SQUARE	0.43308	RESIDUAL	83.	1486.57298	17.91052		
STANDARD ERROR	4.23208						

------------------ VARIABLES IN THE EQUATION ------------------

VARIABLE	B	BETA	STD ERROR B	F
GPA3	2.406733	0.29057	0.84084	8.193
MATHRAW3	0.1589696	0.27759	0.05810	7.486
READRAW3	0.1250277	0.24523	0.05205	5.769
(CONSTANT)	-3.121162			

------------- VARIABLES NOT IN THE EQUATION -------------

VARIABLE	BETA IN	PARTIAL	TOLERANCE	F

MAXIMUM STEP REACHED

STATISTICS WHICH CANNOT BE COMPUTED ARE PRINTED AS ALL NINES.

FILE SYSFILE (CREATION DATE = 10/27/82)

* M U L T I P L E   R E G R E S S I O N * * * * * * * * * * * * * VARIABLE LIST 1
REGRESSION LIST 1

DEPENDENT VARIABLE.. MEAPR4 GRADE 4 MEAP READING SCORE

SUMMARY TABLE

VARIABLE		MULTIPLE R	R SQUARE	RSQ CHANGE	SIMPLE R	B	BETA
GPA3	GRADE POINT AVERAGE AT END OF GRADE 3	0.56474	0.31893	0.31893	0.56474	2.406733	0.29057
MATHRAW3	GRADE 3 MATH RAW SCORE	0.64407	0.41483	0.09590	0.55829	0.1589696	0.27759
READRAW3	GRADE 3 READING RAW SCORE	0.67295	0.45286	0.03803	0.54557	0.1250277	0.24523
(CONSTANT)						-3.121162	

FILE SYSFILE (CREATION DATE = 10/27/82)

* M U L T I P L E R E G R E S S I O N * * * * * * * * * * * * * * VARIABLE LIST 1
REGRESSION LIST 2

DEPENDENT VARIABLE.. MEAPM4 GRADE 4 MEAP MATH SCORE

VARIABLE(S) ENTERED ON STEP NUMBER 1.. GPA3 GRADE POINT AVERAGE AT END OF GRADE 3

MULTIPLE R	0.55807	ANALYSIS OF VARIANCE	DF	SUM OF SQUARES	MEAN SQUARE	F	P
R SQUARE	0.31144	REGRESSION	1.	1770.63817	1770.63817	38.44552	0.0000
ADJUSTED R SQUARE	0.30334	RESIDUAL	85.	3914.74114	46.05578		
STANDARD ERROR	6.78644						

----------------- VARIABLES IN THE EQUATION ------------------

VARIABLE	B	BETA	STD ERROR B	F
GPA3	6.686439	0.55807	1.07838	38.446
(CONSTANT)	5.943121			

------------- VARIABLES NOT IN THE EQUATION --------------

VARIABLE	BETA IN	PARTIAL	TOLERANCE	F
READRAW3	0.19742	0.20189	0.72011	3.569
MATHRAW3	0.34834	0.35849	0.72928	12.388

* *

VARIABLE(S) ENTERED ON STEP NUMBER 2.. MATHRAW3 GRADE 3 MATH RAW SCORE

MULTIPLE R	0.63240	ANALYSIS OF VARIANCE	DF	SUM OF SQUARES	MEAN SQUARE	F	P
R SQUARE	0.39993	REGRESSION	2.	2273.75435	1136.87718	27.99185	0.0000
ADJUSTED R SQUARE	0.38564	RESIDUAL	84.	3411.62496	40.61458		
STANDARD ERROR	6.37296						

----------------- VARIABLES IN THE EQUATION ------------------

VARIABLE	B	BETA	STD ERROR B	F
GPA3	4.514877	0.37682	1.18583	14.496
MATHRAW3	0.2885756	0.34834	0.08199	12.388
(CONSTANT)	3.960091			

------------- VARIABLES NOT IN THE EQUATION --------------

VARIABLE	BETA IN	PARTIAL	TOLERANCE	F
READRAW3	0.08549	0.08777	0.63241	0.644

FILE SYSFILE (CREATION DATE = 10/27/82)

* M U L T I P L E R E G R E S S I O N * * * * * * * * * * * * * VARIABLE LIST 1
REGRESSION LIST 2

DEPENDENT VARIABLE.. MEAPM4 GRADE 4 MEAP MATH SCORE

VARIABLE(S) ENTERED ON STEP NUMBER 3.. READRAW3 GRADE 3 READING RAW SCORE

MULTIPLE R	0.63604	ANALYSIS OF VARIANCE	DF	SUM OF SQUARES	MEAN SQUARE	F	P
R SQUARE	0.40455	REGRESSION	3.	2300.03402	766.67801	18.79698	0.0000
ADJUSTED R SQUARE	0.38303	RESIDUAL	83.	3385.34529	40.78729		
STANDARD ERROR	6.38649						

----------------- VARIABLES IN THE EQUATION ------------------

VARIABLE	B	BETA	STD ERROR B	F
GPA3	4.157788	0.34702	1.26889	10.737
MATHRAW3	0.2640141	0.31869	0.08768	9.067
READRAW3	0.6305243E-01	0.08549	0.07855	0.644
(CONSTANT)	3.792430			

------------- VARIABLES NOT IN THE EQUATION -------------

VARIABLE	BETA IN	PARTIAL	TOLERANCE	F

MAXIMUM STEP REACHED

STATISTICS WHICH CANNOT BE COMPUTED ARE PRINTED AS ALL NINES.

FILE SYSFILE (CREATION DATE = 10/27/82)

* M U L T I P L E   R E G R E S S I O N * * * * * * * * * * * * * * VARIABLE LIST 1
REGRESSION LIST 2

DEPENDENT VARIABLE.. MEAPM4 GRADE 4 MEAP MATH SCORE

SUMMARY TABLE

VARIABLE		MULTIPLE R	R SQUARE	RSQ CHANGE	SIMPLE R	B	BETA
GPA3	GRADE POINT AVERAGE AT END OF GRADE 3	0.55807	0.31144	0.31144	0.55807	4.157788	0.34702
MATHRAW3	GRADE 3 MATH RAW SCORE	0.63240	0.39993	0.08849	0.54440	0.2640141	0.31869
READRAW3	GRADE 3 READING RAW SCORE	0.63604	0.40455	0.00462	0.43741	0.6305243E-01	0.08549
(CONSTANT)						3.792430	

FILE SYSFILE (CREATION DATE = 10/27/82)

* M U L T I P L E R E G R E S S I O N * * * * * * * * * * * * * VARIABLE LIST 1
REGRESSION LIST 3

DEPENDENT VARIABLE.. MEAPR7 GRADE 7 MEAP READING SCORE

VARIABLE(S) ENTERED ON STEP NUMBER 1.. READRAW6 GRADE 6 READING RAW SCORE

		ANALYSIS OF VARIANCE	DF	SUM OF SQUARES	MEAN SQUARE	F	P
MULTIPLE R	0.68683	REGRESSION	1.	1547.92918	1547.92918	75.90496	0.0000
R SQUARE	0.47174	RESIDUAL	85.	1733.40415	20.39299		
ADJUSTED R SQUARE	0.46552						
STANDARD ERROR	4.51586						

------------------ VARIABLES IN THE EQUATION ------------------

VARIABLE	B	BETA	STD ERROR B	F
READRAW6	0.6148269	0.68683	0.07057	75.905
(CONSTANT)	1.584509			

------------- VARIABLES NOT IN THE EQUATION -------------

VARIABLE	BETA IN	PARTIAL	TOLERANCE	F
MATHRAW6	0.18876	0.22150	0.72741	4.334
GPA6	0.33208	0.35913	0.61784	12.438

* *

VARIABLE(S) ENTERED ON STEP NUMBER 2.. GPA6 GRADE POINT AVERAGE AT END OF GRADE 6

		ANALYSIS OF VARIANCE	DF	SUM OF SQUARES	MEAN SQUARE	F	P
MULTIPLE R	0.73476	REGRESSION	2.	1771.49595	885.74798	49.27870	0.0
R SQUARE	0.53987	RESIDUAL	84.	1509.83738	17.97425		
ADJUSTED R SQUARE	0.52892						
STANDARD ERROR	4.23961						

------------------ VARIABLES IN THE EQUATION ------------------

VARIABLE	B	BETA	STD ERROR B	F
READRAW6	0.4310617	0.48155	0.08429	26.155
GPA6	3.434948	0.33208	0.97396	12.438
(CONSTANT)	-2.419180			

------------- VARIABLES NOT IN THE EQUATION -------------

VARIABLE	BETA IN	PARTIAL	TOLERANCE	F
MATHRAW6	0.09841	0.11679	0.64806	1.148

FILE SYSFILE (CREATION DATE = 10/27/82)

* M U L T I P L E   R E G R E S S I O N * * * * * * * * * * * * * * VARIABLE LIST 1
REGRESSION LIST 3

DEPENDENT VARIABLE.. MEAPR7 GRADE 7 MEAP READING SCORE

VARIABLE(S) ENTERED ON STEP NUMBER 3.. MATHRAW6 GRADE 6 MATH RAW SCORE

MULTIPLE R	0.73902	ANALYSIS OF VARIANCE	DF	SUM OF SQUARES	MEAN SQUARE	F	P
R SQUARE	0.54615	REGRESSION	3.	1792.09109	597.36370	33.29290	0.0000
ADJUSTED R SQUARE	0.52974	RESIDUAL	83.	1489.24225	17.94268		
STANDARD ERROR	4.23588						

----------------- VARIABLES IN THE EQUATION ------------------

VARIABLE	B	BETA	STD ERROR B	F
READRAW6	0.4045829	0.45197	0.08777	21.251
GPA6	3.070150	0.29681	1.03096	8.868
MATHRAW6	0.4452826E-01	0.09841	0.04156	1.148
(CONSTANT)	-2.805509			

------------- VARIABLES NOT IN THE EQUATION --------------

VARIABLE	BETA IN	PARTIAL	TOLERANCE	F

MAXIMUM STEP REACHED

STATISTICS WHICH CANNOT BE COMPUTED ARE PRINTED AS ALL NINES.

FILE SYSFILE (CREATION DATE = 10/27/82)

* MULTIPLE REGRESSION * * * * * * * * * * * * * VARIABLE LIST 1
REGRESSION LIST 3

DEPENDENT VARIABLE.. MEAPR7 GRADE 7 MEAP READING SCORE

SUMMARY TABLE

VARIABLE		MULTIPLE R	R SQUARE	RSQ CHANGE	SIMPLE R	B	BETA
READRAW6	GRADE 6 READING RAW SCORE	0.68683	0.47174	0.47174	0.68683	0.4045829	0.45197
GPA6	GRADE POINT AVERAGE AT END OF GRADE 6	0.73476	0.53987	0.06813	0.62976	3.070150	0.29681
MATHRAW6	GRADE 6 MATH RAW SCORE	0.73902	0.54615	0.00628	0.49590	0.4452826E-01	0.09841
(CONSTANT)						-2.805509	

FILE SYSFILE (CREATION DATE = 10/27/82)

* M U L T I P L E R E G R E S S I O N * * * * * * * * * * * * * VARIABLE LIST 1
REGRESSION LIST 4

DEPENDENT VARIABLE.. MEAPM7 GRADE 7 MEAP MATH SCORE

VARIABLE(S) ENTERED ON STEP NUMBER 1.. GPA6 GRADE POINT AVERAGE AT END OF GRADE 6

		ANALYSIS OF VARIANCE	DF	SUM OF SQUARES	MEAN SQUARE	F	P
MULTIPLE R	0.61583						
R SQUARE	0.37925	REGRESSION	1.	908.44824	908.44824	51.93039	0.0000
ADJUSTED R SQUARE	0.37194	RESIDUAL	85.	1486.95406	17.49358		
STANDARD ERROR	4.18253						

------------------ VARIABLES IN THE EQUATION ------------------

VARIABLE	B	BETA	STD ERROR B	F
GPA6	5.442589	0.61583	0.75526	51.930
(CONSTANT)	5.388749			

------------- VARIABLES NOT IN THE EQUATION -------------

VARIABLE	BETA IN	PARTIAL	TOLERANCE	F
READRAW6	0.05085	0.05073	0.61784	0.217
MATHRAW6	0.32155	0.34240	0.70388	11.156

* *

VARIABLE(S) ENTERED ON STEP NUMBER 2.. MATHRAW6 GRADE 6 MATH RAW SCORE

		ANALYSIS OF VARIANCE	DF	SUM OF SQUARES	MEAN SQUARE	F	P
MULTIPLE R	0.67233						
R SQUARE	0.45202	REGRESSION	2.	1082.77845	541.38923	34.64564	0.0000
ADJUSTED R SQUARE	0.43898	RESIDUAL	84.	1312.62385	15.62647		
STANDARD ERROR	3.95303						

------------------ VARIABLES IN THE EQUATION ------------------

VARIABLE	B	BETA	STD ERROR B	F
GPA6	3.896162	0.44085	0.85082	20.970
MATHRAW6	0.1243079	0.32155	0.03722	11.156
(CONSTANT)	3.978697			

------------- VARIABLES NOT IN THE EQUATION -------------

VARIABLE	BETA IN	PARTIAL	TOLERANCE	F
READRAW6	-0.04975	-0.05069	0.56885	0.214

FILE SYSFILE (CREATION DATE = 10/27/82)

* M U L T I P L E   R E G R E S S I O N * * * * * * * * * * * * * * VARIABLE LIST 1
REGRESSION LIST 4

DEPENDENT VARIABLE.. MEAPM7 GRADE 7 MEAP MATH SCORE

VARIABLE(S) ENTERED ON STEP NUMBER 3.. READRAW6 GRADE 6 READING RAW SCORE

		ANALYSIS OF VARIANCE	DF	SUM OF SQUARES	MEAN SQUARE	F	P
MULTIPLE R	0.67337						
R SQUARE	0.45343	REGRESSION	3.	1086.15062	362.05021	22.95217	0.0000
ADJUSTED R SQUARE	0.43368	RESIDUAL	83.	1309.25168	15.77412		
STANDARD ERROR	3.97166						

------------------ VARIABLES IN THE EQUATION ------------------

VARIABLE	B	BETA	STD ERROR B	F
GPA6	4.104831	0.46446	0.96665	18.032
MATHRAW6	0.1293819	0.33467	0.03897	11.023
READRAW6	-0.3804816E-01	-0.04975	0.08229	0.214
(CONSTANT)	4.091800			

------------- VARIABLES NOT IN THE EQUATION -------------

VARIABLE	BETA IN	PARTIAL	TOLERANCE	F

MAXIMUM STEP REACHED

STATISTICS WHICH CANNOT BE COMPUTED ARE PRINTED AS ALL NINES.

FILE SYSFILE (CREATION DATE = 10/27/82)

* M U L T I P L E R E G R E S S I O N * * * * * * * * * * * * * * VARIABLE LIST 1
REGRESSION LIST 4

DEPENDENT VARIABLE.. MEAPM7 GRADE 7 MEAP MATH SCORE

SUMMARY TABLE

VARIABLE		MULTIPLE R	R SQUARE	RSQ CHANGE	SIMPLE R	B	BETA
GPA6	GRADE POINT AVERAGE AT END OF GRADE 6	0.61583	0.37925	0.37925	0.61583	4.104831	0.46446
MATHRAW6	GRADE 6 MATH RAW SCORE	0.67233	0.45202	0.07278	0.56145	0.1293819	0.33467
READRAW6	GRADE 6 READING RAW SCORE	0.67337	0.45343	0.00141	0.41211	-0.3804816E-01	-0.04975
(CONSTANT)						4.091800	

```
TRANSPACE REQUIRED..      600 BYTES
      6 TRANSFORMATIONS
     14 RECODE VALUES + LAG VARIABLES
     26 IF/COMPUTE OPERATIONS

CPU TIME REQUIRED..    0.65 SECONDS


                   30 SELECT IF      (GROUP=1)
**WARNING**  THIS MISPLACED PERMANENT MODIFICATION IS TREATED AS TEMPORARY.  ERRORS MAY RESULT FURTHER ON.
                   31 REGRESSION     VARIABLES=MEAPR4 MEAPM4 MEAPR7 MEAPM7
                   32                          READRAW3 READRAW6
                   33                          MATHRAW3 MATHRAW6
                   34                          GPA3 GPA6/
                   35                REGRESSION=MEAPR4 WITH READRAW3 MATHRAW3 GPA3(1)
                   36                           RESID=0/
                   37                REGRESSION=MEAPM4 WITH READRAW3 MATHRAW3 GPA3(1)
                   38                           RESID=0/
                   39                REGRESSION=MEAPR7 WITH READRAW6 MATHRAW6 GPA6(1)
                   40                           RESID=0/
                   41                REGRESSION=MEAPM7 WITH READRAW6 MATHRAW6 GPA6(1)
                   42                           RESID=0/
                   43 STATISTICS     1,2

NO RESIDUALS OUTPUT WAS REQUESTED SO RESIDUALS WILL NOT BE CALCULATED.  SEE MANUAL RE OPTIONS 11,12  AND STATISTICS 4,5,6.

NO RESIDUALS OUTPUT WAS REQUESTED SO RESIDUALS WILL NOT BE CALCULATED.  SEE MANUAL RE OPTIONS 11,12  AND STATISTICS 4,5,6.

NO RESIDUALS OUTPUT WAS REQUESTED SO RESIDUALS WILL NOT BE CALCULATED.  SEE MANUAL RE OPTIONS 11,12  AND STATISTICS 4,5,6.

NO RESIDUALS OUTPUT WAS REQUESTED SO RESIDUALS WILL NOT BE CALCULATED.  SEE MANUAL RE OPTIONS 11,12  AND STATISTICS 4,5,6.

 ***** REGRESSION PROBLEM REQUIRES   1760 BYTES WORKSPACE, NOT INCLUDING RESIDUALS *****
```

SPSS NOW CONTAINS A NEW REGRESSION PROCEDURE.
SEE CHAPTER 3, PAGES 94-121 OF THE SPSS RELEASE 7-9 UPDATE MANUAL.
NEW REGRESSION WILL REPLACE THIS (OLD) REGRESSION PROCEDURE IN THE NEXT RELEASE.

NEW REGRESSION CONTAINS MANY NEW FEATURES, INCLUDING

- TRUE STEPWISE SELECTION
- BACKWARD EXCLUSION
- REGRESSION THROUGH THE ORIGIN
- MEAN SUBSTITUTION OFMISSING DATA
- INTERNAL SELECTION FOR CROSS-VALIDATION
- MANY TYPES OF RESIDUALS, PREDICTED VALUES, AND DISTANCE MEASURES
- HISTOGRAMS, NORMAL PROBABILITY PLOTS AND OUTLIER TABLES OF RESIDUALS

THE SYNTAX OF NEW REGRESSION DIFFERS FROM (OLD) REGRESSION. MOST NOTABLY, ALL OPTIONS AND STATISTICS ARE REQUESTED VIA KEYWORDS ON THE NEW REGRESSION CONTROL CARD. KEYWORDS IN NEW REGRESSION MAY BE ABBREVIATED TO THE FIRST THREE CHARACTERS (OR USE MORE FOR READABILITY). EQUALS SIGNS (=) ARE OPTIONAL.
HERE ARE EXAMPLES SHOWING COMPARABLE REQUESTS FROM (OLD) REGRESSION AND NEW REGRESSION:

```
                  OLD                          I                      NEW
                                               I
REGRESSION     VARIABLES = A TO E/             I   NEW REGRESSION  VARIABLES = A TO E/
               REGRESSION = A WITH B,C(2) D,E(1)/  I               DEPENDENT = A/ENTER B,C/FORWARD D,E/
                                               I
                                               I SAME REQUEST, ABBREVIATED FORM:
                                               I   NEW REGRESSION  VAR A TO E/
                                               I                   DEP A/ENT B,C/FOR D,E/
                                               I
-----------------------------------------------I------------------------------------------------------
                                               I
REGRESSION     VARIABLES = A, C, E TO P, R, T TO Z/  I   NEW REGRESSION  VAR = A, C, E TO P, R, T TO Z/
               REGRESSION = A (999,3.84,.2)    I                   CRITERIA =  FIN(3.84) TOLERANCE(.2)/
                             WITH C TO Z/      I                   DEP = A/STEPWISE/
                                               I
                                               I (THE USER HAS SPECIFIED TRUE STEPWISE IN NEW REGRESSION.)
                                               I
-----------------------------------------------I------------------------------------------------------
                                               I
REGRESSION     VARIABLES = A TO E/             I   NEW REGRESSION  VARIABLES = A TO E/MISSING = PAIRWISE/
               REGRESSION = A WITH B TO E RESIDS=0/  I             DESCRIPTIVE = MEAN STDDEV COR/
OPTIONS        2,11,12                         I                   DEP '= A/STEPWISE/
STATISTICS     1,2,4,5,6                       I                   RESIDUALS/CASEWISE = ALL/
                                               I                   SCATTER = (*RESID,*PRED)/SAVE = RESID PRED/
                                               I
                                               I DEFAULT CASEWISE PLOT IS OF OUTLIERS ONLY:  CASEWISE/
                                               I SCATTERPLOTS OF ANY VAR IN EQUATION:  SCATTER = (A,*RESID)/
```

FILE SYSFILE (CREATION DATE = 10/27/82)

VARIABLE	MEAN	STANDARD DEV	CASES
MEAPR4	8.2857	5.1596	35
MEAPM4	20.3429	8.7513	35
MEAPR7	13.8571	5.8367	35
MEAPM7	17.2857	4.8116	35
READRAW3	20.6000	6.4680	35
READRAW6	19.3714	5.8415	35
MATHRAW3	24.4286	9.7446	35
MATHRAW6	40.4571	15.1974	35
GPA3	2.2238	0.5815	35
GPA6	2.1976	0.4697	35

FILE SYSFILE (CREATION DATE = 10/27/82)

CORRELATION COEFFICIENTS

A VALUE OF 99.00000 IS PRINTED
IF A COEFFICIENT CANNOT BE COMPUTED.

	MEAPR4	MEAPM4	MEAPR7	MEAPM7	READRAW3	READRAW6	MATHRAW3	MATHRAW6	GPA3	GPA6
MEAPR4	1.00000	0.74880	0.49460	0.48353	0.43801	0.47161	0.75854	0.45664	0.29502	0.42505
MEAPM4	0.74880	1.00000	0.43860	0.44953	0.30906	0.54919	0.55971	0.43290	0.42084	0.50059
MEAPR7	0.49460	0.43860	1.00000	0.59845	0.23217	0.59855	0.54615	0.59561	0.25956	0.49695
MEAPM7	0.48353	0.44953	0.59845	1.00000	0.18901	0.32365	0.57379	0.56006	0.55288	0.60546
READRAW3	0.43801	0.30906	0.23217	0.18901	1.00000	0.43842	0.49464	0.28108	0.38682	0.33577
READRAW6	0.47161	0.54919	0.59855	0.32365	0.43842	1.00000	0.44096	0.61492	0.15808	0.43608
MATHRAW3	0.75854	0.55971	0.54615	0.57379	0.49464	0.44096	1.00000	0.49117	0.37359	0.49395
MATHRAW6	0.45664	0.43290	0.59561	0.56006	0.28108	0.61492	0.49117	1.00000	0.16558	0.41239
GPA3	0.29502	0.42084	0.25956	0.55288	0.38682	0.15808	0.37359	0.16558	1.00000	0.80395
GPA6	0.42505	0.50059	0.49695	0.60546	0.33577	0.43608	0.49395	0.41239	0.80395	1.00000

FILE SYSFILE (CREATION DATE = 10/27/82)

* M U L T I P L E R E G R E S S I O N * * * * * * * * * * * * * * VARIABLE LIST 1
REGRESSION LIST 1

DEPENDENT VARIABLE.. MEAPR4 GRADE 4 MEAP READING SCORE

VARIABLE(S) ENTERED ON STEP NUMBER 1.. MATHRAW3 GRADE 3 MATH RAW SCORE

MULTIPLE R	0.75854	ANALYSIS OF VARIANCE	DF	SUM OF SQUARES	MEAN SQUARE	F	P
R SQUARE	0.57539	REGRESSION	1.	520.80865	520.80865	44.71807	0.0000
ADJUSTED R SQUARE	0.56252	RESIDUAL	33.	384.33420	11.64649		
STANDARD ERROR	3.41270						

----------------- VARIABLES IN THE EQUATION ------------------

VARIABLE	B	BETA	STD ERROR B	F
MATHRAW3	0.4016372	0.75854	0.06006	44.718
(CONSTANT)	-1.525708			

------------- VARIABLES NOT IN THE EQUATION --------------

VARIABLE	BETA IN	PARTIAL	TOLERANCE	F
READRAW3	0.08315	0.11090	0.75533	0.398
GPA3	0.01352	0.01925	0.86043	0.012

* *

VARIABLE(S) ENTERED ON STEP NUMBER 2.. READRAW3 GRADE 3 READING RAW SCORE

MULTIPLE R	0.76198	ANALYSIS OF VARIANCE	DF	SUM OF SQUARES	MEAN SQUARE	F	P
R SQUARE	0.58061	REGRESSION	2.	525.53569	262.76784	22.15072	0.0000
ADJUSTED R SQUARE	0.55440	RESIDUAL	32.	379.60717	11.86272		
STANDARD ERROR	3.44423						

----------------- VARIABLES IN THE EQUATION ------------------

VARIABLE	B	BETA	STD ERROR B	F
MATHRAW3	0.3798595	0.71741	0.06975	29.663
READRAW3	0.6633077E-01	0.08315	0.10508	0.398
(CONSTANT)	-2.360126			

------------- VARIABLES NOT IN THE EQUATION --------------

VARIABLE	BETA IN	PARTIAL	TOLERANCE	F
GPA3	-0.00640	-0.00888	0.80639	0.002

F-LEVEL OR TOLERANCE-LEVEL INSUFFICIENT FOR FURTHER COMPUTATION

STATISTICS WHICH CANNOT BE COMPUTED ARE PRINTED AS ALL NINES.

FILE SYSFILE (CREATION DATE = 10/27/82)

* M U L T I P L E R E G R E S S I O N * * * * * * * * * * * * * VARIABLE LIST 1
REGRESSION LIST 1

DEPENDENT VARIABLE.. MEAPR4 GRADE 4 MEAP READING SCORE

SUMMARY TABLE

VARIABLE		MULTIPLE R	R SQUARE	RSQ CHANGE	SIMPLE R	B	BETA
MATHRAW3	GRADE 3 MATH RAW SCORE	0.75854	0.57539	0.57539	0.75854	0.3798595	0.71741
READRAW3	GRADE 3 READING RAW SCORE	0.76198	0.58061	0.00522	0.43801	0.6633077E-01	0.08315
(CONSTANT)						-2.360126	

FILE SYSFILE (CREATION DATE = 10/27/82)

* M U L T I P L E R E G R E S S I O N * * * * * * * * * * * * * VARIABLE LIST 1
REGRESSION LIST 2

DEPENDENT VARIABLE.. MEAPM4 GRADE 4 MEAP MATH SCORE

VARIABLE(S) ENTERED ON STEP NUMBER 1.. MATHRAW3 GRADE 3 MATH RAW SCORE

MULTIPLE R	0.55971	ANALYSIS OF VARIANCE	DF	SUM OF SQUARES	MEAN SQUARE	F	P
R SQUARE	0.31328	REGRESSION	1.	815.73704	815.73704	15.05430	0.0005
ADJUSTED R SQUARE	0.29247	RESIDUAL	33.	1788.14867	54.18632		
STANDARD ERROR	7.36114						

----------------- VARIABLES IN THE EQUATION ------------------

VARIABLE	B	BETA	STD ERROR B	F
MATHRAW3	0.5026549	0.55971	0.12955	15.054
(CONSTANT)	8.063717			

------------- VARIABLES NOT IN THE EQUATION --------------

VARIABLE	BETA IN	PARTIAL	TOLERANCE	F
READRAW3	0.04264	0.04472	0.75533	0.064
GPA3	0.24608	0.27545	0.86043	2.627

* *

VARIABLE(S) ENTERED ON STEP NUMBER 2.. GPA3 GRADE POINT AVERAGE AT END OF GRADE 3

MULTIPLE R	0.60447	ANALYSIS OF VARIANCE	DF	SUM OF SQUARES	MEAN SQUARE	F	P
R SQUARE	0.36538	REGRESSION	2.	951.41235	475.70618	9.21201	0.0007
ADJUSTED R SQUARE	0.32572	RESIDUAL	32.	1652.47336	51.63979		
STANDARD ERROR	7.18608						

----------------- VARIABLES IN THE EQUATION ------------------

VARIABLE	B	BETA	STD ERROR B	F
MATHRAW3	0.4200926	0.46778	0.13634	9.494
GPA3	3.703424	0.24608	2.28478	2.627
(CONSTANT)	1.844889			

------------- VARIABLES NOT IN THE EQUATION --------------

VARIABLE	BETA IN	PARTIAL	TOLERANCE	F
READRAW3	-0.02473	-0.02612	0.70789	0.021

FILE SYSFILE (CREATION DATE = 10/27/82)

* M U L T I P L E R E G R E S S I O N * * * * * * * * * * * * * VARIABLE LIST 1
REGRESSION LIST 2

DEPENDENT VARIABLE.. MEAPM4 GRADE 4 MEAP MATH SCORE

VARIABLE(S) ENTERED ON STEP NUMBER 3.. READRAW3 GRADE 3 READING RAW SCORE

		ANALYSIS OF VARIANCE	DF	SUM OF SQUARES	MEAN SQUARE	F	P
MULTIPLE R	0.60483	REGRESSION	3.	952.53986	317.51329	5.96054	0.0025
R SQUARE	0.36581	RESIDUAL	31.	1651.34586	53.26922		
ADJUSTED R SQUARE	0.30444						
STANDARD ERROR	7.29858						

----------------- VARIABLES IN THE EQUATION ------------------

VARIABLE	B	BETA	STD ERROR B	F
MATHRAW3	0.4291307	0.47784	0.15177	7.994
GPA3	3.790819	0.25189	2.39704	2.501
READRAW3	-0.3346296E-01	-0.02473	0.23001	0.021
(CONSTANT)	2.119086			

------------- VARIABLES NOT IN THE EQUATION -------------

VARIABLE	BETA IN	PARTIAL	TOLERANCE	F

MAXIMUM STEP REACHED

STATISTICS WHICH CANNOT BE COMPUTED ARE PRINTED AS ALL NINES.

FILE SYSFILE (CREATION DATE = 10/27/82)

* M U L T I P L E   R E G R E S S I O N * * * * * * * * * * * * * VARIABLE LIST 1
REGRESSION LIST 2

DEPENDENT VARIABLE.. MEAPM4 GRADE 4 MEAP MATH SCORE

SUMMARY TABLE

VARIABLE		MULTIPLE R	R SQUARE	RSQ CHANGE	SIMPLE R	B	BETA
MATHRAW3	GRADE 3 MATH RAW SCORE	0.55971	0.31328	0.31328	0.55971	0.4291307	0.47784
GPA3	GRADE POINT AVERAGE AT END OF GRADE 3	0.60447	0.36538	0.05210	0.42084	3.790819	0.25189
READRAW3	GRADE 3 READING RAW SCORE	0.60483	0.36581	0.00043	0.30906	-0.3346296E-01	-0.02473
(CONSTANT)						2.119086	

FILE SYSFILE (CREATION DATE = 10/27/82)

* M U L T I P L E   R E G R E S S I O N * * * * * * * * * * * * * * VARIABLE LIST 1
REGRESSION LIST 3

DEPENDENT VARIABLE.. MEAPR7 GRADE 7 MEAP READING SCORE

VARIABLE(S) ENTERED ON STEP NUMBER 1.. READRAW6 GRADE 6 READING RAW SCORE

		ANALYSIS OF VARIANCE	DF	SUM OF SQUARES	MEAN SQUARE	F	P
MULTIPLE R	0.59855						
R SQUARE	0.35826	REGRESSION	1.	414.97120	414.97120	18.42295	0.0001
ADJUSTED R SQUARE	0.33882	RESIDUAL	33.	743.31451	22.52468		
STANDARD ERROR	4.74602						

---------------- VARIABLES IN THE EQUATION -----------------

VARIABLE	B	BETA	STD ERROR B	F
READRAW6	0.5980643	0.59855	0.13934	18.423
(CONSTANT)	2.271782			

------------ VARIABLES NOT IN THE EQUATION -------------

VARIABLE	BETA IN	PARTIAL	TOLERANCE	F
MATHRAW6	0.36590	0.36019	0.62187	4.771
GPA6	0.29133	0.32727	0.80984	3.839

* *

VARIABLE(S) ENTERED ON STEP NUMBER 2.. MATHRAW6 GRADE 6 MATH RAW SCORE

		ANALYSIS OF VARIANCE	DF	SUM OF SQUARES	MEAN SQUARE	F	P
MULTIPLE R	0.66447						
R SQUARE	0.44152	REGRESSION	2.	511.40743	255.70371	12.64924	0.0001
ADJUSTED R SQUARE	0.40662	RESIDUAL	32.	646.87829	20.21495		
STANDARD ERROR	4.49610						

---------------- VARIABLES IN THE EQUATION -----------------

VARIABLE	B	BETA	STD ERROR B	F
READRAW6	0.3732465	0.37355	0.16739	4.972
MATHRAW6	0.1405276	0.36590	0.06434	4.771
(CONSTANT)	0.9414806			

------------ VARIABLES NOT IN THE EQUATION -------------

VARIABLE	BETA IN	PARTIAL	TOLERANCE	F
GPA6	0.23591	0.27815	0.77638	2.599

FILE SYSFILE (CREATION DATE = 10/27/82)

* M U L T I P L E R E G R E S S I O N * * * * * * * * * * * * * * VARIABLE LIST 1
REGRESSION LIST 3

DEPENDENT VARIABLE.. MEAPR7 GRADE 7 MEAP READING SCORE

VARIABLE(S) ENTERED ON STEP NUMBER 3.. GPA6 GRADE POINT AVERAGE AT END OF GRADE 6

MULTIPLE R	0.69622	ANALYSIS OF VARIANCE	DF	SUM OF SQUARES	MEAN SQUARE	F	P
R SQUARE	0.48473	REGRESSION	3.	561.45436	187.15145	9.72083	0.0001
ADJUSTED R SQUARE	0.43486	RESIDUAL	31.	596.83135	19.25262		
STANDARD ERROR	4.38778						

----------------- VARIABLES IN THE EQUATION ------------------

VARIABLE	B	BETA	STD ERROR B	F
READRAW6	0.3040743	0.30432	0.16890	3.241
MATHRAW6	0.1195133	0.31118	0.06413	3.473
GPA6	2.931474	0.23591	1.81820	2.599
(CONSTANT)	-3.310642			

------------- VARIABLES NOT IN THE EQUATION --------------

VARIABLE	BETA IN	PARTIAL	TOLERANCE	F

MAXIMUM STEP REACHED

STATISTICS WHICH CANNOT BE COMPUTED ARE PRINTED AS ALL NINES.

FILE SYSFILE (CREATION DATE = 10/27/82)

* M U L T I P L E R E G R E S S I O N * * * * * * * * * * * * * VARIABLE LIST 1
REGRESSION LIST 3

DEPENDENT VARIABLE.. MEAPR7 GRADE 7 MEAP READING SCORE

SUMMARY TABLE

VARIABLE		MULTIPLE R	R SQUARE	RSQ CHANGE	SIMPLE R	B	BETA
READRAW6	GRADE 6 READING RAW SCORE	0.59855	0.35826	0.35826	0.59855	0.3040743	0.30432
MATHRAW6	GRADE 6 MATH RAW SCORE	0.66447	0.44152	0.08326	0.59561	0.1195133	0.31118
GPA6	GRADE POINT AVERAGE AT END OF GRADE 6	0.69622	0.48473	0.04321	0.49695	2.931474	0.23591
(CONSTANT)						-3.310642	

FILE SYSFILE (CREATION DATE = 10/27/82)

* M U L T I P L E R E G R E S S I O N * * * * * * * * * * * * * VARIABLE LIST 1
REGRESSION LIST 4

DEPENDENT VARIABLE.. MEAPM7 GRADE 7 MEAP MATH SCORE

VARIABLE(S) ENTERED ON STEP NUMBER 1.. GPA6 GRADE POINT AVERAGE AT END OF GRADE 6

MULTIPLE R	0.60546	ANALYSIS OF VARIANCE	DF	SUM OF SQUARES	MEAN SQUARE	F	P
R SQUARE	0.36658	REGRESSION	1.	288.54957	288.54957	19.09800	0.0001
ADJUSTED R SQUARE	0.34738	RESIDUAL	33.	498.59329	15.10889		
STANDARD ERROR	3.88702						

------------------ VARIABLES IN THE EQUATION ------------------

VARIABLE	B	BETA	STD ERROR B	F
GPA6	6.202191	0.60546	1.41922	19.098
(CONSTANT)	3.655663			

------------- VARIABLES NOT IN THE EQUATION -------------

VARIABLE	BETA IN	PARTIAL	TOLERANCE	F
READRAW6	0.07362	0.08324	0.80984	0.223
MATHRAW6	0.37398	0.42808	0.82993	7.180

* *

VARIABLE(S) ENTERED ON STEP NUMBER 2.. MATHRAW6 GRADE 6 MATH RAW SCORE

MULTIPLE R	0.69473	ANALYSIS OF VARIANCE	DF	SUM OF SQUARES	MEAN SQUARE	F	P
R SQUARE	0.48265	REGRESSION	2.	379.91745	189.95872	14.92706	0.0000
ADJUSTED R SQUARE	0.45032	RESIDUAL	32.	407.22541	12.72579		
STANDARD ERROR	3.56732						

------------------ VARIABLES IN THE EQUATION ------------------

VARIABLE	B	BETA	STD ERROR B	F
GPA6	4.622334	0.45123	1.42973	10.452
MATHRAW6	0.1184038	0.37398	0.04419	7.180
(CONSTANT)	2.337307			

------------- VARIABLES NOT IN THE EQUATION -------------

VARIABLE	BETA IN	PARTIAL	TOLERANCE	F
READRAW6	-0.17722	-0.18792	0.58174	1.135

FILE SYSFILE (CREATION DATE = 10/27/82)

* M U L T I P L E R E G R E S S I O N * * * * * * * * * * * * * VARIABLE LIST 1
REGRESSION LIST 4

DEPENDENT VARIABLE.. MEAPM7 GRADE 7 MEAP MATH SCORE

VARIABLE(S) ENTERED ON STEP NUMBER 3.. READRAW6 GRADE 6 READING RAW SCORE

MULTIPLE R	0.70776	ANALYSIS OF VARIANCE	DF	SUM OF SQUARES	MEAN SQUARE	F	P
R SQUARE	0.50092	REGRESSION	3.	394.29855	131.43285	10.37159	0.0001
ADJUSTED R SQUARE	0.45263	RESIDUAL	31.	392.84431	12.67240		
STANDARD ERROR	3.55983						

----------------- VARIABLES IN THE EQUATION ------------------

VARIABLE	B	BETA	STD ERROR B	F
GPA6	5.021508	0.49020	1.47512	11.588
MATHRAW6	0.1478180	0.46688	0.05203	8.072
READRAW6	-0.1459721	-0.17722	0.13703	1.135
(CONSTANT)	3.097750			

------------- VARIABLES NOT IN THE EQUATION -------------

VARIABLE	BETA IN	PARTIAL	TOLERANCE	F

MAXIMUM STEP REACHED

STATISTICS WHICH CANNOT BE COMPUTED ARE PRINTED AS ALL NINES.

FILE SYSFILE (CREATION DATE = 10/27/82)

* M U L T I P L E   R E G R E S S I O N * * * * * * * * * * * * * * VARIABLE LIST 1
REGRESSION LIST 4

DEPENDENT VARIABLE.. MEAPM7 GRADE 7 MEAP MATH SCORE

SUMMARY TABLE

VARIABLE		MULTIPLE R	R SQUARE	RSQ CHANGE	SIMPLE R	B	BETA
GPA6	GRADE POINT AVERAGE AT END OF GRADE 6	0.60546	0.36658	0.36658	0.60546	5.021508	0.49020
MATHRAW6	GRADE 6 MATH RAW SCORE	0.69473	0.48265	0.11608	0.56006	0.1478180	0.46688
READRAW6	GRADE 6 READING RAW SCORE	0.70776	0.50092	0.01827	0.32365	-0.1459721	-0.17722
(CONSTANT)						3.097750	

```
TRANSPACE REQUIRED..       100 BYTES
      1 TRANSFORMATIONS
      0 RECODE VALUES + LAG VARIABLES
      3 IF/COMPUTE OPERATIONS

CPU TIME REQUIRED..    0.63 SECONDS


                   SELECT IF      (GROUP=2)
**WARNING**  THIS MISPLACED PERMANENT MODIFICATION IS TREATED AS TEMPORARY.  ERRORS MAY RESULT FURTHER ON.
                   REGRESSION     VARIABLES=MEAPR4 MEAPM4 MEAPR7 MEAPM7
                                            READRAW3 READRAW6
                                            MATHRAW3 MATHRAW6
                                            GPA3 GPA6/
                                  REGRESSION=MEAPR4 WITH READRAW3 MATHRAW3 GPA3(1)
                                             RESID=0/
                                  REGRESSION=MEAPM4 WITH READRAW3 MATHRAW3 GPA3(1)
                                             RESID=0/
                                  REGRESSION=MEAPR7 WITH READRAW6 MATHRAW6 GPA6(1)
                                             RESID=0/
                                  REGRESSION=MEAPM7 WITH READRAW6 MATHRAW6 GPA6(1)
                                             RESID=0/
                   STATISTICS     1,2

NO RESIDUALS OUTPUT WAS REQUESTED SO RESIDUALS WILL NOT BE CALCULATED.  SEE MANUAL RE OPTIONS 11,12  AND STATISTICS 4,5,6.

NO RESIDUALS OUTPUT WAS REQUESTED SO RESIDUALS WILL NOT BE CALCULATED.  SEE MANUAL RE OPTIONS 11,12  AND STATISTICS 4,5,6.

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NO RESIDUALS OUTPUT WAS REQUESTED SO RESIDUALS WILL NOT BE CALCULATED.  SEE MANUAL RE OPTIONS 11,12  AND STATISTICS 4,5,6.

 ***** REGRESSION PROBLEM REQUIRES   1760 BYTES WORKSPACE, NOT INCLUDING RESIDUALS *****
```

SPSS NOW CONTAINS A NEW REGRESSION PROCEDURE.
SEE CHAPTER 3, PAGES 94-121 OF THE SPSS RELEASE 7-9 UPDATE MANUAL.
NEW REGRESSION WILL REPLACE THIS (OLD) REGRESSION PROCEDURE IN THE NEXT RELEASE.

NEW REGRESSION CONTAINS MANY NEW FEATURES, INCLUDING

- TRUE STEPWISE SELECTION
- BACKWARD EXCLUSION
- REGRESSION THROUGH THE ORIGIN
- MEAN SUBSTITUTION OFMISSING DATA
- INTERNAL SELECTION FOR CROSS-VALIDATION
- MANY TYPES OF RESIDUALS, PREDICTED VALUES, AND DISTANCE MEASURES
- HISTOGRAMS, NORMAL PROBABILITY PLOTS AND OUTLIER TABLES OF RESIDUALS

THE SYNTAX OF NEW REGRESSION DIFFERS FROM (OLD) REGRESSION. MOST NOTABLY, ALL OPTIONS AND STATISTICS ARE REQUESTED VIA KEYWORDS ON THE NEW REGRESSION CONTROL CARD. KEYWORDS IN NEW REGRESSION MAY BE ABBREVIATED TO THE FIRST THREE CHARACTERS (OR USE MORE FOR READABILITY). EQUALS SIGNS (=) ARE OPTIONAL.
HERE ARE EXAMPLES SHOWING COMPARABLE REQUESTS FROM (OLD) REGRESSION AND NEW REGRESSION:

```
                    OLD                          I                       NEW
                                                 I
REGRESSION     VARIABLES = A TO E/               I   NEW REGRESSION  VARIABLES = A TO E/
               REGRESSION = A WITH B,C(2) D,E(1)/ I                  DEPENDENT = A/ENTER B,C/FORWARD D,E/
                                                 I
                                                 I  SAME REQUEST, ABBREVIATED FORM:
                                                 I   NEW REGRESSION  VAR A TO E/
                                                 I                   DEP A/ENT B,C/FOR D,E/
                                                 I
-------------------------------------------------I------------------------------------------------------------
                                                 I
REGRESSION     VARIABLES = A, C, E TO P, R, T TO Z/ I  NEW REGRESSION  VAR = A, C, E TO P, R, T TO Z/
               REGRESSION = A (999,3.84,.2)      I                   CRITERIA =  FIN(3.84) TOLERANCE(.2)/
                             WITH C TO Z/        I                   DEP = A/STEPWISE/
                                                 I
                                                 I  (THE USER HAS SPECIFIED TRUE STEPWISE IN NEW REGRESSION.)
                                                 I
-------------------------------------------------I------------------------------------------------------------
                                                 I
REGRESSION     VARIABLES = A TO E/               I   NEW REGRESSION  VARIABLES = A TO E/MISSING = PAIRWISE/
               REGRESSION = A WITH B TO E RESIDS=O/ I                DESCRIPTIVE = MEAN STDDEV COR/
OPTIONS        2,11,12                           I                   DEP '= A/STEPWISE/
STATISTICS     1,2,4,5,6                         I                   RESIDUALS/CASEWISE = ALL/
                                                 I                   SCATTER = (*RESID,*PRED)/SAVE = RESID PRED/
                                                 I
                                                 I  DEFAULT CASEWISE PLOT IS OF OUTLIERS ONLY:  CASEWISE/
                                                 I  SCATTERPLOTS OF ANY VAR IN EQUATION:  SCATTER = (A,*RESID)/
```

FILE SYSFILE (CREATION DATE = 10/27/82)

VARIABLE	MEAN	STANDARD DEV	CASES
MEAPR4	10.3000	6.0880	20
MEAPM4	23.7000	7.2844	20
MEAPR7	15.2500	5.9105	20
MEAPM7	19.6000	5.0617	20
READRAW3	28.5000	10.8991	20
READRAW6	22.9500	7.3519	20
MATHRAW3	28.7500	8.8071	20
MATHRAW6	39.9500	14.5547	20
GPA3	2.6083	0.6994	20
GPA6	2.4792	0.6135	20

FILE SYSFILE (CREATION DATE = 10/27/82)

CORRELATION COEFFICIENTS

A VALUE OF 99.00000 IS PRINTED
IF A COEFFICIENT CANNOT BE COMPUTED.

	MEAPR4	MEAPM4	MEAPR7	MEAPM7	READRAW3	READRAW6	MATHRAW3	MATHRAW6	GPA3	GPA6
MEAPR4	1.00000	0.68455	0.85933	0.36619	0.75593	0.79998	0.60320	0.45398	0.65125	0.79325
MEAPM4	0.68455	1.00000	0.61060	0.36199	0.54359	0.51566	0.55253	0.49825	0.60936	0.71301
MEAPR7	0.85933	0.61060	1.00000	0.28148	0.67527	0.77064	0.54320	0.34093	0.66369	0.76596
MEAPM7	0.36619	0.36199	0.28148	1.00000	0.18222	0.28654	0.39905	0.48051	0.34493	0.34604
READRAW3	0.75593	0.54359	0.67527	0.18222	1.00000	0.67819	0.73336	0.35882	0.78428	0.77303
READRAW6	0.79998	0.51566	0.77064	0.28654	0.67819	1.00000	0.61919	0.47167	0.64771	0.79034
MATHRAW3	0.60320	0.55253	0.54320	0.39905	0.73336	0.61919	1.00000	0.56364	0.72525	0.81317
MATHRAW6	0.45398	0.49825	0.34093	0.48051	0.35882	0.47167	0.56364	1.00000	0.60380	0.65071
GPA3	0.65125	0.60936	0.66369	0.34493	0.78428	0.64771	0.72525	0.60380	1.00000	0.91022
GPA6	0.79325	0.71301	0.76596	0.34604	0.77303	0.79034	0.81317	0.65071	0.91022	1.00000

FILE SYSFILE (CREATION DATE = 10/27/82)

* M U L T I P L E R E G R E S S I O N * * * * * * * * * * * * * * VARIABLE LIST 1
REGRESSION LIST 1

DEPENDENT VARIABLE.. MEAPR4 GRADE 4 MEAP READING SCORE

VARIABLE(S) ENTERED ON STEP NUMBER 1.. READRAW3 GRADE 3 READING RAW SCORE

MULTIPLE R	0.75593	ANALYSIS OF VARIANCE	DF	SUM OF SQUARES	MEAN SQUARE	F	P
R SQUARE	0.57142	REGRESSION	1.	402.39654	402.39654	23.99952	0.0001
ADJUSTED R SQUARE	0.54761	RESIDUAL	18.	301.80346	16.76686		
STANDARD ERROR	4.09474						

----------------- VARIABLES IN THE EQUATION ------------------

VARIABLE	B	BETA	STD ERROR B	F
READRAW3	0.4222419	0.75593	0.08619	24.000
(CONSTANT)	-1.733895			

------------- VARIABLES NOT IN THE EQUATION --------------

VARIABLE	BETA IN	PARTIAL	TOLERANCE	F
MATHRAW3	0.10566	0.10973	0.46219	0.207
GPA3	0.15170	0.14377	0.38491	0.359

* *

VARIABLE(S) ENTERED ON STEP NUMBER 2.. GPA3 GRADE POINT AVERAGE AT END OF GRADE 3

MULTIPLE R	0.76176	ANALYSIS OF VARIANCE	DF	SUM OF SQUARES	MEAN SQUARE	F	P
R SQUARE	0.58028	REGRESSION	2.	408.63453	204.31726	11.75169	0.0006
ADJUSTED R SQUARE	0.53090	RESIDUAL	17.	295.56547	17.38620		
STANDARD ERROR	4.16968						

----------------- VARIABLES IN THE EQUATION ------------------

VARIABLE	B	BETA	STD ERROR B	F
READRAW3	0.3557840	0.63695	0.14147	6.325
GPA3	1.320577	0.15170	2.20467	0.359
(CONSTANT)	-3.284348			

------------- VARIABLES NOT IN THE EQUATION --------------

VARIABLE	BETA IN	PARTIAL	TOLERANCE	F
MATHRAW3	0.06458	0.06333	0.40366	0.064

FILE SYSFILE (CREATION DATE = 10/27/82)

* M U L T I P L E R E G R E S S I O N * * * * * * * * * * * * * VARIABLE LIST 1
REGRESSION LIST 1

DEPENDENT VARIABLE.. MEAPR4 GRADE 4 MEAP READING SCORE

VARIABLE(S) ENTERED ON STEP NUMBER 3.. MATHRAW3 GRADE 3 MATH RAW SCORE

MULTIPLE R	0.76287	ANALYSIS OF VARIANCE	DF	SUM OF SQUARES	MEAN SQUARE	F	P
R SQUARE	0.58197	REGRESSION	3.	409.81990	136.60663	7.42478	0.0025
ADJUSTED R SQUARE	0.50358	RESIDUAL	16.	294.38010	18.39876		
STANDARD ERROR	4.28938						

------------------ VARIABLES IN THE EQUATION ------------------

VARIABLE	B	BETA	STD ERROR B	F
READRAW3	0.3403627	0.60934	0.15770	4.658
GPA3	1.101371	0.12652	2.42682	0.206
MATHRAW3	0.4463854E-01	0.06458	0.17586	0.064
(CONSTANT)	-3.556437			

------------- VARIABLES NOT IN THE EQUATION -------------

VARIABLE	BETA IN	PARTIAL	TOLERANCE	F

MAXIMUM STEP REACHED

STATISTICS WHICH CANNOT BE COMPUTED ARE PRINTED AS ALL NINES.

FILE SYSFILE (CREATION DATE = 10/27/82)

* M U L T I P L E R E G R E S S I O N * * * * * * * * * * * * * VARIABLE LIST 1
REGRESSION LIST 1

DEPENDENT VARIABLE.. MEAPR4 GRADE 4 MEAP READING SCORE

SUMMARY TABLE

VARIABLE		MULTIPLE R	R SQUARE	RSQ CHANGE	SIMPLE R	B	BETA
READRAW3	GRADE 3 READING RAW SCORE	0.75593	0.57142	0.57142	0.75593	0.3403627	0.60934
GPA3	GRADE POINT AVERAGE AT END OF GRADE 3	0.76176	0.58028	0.00886	0.65125	1.101371	0.12652
MATHRAW3	GRADE 3 MATH RAW SCORE	0.76287	0.58197	0.00168	0.60320	0.4463854E-01	0.06458
(CONSTANT)						-3.556437	

FILE SYSFILE (CREATION DATE = 10/27/82)

* M U L T I P L E R E G R E S S I O N * * * * * * * * * * * * * * VARIABLE LIST 1
REGRESSION LIST 2

DEPENDENT VARIABLE.. MEAPM4 GRADE 4 MEAP MATH SCORE

VARIABLE(S) ENTERED ON STEP NUMBER 1.. GPA3 GRADE POINT AVERAGE AT END OF GRADE 3

MULTIPLE R	0.60936	ANALYSIS OF VARIANCE	DF	SUM OF SQUARES	MEAN SQUARE	F	P
R SQUARE	0.37132	REGRESSION	1.	374.36910	374.36910	10.63161	0.0043
ADJUSTED R SQUARE	0.33640	RESIDUAL	18.	633.83090	35.21283		
STANDARD ERROR	5.93404						

----------------- VARIABLES IN THE EQUATION -----------------

VARIABLE	B	BETA	STD ERROR B	F
GPA3	6.347033	0.60936	1.94658	10.632
(CONSTANT)	7.144825			

------------- VARIABLES NOT IN THE EQUATION -------------

VARIABLE	BETA IN	PARTIAL	TOLERANCE	F
READRAW3	0.17065	0.13353	0.38491	0.309
MATHRAW3	0.23329	0.20257	0.47401	0.727

* *

VARIABLE(S) ENTERED ON STEP NUMBER 2.. MATHRAW3 GRADE 3 MATH RAW SCORE

MULTIPLE R	0.63018	ANALYSIS OF VARIANCE	DF	SUM OF SQUARES	MEAN SQUARE	F	P
R SQUARE	0.39712	REGRESSION	2.	400.37906	200.18953	5.59905	0.0136
ADJUSTED R SQUARE	0.32620	RESIDUAL	17.	607.82094	35.75417		
STANDARD ERROR	5.97948						

----------------- VARIABLES IN THE EQUATION -----------------

VARIABLE	B	BETA	STD ERROR B	F
GPA3	4.584710	0.44017	2.84899	2.590
MATHRAW3	0.1929586	0.23329	0.22623	0.727
(CONSTANT)	6.193990			

------------- VARIABLES NOT IN THE EQUATION -------------

VARIABLE	BETA IN	PARTIAL	TOLERANCE	F
READRAW3	0.08327	0.06140	0.32778	0.061

FILE SYSFILE (CREATION DATE = 10/27/82)

* M U L T I P L E R E G R E S S I O N * * * * * * * * * * * * * VARIABLE LIST 1
REGRESSION LIST 2

DEPENDENT VARIABLE.. MEAPM4 GRADE 4 MEAP MATH SCORE

VARIABLE(S) ENTERED ON STEP NUMBER 3.. READRAW3 GRADE 3 READING RAW SCORE

MULTIPLE R	0.63198	ANALYSIS OF VARIANCE	DF	SUM OF SQUARES	MEAN SQUARE	F	P
R SQUARE	0.39940	REGRESSION	3.	402.67032	134.22344	3.54661	0.0385
ADJUSTED R SQUARE	0.28678	RESIDUAL	16.	605.52968	37.84561		
STANDARD ERROR	6.15188						

------------------ VARIABLES IN THE EQUATION ------------------

VARIABLE	B	BETA	STD ERROR B	F
GPA3	4.122880	0.39583	3.48058	1.403
MATHRAW3	0.1690491	0.20439	0.25223	0.449
READRAW3	0.5565193E-01	0.08327	0.22618	0.061
(CONSTANT)	6.499915			

------------- VARIABLES NOT IN THE EQUATION -------------

VARIABLE	BETA IN	PARTIAL	TOLERANCE	F

MAXIMUM STEP REACHED

STATISTICS WHICH CANNOT BE COMPUTED ARE PRINTED AS ALL NINES.

FILE SYSFILE (CREATION DATE = 10/27/82)

* M U L T I P L E R E G R E S S I O N * * * * * * * * * * * * * VARIABLE LIST 1
REGRESSION LIST 2

DEPENDENT VARIABLE.. MEAPM4 GRADE 4 MEAP MATH SCORE

SUMMARY TABLE

VARIABLE		MULTIPLE R	R SQUARE	RSQ CHANGE	SIMPLE R	B	BETA
GPA3	GRADE POINT AVERAGE AT END OF GRADE 3	0.60936	0.37132	0.37132	0.60936	4.122880	0.39583
MATHRAW3	GRADE 3 MATH RAW SCORE	0.63018	0.39712	0.02580	0.55253	0.1690491	0.20439
READRAW3	GRADE 3 READING RAW SCORE	0.63198	0.39940	0.00227	0.54359	0.5565193E-01	0.08327
(CONSTANT)						6.499915	

FILE SYSFILE (CREATION DATE = 10/27/82)

* M U L T I P L E R E G R E S S I O N * * * * * * * * * * * * * VARIABLE LIST 1
REGRESSION LIST 3

DEPENDENT VARIABLE.. MEAPR7 GRADE 7 MEAP READING SCORE

VARIABLE(S) ENTERED ON STEP NUMBER 1.. READRAW6 GRADE 6 READING RAW SCORE

MULTIPLE R	0.77064	ANALYSIS OF VARIANCE	DF	SUM OF SQUARES	MEAN SQUARE	F	P
R SQUARE	0.59388	REGRESSION	1.	394.19063	394.19063	26.32233	0.0001
ADJUSTED R SQUARE	0.57132	RESIDUAL	18.	269.55937	14.97552		
STANDARD ERROR	3.86982						

----------------- VARIABLES IN THE EQUATION ------------------

VARIABLE	B	BETA	STD ERROR B	F
READRAW6	0.6195530	0.77064	0.12076	26.322
(CONSTANT)	1.031258			

------------- VARIABLES NOT IN THE EQUATION -------------

VARIABLE	BETA IN	PARTIAL	TOLERANCE	F
MATHRAW6	-0.02901	-0.04014	0.77752	0.027
GPA6	0.41798	0.40184	0.37536	3.274

* *

VARIABLE(S) ENTERED ON STEP NUMBER 2.. GPA6 GRADE POINT AVERAGE AT END OF GRADE 6

MULTIPLE R	0.81207	ANALYSIS OF VARIANCE	DF	SUM OF SQUARES	MEAN SQUARE	F	P
R SQUARE	0.65946	REGRESSION	2.	437.71780	218.85890	16.46049	0.0001
ADJUSTED R SQUARE	0.61940	RESIDUAL	17.	226.03220	13.29601		
STANDARD ERROR	3.64637						

----------------- VARIABLES IN THE EQUATION ------------------

VARIABLE	B	BETA	STD ERROR B	F
READRAW6	0.3539699	0.44029	0.18572	3.632
GPA6	4.026930	0.41798	2.22564	3.274
(CONSTANT)	-2.857037			

------------- VARIABLES NOT IN THE EQUATION -------------

VARIABLE	BETA IN	PARTIAL	TOLERANCE	F
MATHRAW6	-0.24264	-0.31439	0.57174	1.755

FILE SYSFILE (CREATION DATE = 10/27/82)

* M U L T I P L E R E G R E S S I O N * * * * * * * * * * * * * VARIABLE LIST 1
REGRESSION LIST 3

DEPENDENT VARIABLE.. MEAPR7 GRADE 7 MEAP READING SCORE

VARIABLE(S) ENTERED ON STEP NUMBER 3.. MATHRAW6 GRADE 6 MATH RAW SCORE

MULTIPLE R	0.83254	ANALYSIS OF VARIANCE	DF	SUM OF SQUARES	MEAN SQUARE	F	P
R SQUARE	0.69312	REGRESSION	3.	460.05973	153.35324	12.04599	0.0002
ADJUSTED R SQUARE	0.63558	RESIDUAL	16.	203.69027	12.73064		
STANDARD ERROR	3.56800						

------------------ VARIABLES IN THE EQUATION ------------------

VARIABLE	B	BETA	STD ERROR B	F
READRAW6	0.3318247	0.41274	0.18250	3.306
GPA6	5.757796	0.59764	2.53967	5.140
MATHRAW6	-0.9853294E-01	-0.24264	0.07438	1.755
(CONSTANT)	-2.703521			

------------- VARIABLES NOT IN THE EQUATION -------------

VARIABLE	BETA IN	PARTIAL	TOLERANCE	F

MAXIMUM STEP REACHED

STATISTICS WHICH CANNOT BE COMPUTED ARE PRINTED AS ALL NINES.

FILE SYSFILE (CREATION DATE = 10/27/82)

* M U L T I P L E R E G R E S S I O N * * * * * * * * * * * * * * VARIABLE LIST 1
REGRESSION LIST 3

DEPENDENT VARIABLE.. MEAPR7 GRADE 7 MEAP READING SCORE

SUMMARY TABLE

VARIABLE		MULTIPLE R	R SQUARE	RSQ CHANGE	SIMPLE R	B	BETA
READRAW6	GRADE 6 READING RAW SCORE	0.77064	0.59388	0.59388	0.77064	0.3318247	0.41274
GPA6	GRADE POINT AVERAGE AT END OF GRADE 6	0.81207	0.65946	0.06558	0.76596	5.757796	0.59764
MATHRAW6	GRADE 6 MATH RAW SCORE	0.83254	0.69312	0.03366	0.34093	-0.9853294E-01	-0.24264
(CONSTANT)						-2.703521	

FILE SYSFILE (CREATION DATE = 10/27/82)

* M U L T I P L E R E G R E S S I O N * * * * * * * * * * * * * * VARIABLE LIST 1
REGRESSION LIST 4

DEPENDENT VARIABLE.. MEAPM7 GRADE 7 MEAP MATH SCORE

VARIABLE(S) ENTERED ON STEP NUMBER 1.. MATHRAW6 GRADE 6 MATH RAW SCORE

		ANALYSIS OF VARIANCE	DF	SUM OF SQUARES	MEAN SQUARE	F	P
MULTIPLE R	0.48051						
R SQUARE	0.23089	REGRESSION	1.	112.39662	112.39662	5.40363	0.0320
ADJUSTED R SQUARE	0.18816	RESIDUAL	18.	374.40338	20.80019		
STANDARD ERROR	4.56072						

------------------ VARIABLES IN THE EQUATION ------------------

VARIABLE	B	BETA	STD ERROR B	F
MATHRAW6	0.1671077	0.48051	0.07189	5.404
(CONSTANT)	12.92405			

------------- VARIABLES NOT IN THE EQUATION -------------

VARIABLE	BETA IN	PARTIAL	TOLERANCE	F
READRAW6	0.07704	0.07746	0.77752	0.103
GPA6	0.05787	0.05011	0.57658	0.043

* *

VARIABLE(S) ENTERED ON STEP NUMBER 2.. READRAW6 GRADE 6 READING RAW SCORE

		ANALYSIS OF VARIANCE	DF	SUM OF SQUARES	MEAN SQUARE	F	P
MULTIPLE R	0.48529						
R SQUARE	0.23550	REGRESSION	2.	114.64301	57.32151	2.61843	0.1020
ADJUSTED R SQUARE	0.14556	RESIDUAL	17.	372.15699	21.89159		
STANDARD ERROR	4.67884						

------------------ VARIABLES IN THE EQUATION ------------------

VARIABLE	B	BETA	STD ERROR B	F
MATHRAW6	0.1544706	0.44417	0.08364	3.411
READRAW6	0.5304099E-01	0.07704	0.16558	0.103
(CONSTANT)	12.21161			

------------- VARIABLES NOT IN THE EQUATION -------------

VARIABLE	BETA IN	PARTIAL	TOLERANCE	F
GPA6	-0.01404	-0.00844	0.27601	0.001

F-LEVEL OR TOLERANCE-LEVEL INSUFFICIENT FOR FURTHER COMPUTATION

STATISTICS WHICH CANNOT BE COMPUTED ARE PRINTED AS ALL NINES.

FILE SYSFILE (CREATION DATE = 10/27/82)

* M U L T I P L E R E G R E S S I O N * * * * * * * * * * * * * * VARIABLE LIST 1
REGRESSION LIST 4

DEPENDENT VARIABLE.. MEAPM7 GRADE 7 MEAP MATH SCORE

SUMMARY TABLE

VARIABLE		MULTIPLE R	R SQUARE	RSQ CHANGE	SIMPLE R	B	BETA
MATHRAW6	GRADE 6 MATH RAW SCORE	0.48051	0.23089	0.23089	0.48051	0.1544706	0.44417
READRAW6	GRADE 6 READING RAW SCORE	0.48529	0.23550	0.00461	0.28654	0.5304099E-01	0.07704
(CONSTANT)						12.21161	

```
TRANSPACE REQUIRED..        100 BYTES
      1 TRANSFORMATIONS
      0 RECODE VALUES + LAG VARIABLES
      3 IF/COMPUTE OPERATIONS

CPU TIME REQUIRED..     0.54 SECONDS


                 58 SELECT IF       (GROUP=3)
**WARNING**  THIS MISPLACED PERMANENT MODIFICATION IS TREATED AS TEMPORARY.  ERRORS MAY RESULT FURTHER ON.
                 59 REGRESSION      VARIABLES=MEAPR4 MEAPM4 MEAPR7 MEAPM7
                 60                           READRAW3 READRAW6
                 61                           MATHRAW3 MATHRAW6
                 62                           GPA3 GPA6/
                 63                 REGRESSION=MEAPR4 WITH READRAW3 MATHRAW3 GPA3(1)
                 64                            RESID=0/
                 65                 REGRESSION=MEAPM4 WITH READRAW3 MATHRAW3 GPA3(1)
                 66                            RESID=0/
                 67                 REGRESSION=MEAPR7 WITH READRAW6 MATHRAW6 GPA6(1)
                 68                            RESID=0/
                 69                 REGRESSION=MEAPM7 WITH READRAW6 MATHRAW6 GPA6(1)
                 70                            RESID=0/
                 71 STATISTICS      1,2

NO RESIDUALS OUTPUT WAS REQUESTED SO RESIDUALS WILL NOT BE CALCULATED.  SEE MANUAL RE OPTIONS 11,12  AND STATISTICS 4,5,6.

NO RESIDUALS OUTPUT WAS REQUESTED SO RESIDUALS WILL NOT BE CALCULATED.  SEE MANUAL RE OPTIONS 11,12  AND STATISTICS 4,5,6.

NO RESIDUALS OUTPUT WAS REQUESTED SO RESIDUALS WILL NOT BE CALCULATED.  SEE MANUAL RE OPTIONS 11,12  AND STATISTICS 4,5,6.

NO RESIDUALS OUTPUT WAS REQUESTED SO RESIDUALS WILL NOT BE CALCULATED.  SEE MANUAL RE OPTIONS 11,12  AND STATISTICS 4,5,6.

 ***** REGRESSION PROBLEM REQUIRES   1760 BYTES WORKSPACE, NOT INCLUDING RESIDUALS *****
```

SPSS NOW CONTAINS A NEW REGRESSION PROCEDURE.
SEE CHAPTER 3, PAGES 94-121 OF THE SPSS RELEASE 7-9 UPDATE MANUAL.
NEW REGRESSION WILL REPLACE THIS (OLD) REGRESSION PROCEDURE IN THE NEXT RELEASE.

NEW REGRESSION CONTAINS MANY NEW FEATURES, INCLUDING

- TRUE STEPWISE SELECTION
- BACKWARD EXCLUSION
- REGRESSION THROUGH THE ORIGIN
- MEAN SUBSTITUTION OFMISSING DATA
- INTERNAL SELECTION FOR CROSS-VALIDATION
- MANY TYPES OF RESIDUALS, PREDICTED VALUES, AND DISTANCE MEASURES
- HISTOGRAMS, NORMAL PROBABILITY PLOTS AND OUTLIER TABLES OF RESIDUALS

THE SYNTAX OF NEW REGRESSION DIFFERS FROM (OLD) REGRESSION. MOST NOTABLY, ALL OPTIONS AND STATISTICS ARE REQUESTED VIA KEYWORDS ON THE NEW REGRESSION CONTROL CARD. KEYWORDS IN NEW REGRESSION MAY BE ABBREVIATED TO THE FIRST THREE CHARACTERS (OR USE MORE FOR READABILITY). EQUALS SIGNS (=) ARE OPTIONAL.
HERE ARE EXAMPLES SHOWING COMPARABLE REQUESTS FROM (OLD) REGRESSION AND NEW REGRESSION:

```
                  OLD                          I                      NEW
                                               I
REGRESSION     VARIABLES = A TO E/             I   NEW REGRESSION  VARIABLES = A TO E/
               REGRESSION = A WITH B,C(2) D,E(1)/  I               DEPENDENT = A/ENTER B,C/FORWARD D,E/
                                               I
                                               I  SAME REQUEST, ABBREVIATED FORM:
                                               I   NEW REGRESSION  VAR A TO E/
                                               I                   DEP A/ENT B,C/FOR D,E/
                                               I
-----------------------------------------------I---------------------------------------------------
                                               I
REGRESSION     VARIABLES = A, C, E TO P, R, T TO Z/  I   NEW REGRESSION  VAR = A, C, E TO P, R, T TO Z/
               REGRESSION = A (999,3.84,.2)    I                   CRITERIA =  FIN(3.84) TOLERANCE(.2)/
                              WITH C TO Z/     I                   DEP = A/STEPWISE/
                                               I
                                               I  (THE USER HAS SPECIFIED TRUE STEPWISE IN NEW REGRESSION.)
                                               I
-----------------------------------------------I---------------------------------------------------
                                               I
REGRESSION     VARIABLES = A TO E/             I   NEW REGRESSION  VARIABLES = A TO E/MISSING = PAIRWISE/
               REGRESSION = A WITH B TO E RESIDS=O/  I             DESCRIPTIVE = MEAN STDDEV COR/
OPTIONS        2,11,12                         I                   DEP '= A/STEPWISE/
STATISTICS     1,2,4,5,6                       I                   RESIDUALS/CASEWISE = ALL/
                                               I                   SCATTER = (*RESID,*PRED)/SAVE = RESID PRED/
                                               I
                                               I  DEFAULT CASEWISE PLOT IS OF OUTLIERS ONLY:  CASEWISE/
                                               I  SCATTERPLOTS OF ANY VAR IN EQUATION:  SCATTER = (A,*RESID)/
```

FILE SYSFILE (CREATION DATE = 10/27/82)

VARIABLE	MEAN	STANDARD DEV	CASES
MEAPR4	10.8125	5.6536	32
MEAPM4	22.0000	7.8822	32
MEAPR7	14.2813	6.8024	32
MEAPM7	17.1563	5.7760	32
READRAW3	29.3125	13.0617	32
READRAW6	20.8438	7.5010	32
MATHRAW3	22.2813	9.9425	32
MATHRAW6	38.5625	11.4833	32
GPA3	2.3542	0.7390	32
GPA6	2.2318	0.6936	32

FILE SYSFILE (CREATION DATE = 10/27/82)

CORRELATION COEFFICIENTS

A VALUE OF 99.00000 IS PRINTED
IF A COEFFICIENT CANNOT BE COMPUTED.

	MEAPR4	MEAPM4	MEAPR7	MEAPM7	READRAW3	READRAW6	MATHRAW3	MATHRAW6	GPA3	GPA6
MEAPR4	1.00000	0.66886	0.66992	0.48694	0.45556	0.63748	0.43711	0.49805	0.71770	0.73330
MEAPM4	0.66886	1.00000	0.68104	0.75176	0.49129	0.64926	0.53016	0.62831	0.64608	0.65987
MEAPR7	0.66992	0.68104	1.00000	0.65647	0.31919	0.71085	0.38179	0.51576	0.61481	0.65350
MEAPM7	0.48694	0.75176	0.65647	1.00000	0.29008	0.50390	0.53059	0.67854	0.72596	0.72744
READRAW3	0.45556	0.49129	0.31919	0.29008	1.00000	0.36334	0.62650	0.31988	0.46716	0.55553
READRAW6	0.63748	0.64926	0.71085	0.50390	0.36334	1.00000	0.48505	0.54071	0.62617	0.60810
MATHRAW3	0.43711	0.53016	0.38179	0.53059	0.62650	0.48505	1.00000	0.51646	0.52381	0.51065
MATHRAW6	0.49805	0.62831	0.51576	0.67854	0.31988	0.54071	0.51646	1.00000	0.64604	0.69053
GPA3	0.71770	0.64608	0.61481	0.72596	0.46716	0.62617	0.52381	0.64604	1.00000	0.95438
GPA6	0.73330	0.65987	0.65350	0.72744	0.55553	0.60810	0.51065	0.69053	0.95438	1.00000

FILE SYSFILE (CREATION DATE = 10/27/82)

* M U L T I P L E   R E G R E S S I O N * * * * * * * * * * * * * * VARIABLE LIST 1
REGRESSION LIST 1

DEPENDENT VARIABLE.. MEAPR4 GRADE 4 MEAP READING SCORE

VARIABLE(S) ENTERED ON STEP NUMBER 1.. GPA3 GRADE POINT AVERAGE AT END OF GRADE 3

		ANALYSIS OF VARIANCE	DF	SUM OF SQUARES	MEAN SQUARE	F	P
MULTIPLE R	0.71770	REGRESSION	1.	510.39386	510.39386	31.86767	0.0000
R SQUARE	0.51509	RESIDUAL	30.	480.48114	16.01604		
ADJUSTED R SQUARE	0.49893						
STANDARD ERROR	4.00200						

----------------- VARIABLES IN THE EQUATION ------------------

VARIABLE	B	BETA	STD ERROR B	F
GPA3	5.490565	0.71770	0.97262	31.868
(CONSTANT)	-2.113202			

------------- VARIABLES NOT IN THE EQUATION -------------

VARIABLE	BETA IN	PARTIAL	TOLERANCE	F
READRAW3	0.15385	0.19535	0.78176	1.151
MATHRAW3	0.08430	0.10312	0.72562	0.312

* *

VARIABLE(S) ENTERED ON STEP NUMBER 2.. READRAW3 GRADE 3 READING RAW SCORE

		ANALYSIS OF VARIANCE	DF	SUM OF SQUARES	MEAN SQUARE	F	P
MULTIPLE R	0.73048	REGRESSION	2.	528.72962	264.36481	16.58911	0.0000
R SQUARE	0.53360	RESIDUAL	29.	462.14538	15.93605		
ADJUSTED R SQUARE	0.50143						
STANDARD ERROR	3.99200						

----------------- VARIABLES IN THE EQUATION ------------------

VARIABLE	B	BETA	STD ERROR B	F
GPA3	4.940720	0.64583	1.09728	20.274
READRAW3	0.6659325E-01	0.15385	0.06208	1.151
(CONSTANT)	-2.770791			

------------- VARIABLES NOT IN THE EQUATION -------------

VARIABLE	BETA IN	PARTIAL	TOLERANCE	F
MATHRAW3	0.00451	0.00485	0.53917	0.001

F-LEVEL OR TOLERANCE-LEVEL INSUFFICIENT FOR FURTHER COMPUTATION

STATISTICS WHICH CANNOT BE COMPUTED ARE PRINTED AS ALL NINES.

FILE SYSFILE (CREATION DATE = 10/27/82)

* M U L T I P L E   R E G R E S S I O N * * * * * * * * * * * * * * VARIABLE LIST 1
REGRESSION LIST 1

DEPENDENT VARIABLE.. MEAPR4 GRADE 4 MEAP READING SCORE

SUMMARY TABLE

VARIABLE		MULTIPLE R	R SQUARE	RSQ CHANGE	SIMPLE R	B	BETA
GPA3	GRADE POINT AVERAGE AT END OF GRADE 3	0.71770	0.51509	0.51509	0.71770	4.940720	0.64583
READRAW3	GRADE 3 READING RAW SCORE	0.73048	0.53360	0.01850	0.45556	0.6659325E-01	0.15385
(CONSTANT)						-2.770791	

FILE SYSFILE (CREATION DATE = 10/27/82)

* M U L T I P L E R E G R E S S I O N * * * * * * * * * * * * * * VARIABLE LIST 1
REGRESSION LIST 2

DEPENDENT VARIABLE.. MEAPM4 GRADE 4 MEAP MATH SCORE

VARIABLE(S) ENTERED ON STEP NUMBER 1.. GPA3 GRADE POINT AVERAGE AT END OF GRADE 3

		ANALYSIS OF VARIANCE	DF	SUM OF SQUARES	MEAN SQUARE	F	P
MULTIPLE R	0.64608	REGRESSION	1.	803.93758	803.93758	21.49446	0.0001
R SQUARE	0.41741	RESIDUAL	30.	1122.06242	37.40208		
ADJUSTED R SQUARE	0.39799						
STANDARD ERROR	6.11572						

---------------- VARIABLES IN THE EQUATION ------------------

VARIABLE	B	BETA	STD ERROR B	F
GPA3	6.890892	0.64608	1.48632	21.494
(CONSTANT)	5.777694			

------------ VARIABLES NOT IN THE EQUATION -------------

VARIABLE	BETA IN	PARTIAL	TOLERANCE	F
READRAW3	0.24236	0.28075	0.78176	2.481
MATHRAW3	0.26425	0.29491	0.72562	2.762

* *

VARIABLE(S) ENTERED ON STEP NUMBER 2.. MATHRAW3 GRADE 3 MATH RAW SCORE

		ANALYSIS OF VARIANCE	DF	SUM OF SQUARES	MEAN SQUARE	F	P
MULTIPLE R	0.68416	REGRESSION	2.	901.52373	450.76187	12.75978	0.0001
R SQUARE	0.46808	RESIDUAL	29.	1024.47627	35.32677		
ADJUSTED R SQUARE	0.43140						
STANDARD ERROR	5.94363						

---------------- VARIABLES IN THE EQUATION ------------------

VARIABLE	B	BETA	STD ERROR B	F
GPA3	5.414590	0.50766	1.69574	10.196
MATHRAW3	0.2094887	0.26425	0.12604	2.762
(CONSTANT)	4.585485			

------------ VARIABLES NOT IN THE EQUATION -------------

VARIABLE	BETA IN	PARTIAL	TOLERANCE	F
READRAW3	0.15249	0.15936	0.58088	0.730

FILE SYSFILE (CREATION DATE = 10/27/82)

* M U L T I P L E R E G R E S S I O N * * * * * * * * * * * * * VARIABLE LIST 1
REGRESSION LIST 2

DEPENDENT VARIABLE.. MEAPM4 GRADE 4 MEAP MATH SCORE

VARIABLE(S) ENTERED ON STEP NUMBER 3.. READRAW3 GRADE 3 READING RAW SCORE

MULTIPLE R	0.69397	ANALYSIS OF VARIANCE	DF	SUM OF SQUARES	MEAN SQUARE	F	P
R SQUARE	0.48159	REGRESSION	3.	927.54033	309.18011	8.67040	0.0003
ADJUSTED R SQUARE	0.42604	RESIDUAL	28.	998.45967	35.65927		
STANDARD ERROR	5.97154						

----------------- VARIABLES IN THE EQUATION ------------------

VARIABLE	B	BETA	STD ERROR B	F
GPA3	5.103037	0.47845	1.74231	8.578
MATHRAW3	0.1458791	0.18401	0.14691	0.986
READRAW3	0.9202397E-01	0.15249	0.10774	0.730
(CONSTANT)	4.038780			

------------- VARIABLES NOT IN THE EQUATION --------------

VARIABLE	BETA IN	PARTIAL	TOLERANCE	F

MAXIMUM STEP REACHED

STATISTICS WHICH CANNOT BE COMPUTED ARE PRINTED AS ALL NINES.

FILE SYSFILE (CREATION DATE = 10/27/82)

* M U L T I P L E   R E G R E S S I O N * * * * * * * * * * * * * * VARIABLE LIST 1
REGRESSION LIST 2

DEPENDENT VARIABLE.. MEAPM4 GRADE 4 MEAP MATH SCORE

SUMMARY TABLE

VARIABLE		MULTIPLE R	R SQUARE	RSQ CHANGE	SIMPLE R	B	BETA
GPA3	GRADE POINT AVERAGE AT END OF GRADE 3	0.64608	0.41741	0.41741	0.64608	5.103037	0.47845
MATHRAW3	GRADE 3 MATH RAW SCORE	0.68416	0.46808	0.05067	0.53016	0.1458791	0.18401
READRAW3	GRADE 3 READING RAW SCORE	0.69397	0.48159	0.01351	0.49129	0.9202397E-01	0.15249
(CONSTANT)						4.038780	

FILE SYSFILE (CREATION DATE = 10/27/82)

* M U L T I P L E   R E G R E S S I O N * * * * * * * * * * * * * *   VARIABLE LIST 1
REGRESSION LIST 3

DEPENDENT VARIABLE.. MEAPR7 GRADE 7 MEAP READING SCORE

VARIABLE(S) ENTERED ON STEP NUMBER 1.. READRAW6 GRADE 6 READING RAW SCORE

MULTIPLE R	0.71085	ANALYSIS OF VARIANCE	DF	SUM OF SQUARES	MEAN SQUARE	F	P
R SQUARE	0.50531	REGRESSION	1.	724.84567	724.84567	30.64355	0.0000
ADJUSTED R SQUARE	0.48882	RESIDUAL	30.	709.62308	23.65410		
STANDARD ERROR	4.86355						

------------------ VARIABLES IN THE EQUATION ------------------

VARIABLE	B	BETA	STD ERROR B	F
READRAW6	0.6446475	0.71085	0.11645	30.644
(CONSTANT)	0.8443788			

------------- VARIABLES NOT IN THE EQUATION -------------

VARIABLE	BETA IN	PARTIAL	TOLERANCE	F
MATHRAW6	0.18569	0.22208	0.70764	1.505
GPA6	0.35103	0.39621	0.63021	5.400

* *

VARIABLE(S) ENTERED ON STEP NUMBER 2.. GPA6 GRADE POINT AVERAGE AT END OF GRADE 6

MULTIPLE R	0.76352	ANALYSIS OF VARIANCE	DF	SUM OF SQUARES	MEAN SQUARE	F	P
R SQUARE	0.58296	REGRESSION	2.	836.24335	418.12167	20.26916	0.0000
ADJUSTED R SQUARE	0.55420	RESIDUAL	29.	598.22540	20.62846		
STANDARD ERROR	4.54186						

------------------ VARIABLES IN THE EQUATION ------------------

VARIABLE	B	BETA	STD ERROR B	F
READRAW6	0.4510618	0.49738	0.13699	10.842
GPA6	3.442814	0.35103	1.48152	5.400
(CONSTANT)	-2.804140			

------------- VARIABLES NOT IN THE EQUATION -------------

VARIABLE	BETA IN	PARTIAL	TOLERANCE	F
MATHRAW6	0.00884	0.00968	0.50002	0.003

F-LEVEL OR TOLERANCE-LEVEL INSUFFICIENT FOR FURTHER COMPUTATION

STATISTICS WHICH CANNOT BE COMPUTED ARE PRINTED AS ALL NINES.

FILE SYSFILE (CREATION DATE = 10/27/82)

* M U L T I P L E R E G R E S S I O N * * * * * * * * * * * * * * VARIABLE LIST 1
REGRESSION LIST 3

DEPENDENT VARIABLE.. MEAPR7 GRADE 7 MEAP READING SCORE

SUMMARY TABLE

VARIABLE		MULTIPLE R	R SQUARE	RSQ CHANGE	SIMPLE R	B	BETA
READRAW6	GRADE 6 READING RAW SCORE	0.71085	0.50531	0.50531	0.71085	0.4510618	0.49738
GPA6	GRADE POINT AVERAGE AT END OF GRADE 6	0.76352	0.58296	0.07766	0.65350	3.442814	0.35103
(CONSTANT)						-2.804140	

FILE SYSFILE (CREATION DATE = 10/27/82)

* M U L T I P L E R E G R E S S I O N * * * * * * * * * * * * * * VARIABLE LIST 1
REGRESSION LIST 4

DEPENDENT VARIABLE.. MEAPM7 GRADE 7 MEAP MATH SCORE

VARIABLE(S) ENTERED ON STEP NUMBER 1.. GPA6 GRADE POINT AVERAGE AT END OF GRADE 6

MULTIPLE R	0.72744	ANALYSIS OF VARIANCE	DF	SUM OF SQUARES	MEAN SQUARE	F	P
R SQUARE	0.52917	REGRESSION	1.	547.27638	547.27638	33.71711	0.0000
ADJUSTED R SQUARE	0.51347	RESIDUAL	30.	486.94237	16.23141		
STANDARD ERROR	4.02882						

----------------- VARIABLES IN THE EQUATION ------------------

VARIABLE	B	BETA	STD ERROR B	F
GPA6	6.057887	0.72744	1.04327	33.717
(CONSTANT)	3.636435			

------------- VARIABLES NOT IN THE EQUATION --------------

VARIABLE	BETA IN	PARTIAL	TOLERANCE	F
READRAW6	0.09765	0.11297	0.63021	0.375
MATHRAW6	0.33684	0.35507	0.52317	4.184

* *

VARIABLE(S) ENTERED ON STEP NUMBER 2.. MATHRAW6 GRADE 6 MATH RAW SCORE

MULTIPLE R	0.76716	ANALYSIS OF VARIANCE	DF	SUM OF SQUARES	MEAN SQUARE	F	P
R SQUARE	0.58853	REGRESSION	2.	608.66832	304.33416	20.73947	0.0000
ADJUSTED R SQUARE	0.56015	RESIDUAL	29.	425.55043	14.67415		
STANDARD ERROR	3.83069						

----------------- VARIABLES IN THE EQUATION ------------------

VARIABLE	B	BETA	STD ERROR B	F
GPA6	4.120882	0.49484	1.37142	9.029
MATHRAW6	0.1694275	0.33684	0.08283	4.184
(CONSTANT)	1.425838			

------------- VARIABLES NOT IN THE EQUATION --------------

VARIABLE	BETA IN	PARTIAL	TOLERANCE	F
READRAW6	0.03461	0.04188	0.60232	0.049

FILE SYSFILE (CREATION DATE = 10/27/82)

* M U L T I P L E   R E G R E S S I O N * * * * * * * * * * * * * * VARIABLE LIST 1
REGRESSION LIST 4

DEPENDENT VARIABLE.. MEAPM7 GRADE 7 MEAP MATH SCORE

VARIABLE(S) ENTERED ON STEP NUMBER 3.. READRAW6 GRADE 6 READING RAW SCORE

		ANALYSIS OF VARIANCE	DF	SUM OF SQUARES	MEAN SQUARE	F	P
MULTIPLE R	0.76763						
R SQUARE	0.58925	REGRESSION	3.	609.41468	203.13823	13.38940	0.0000
ADJUSTED R SQUARE	0.54524	RESIDUAL	28.	424.80407	15.17157		
STANDARD ERROR	3.89507						

------------------ VARIABLES IN THE EQUATION ------------------

VARIABLE	B	BETA	STD ERROR B	F
GPA6	3.991550	0.47931	1.51148	6.974
MATHRAW6	0.1654076	0.32885	0.08615	3.686
READRAW6	0.2665391E-01	0.03461	0.12017	0.049
(CONSTANT)	1.313927			

------------- VARIABLES NOT IN THE EQUATION --------------

VARIABLE	BETA IN	PARTIAL	TOLERANCE	F

MAXIMUM STEP REACHED

STATISTICS WHICH CANNOT BE COMPUTED ARE PRINTED AS ALL NINES.

FILE SYSFILE (CREATION DATE = 10/27/82)

* M U L T I P L E R E G R E S S I O N * * * * * * * * * * * * * * VARIABLE LIST 1
REGRESSION LIST 4

DEPENDENT VARIABLE.. MEAPM7 GRADE 7 MEAP MATH SCORE

SUMMARY TABLE

VARIABLE		MULTIPLE R	R SQUARE	RSQ CHANGE	SIMPLE R	B	BETA
GPA6	GRADE POINT AVERAGE AT END OF GRADE 6	0.72744	0.52917	0.52917	0.72744	3.991550	0.47931
MATHRAW6	GRADE 6 MATH RAW SCORE	0.76716	0.58853	0.05936	0.67854	0.1654076	0.32885
READRAW6	GRADE 6 READING RAW SCORE	0.76763	0.58925	0.00072	0.50390	0.2665391E-01	0.03461
(CONSTANT)						1.313927	

```
TRANSPACE REQUIRED..      100 BYTES
      1 TRANSFORMATIONS
      0 RECODE VALUES + LAG VARIABLES
      3 IF/COMPUTE OPERATIONS

CPU TIME REQUIRED..    0.51 SECONDS


                 72 FINISH

         NORMAL END OF JOB.
            72 CONTROL CARDS WERE PROCESSED.
             0 ERRORS WERE DETECTED.
```

APPENDIX 6

DISCRIMINANT ANALYSES

```
SPSS BATCH SYSTEM                                                                                       10/27/82        PAGE    1

MTS/SPSS, VERSION H, RELEASE 9.1, FEBRUARY 1, 1982

                                  CURRENT DOCUMENTATION FOR THE SPSS BATCH SYSTEM
ORDER FROM MCGRAW-HILL:  SPSS, 2ND ED. (PRINCIPAL TEXT)        ORDER FROM SPSS INC.:  SPSS STATISTICAL ALGORITHMS
                         SPSS UPDATE 7-9 (USE W/SPSS,2ND FOR REL. 7, 8, 9)            KEYWORDS: THE SPSS INC. NEWSLETTER
                         SPSS POCKET GUIDE, RELEASE 9
                         SPSS PRIMER (BRIEF INTRO TO SPSS)


DEFAULT SPACE ALLOCATION..     ALLOWS FOR..   102 TRANSFORMATIONS
WORKSPACE      71680 BYTES                    409 RECODE VALUES + LAG VARIABLES
TRANSPACE      10240 BYTES                   1641 IF/COMPUTE OPERATIONS

                  1 RUN NAME       DISCRIMINANT ANALYSES
                  2 GET FILE       SYSFILE


                              FILE SYSFILE  HAS  69 VARIABLES

                              THE SUBFILES ARE..

                                         NO OF
                              NAME       CASES

                              SYSFILE       92


CPU TIME REQUIRED..    0.27 SECONDS


                  3 COUNT          NSERV1=ARTЗK TITL1K ART31 TITL11(1)
                  4 COUNT          NSERV2=ART3K TITL1K ART31 ART32
                  5                       TITL11 TITL12(1)
                  6 COUNT          NSERV3=ART3K TITL1K
                  7                       ART31 TO ART33
                  8                       TITL11 TO TITL13(1)
                  9 COUNT          NSERV4=ART3K TITL1K
                 10                       ART31 TO ART34
                 11                       TITL11 TO TITL14(1)
                 12 COUNT          NSERV5=ART3K TITL1K
                 13                       ART31 TO ART35
                 14                       TITL11 TO TITL15(1)
                 15 COUNT          NSERV6=ART3K TITL1K
                 16                       ART31 TO ART36
                 17                       TITL11 TO TITL16(1)
                 18 COUNT          DIVISOR1=READM1 MATHM1(0,1,2,3,4)
                 19 COMPUTE        SUM1=READM1+MATHM1
                 20 COMPUTE        GPA1=SUM1/DIVISOR1
                 21 COUNT          DIVISOR2=READM1 READM2
                 22                         MATHM1 MATHM2(0,1,2,3,4)
                 23 COMPUTE        SUM2=READM1+READM2+MATHM1+MATHM2
```

```
COMPUTE        GPA2=SUM2/DIVISOR2
COUNT          DIVISOR3=READM1 TO READM3
                         MATHM1 TO MATHM3(0,1,2,3,4)
COMPUTE        SUM3=READM1+READM2+READM3+
                     MATHM1+MATHM2+MATHM3
COMPUTE        GPA3=SUM3/DIVISOR3
COUNT          DIVISOR4=READM1 TO READM4
                         MATHM1 TO MATHM4(0,1,2,3,4)
COMPUTE        SUM4=READM1+READM2+READM3+READM4+
                     MATHM1+MATHM2+MATHM3+MATHM4
COMPUTE        GPA4=SUM4/DIVISOR4
COUNT          DIVISOR5=READM1 TO READM5
                         MATHM1 TO MATHM5(0,1,2,3,4)
COMPUTE        SUM5=READM1+READM2+READM3+
                     READM4+READM5+
                     MATHM1+MATHM2+MATHM3+
                     MATHM4+MATHM5
COMPUTE        GPA5=SUM5/DIVISOR5
COUNT          DIVISOR6=READM1 TO READM6
                         MATHM1 TO MATHM6(0,1,2,3,4)
COMPUTE        SUM6=READM1+READM2+READM3+
                     READM4+READM5+READM6+
                     MATHM1+MATHM2+MATHM3+
                     MATHM4+MATHM5+MATHM6
COMPUTE        GPA6=SUM6/DIVISOR6
COMPUTE        AVGABS1=(ATTENDK+ATTEND1)/2
COMPUTE        AVGABS2=(2*AVGABS1+ATTEND2)/3
COMPUTE        AVGABS3=(3*AVGABS2+ATTEND3)/4
COMPUTE        AVGABS4=(4*AVGABS3+ATTEND4)/5
COMPUTE        AVGABS5=(5*AVGABS4+ATTEND5)/6
COMPUTE        AVGABS6=(6*AVGABS5+ATTEND6)/7
VAR LABELS     NSERV1 NUMBER OF SERVICES BY END OF GRADE 1/
               NSERV2 NUMBER OF SERVICES BY END OF GRADE 2/
               NSERV3 NUMBER OF SERVICES BY END OF GRADE 3/
               NSERV4 NUMBER OF SERVICES BY END OF GRADE 4/
               NSERV5 NUMBER OF SERVICES BY END OF GRADE 5/
               NSERV6 NUMBER OF SERVICES BY END OF GRADE 6/
               GPA1 GRADE POINT AVERAGE BY END OF GRADE 1/
               GPA2 GRADE POINT AVERAGE BY END OF GRADE 2/
               GPA3 GRADE POINT AVERAGE BY END OF GRADE 3/
               GPA4 GRADE POINT AVERAGE BY END OF GRADE 4/
               GPA5 GRADE POINT AVERAGE BY END OF GRADE 5/
               GPA6 GRADE POINT AVERAGE BY END OF GRADE 6/
               AVGABS1 MEAN NUMBER OF ABSENCES BY END OF GRADE 1/
               AVGABS2 MEAN NUMBER OF ABSENCES BY END OF GRADE 2/
               AVGABS3 MEAN NUMBER OF ABSENCES BY END OF GRADE 3/
               AVGABS4 MEAN NUMBER OF ABSENCES BY END OF GRADE 4/
               AVGABS5 MEAN NUMBER OF ABSENCES BY END OF GRADE 5/
               AVGABS6 MEAN NUMBER OF ABSENCES BY END OF GRADE 6/
DISCRIMINANT   GROUPS=GROUP(1,3)/
               VARIABLES=AVGABS1 NSERV1 READRAW1
                         MATHRAW1 GPA1/
               ANALYSIS=AVGABS1 TO GPA1(1)/
```

```
77                  METHOD=WILKS/
78                  FUNCTION=1
79 OPTIONS          5,6,7,8,11,12
80 STATISTICS       1,2,6
```

THIS DISCRIMINANT ANALYSIS REQUIRES 2940 (2.9K) BYTES OF WORKSPACE.

FILE SYSFILE (CREATION DATE = 10/27/82)

- D I S C R I M I N A N T A N A L Y S I S -

ON GROUPS DEFINED BY GROUP

92 (UNWEIGHTED) CASES WERE PROCESSED.
2 OF THESE WERE EXCLUDED FROM THE ANALYSIS.
0 HAD MISSING OR OUT-OF-RANGE GROUP CODES.
2 HAD AT LEAST ONE MISSING DISCRIMINATING VARIABLE.
0 HAD BOTH.
90 (UNWEIGHTED) CASES WILL BE USED IN THE ANALYSIS.

NUMBER OF CASES BY GROUP

	NUMBER OF CASES		
GROUP	UNWEIGHTED	WEIGHTED	LABEL
1	35	35.0	REGULAR
2	22	22.0	PRESCHL ONLY
3	33	33.0	FOLLOW THROUGH
TOTAL	90	90.0	

GROUP MEANS

GROUP	AVGABS1	NSERV1	READRAW1	MATHRAW1	GPA1
1	19.63571	0.88571	18.80000	38.34286	2.02857
2	13.37500	0.81818	21.31818	39.18182	2.45455
3	18.18182	0.84848	16.39394	31.75758	2.34848
TOTAL	17.57222	0.85556	18.53333	36.13333	2.25000

GROUP STANDARD DEVIATIONS

GROUP	AVGABS1	NSERV1	READRAW1	MATHRAW1	GPA1
1	12.42808	0.52979	8.82443	9.12960	0.79468
2	12.34831	0.66450	7.89446	9.32297	0.93744
3	16.85140	0.66714	7.80600	11.06806	0.93946
TOTAL	14.25669	0.61005	8.36687	10.37846	0.89396

WILKS' LAMBDA (U-STATISTIC) AND UNIVARIATE F-RATIO
WITH 2 AND 87 DEGREES OF FREEDOM

VARIABLE	WILKS' LAMBDA	F	SIGNIFICANCE
AVGABS1	0.96966	1.361	0.2618
NSERV1	0.99806	0.8450E-01	0.9191
READRAW1	0.94797	2.387	0.0979
MATHRAW1	0.89494	5.107	0.0080
GPA1	0.95843	1.887	0.1577

FILE SYSFILE (CREATION DATE = 10/27/82)

\- D I S C R I M I N A N T A N A L Y S I S -

ON GROUPS DEFINED BY GROUP

ANALYSIS NUMBER 1

STEPWISE VARIABLE SELECTION

SELECTION RULE: MINIMIZE WILKS' LAMBDA
MAXIMUM NUMBER OF STEPS.................. 10
MINIMUM TOLERANCE LEVEL.................. 0.00100
MINIMUM F TO ENTER....................... 1.0000
MAXIMUM F TO REMOVE...................... 1.0000

CANONICAL DISCRIMINANT FUNCTIONS

MAXIMUM NUMBER OF FUNCTIONS.............. 1
MINIMUM CUMULATIVE PERCENT OF VARIANCE... 100.00
MAXIMUM SIGNIFICANCE OF WILKS' LAMBDA.... 1.0000

PRIOR PROBABILITY FOR EACH GROUP IS 0.33333

-------------------- VARIABLES NOT IN THE ANALYSIS AFTER STEP 0 --------------------

VARIABLE	TOLERANCE	MINIMUM TOLERANCE	F TO ENTER	WILKS' LAMBDA
AVGABS1	1.0000000	1.0000000	1.3611	0.9696587
NSERV1	1.0000000	1.0000000	0.84497E-01	0.9980613
READRAW1	1.0000000	1.0000000	2.3874	0.9479731
MATHRAW1	1.0000000	1.0000000	5.1068	0.8949365
GPA1	1.0000000	1.0000000	1.8867	0.9584309

* *

AT STEP 1, MATHRAW1 WAS INCLUDED IN THE ANALYSIS.

		DEGREES OF FREEDOM			SIGNIFICANCE	BETWEEN GROUPS
WILKS' LAMBDA	0.8949365	1	2	87.0		
EQUIVALENT F	5.106802		2	87.0	0.0080	

---------------- VARIABLES IN THE ANALYSIS AFTER STEP 1 ----------------

VARIABLE	TOLERANCE	F TO REMOVE	WILKS' LAMBDA
MATHRAW1	1.0000000	5.1068	

-------------------- VARIABLES NOT IN THE ANALYSIS AFTER STEP 1 --------------------

VARIABLE	TOLERANCE	MINIMUM TOLERANCE	F TO ENTER	WILKS' LAMBDA
AVGABS1	0.9994932	0.9994932	1.3075	0.8685266
NSERV1	0.9992977	0.9992977	0.89907E-01	0.8930692
READRAW1	0.8980128	0.8980128	0.93030	0.8759846
GPA1	0.7975088	0.7975088	4.4609	0.8108200

* *

AT STEP 2, GPA1 WAS INCLUDED IN THE ANALYSIS.

		DEGREES OF FREEDOM			SIGNIFICANCE	BETWEEN GROUPS
WILKS' LAMBDA	0.8108200	2	2	87.0		
EQUIVALENT F	4.753613		4	172.0	0.0012	

---------------- VARIABLES IN THE ANALYSIS AFTER STEP 2 ----------------

VARIABLE	TOLERANCE	F TO REMOVE	WILKS' LAMBDA
MATHRAW1	0.7975088	7.8282	0.9584309
GPA1	0.7975088	4.4609	0.8949365

-------------------- VARIABLES NOT IN THE ANALYSIS AFTER STEP 2 --------------------

VARIABLE	TOLERANCE	MINIMUM TOLERANCE	F TO ENTER	WILKS' LAMBDA
AVGABS1	0.9658841	0.7706916	1.0344	0.7915539
NSERV1	0.9992603	0.7971597	0.76793E-01	0.8093575
READRAW1	0.7602729	0.6751844	1.8305	0.7773390

* *

AT STEP 3, READRAW1 WAS INCLUDED IN THE ANALYSIS.

		DEGREES OF FREEDOM			SIGNIFICANCE	BETWEEN GROUPS
WILKS' LAMBDA	0.7773390	3	2	87.0		
EQUIVALENT F	3.802713		6	170.0	0.0014	

---------------- VARIABLES IN THE ANALYSIS AFTER STEP 3 ----------------

VARIABLE	TOLERANCE	F TO REMOVE	WILKS' LAMBDA
READRAW1	0.7602729	1.8305	0.8108200
MATHRAW1	0.7831206	6.1791	0.8903568
GPA1	0.6751844	5.3933	0.8759846

-------------------- VARIABLES NOT IN THE ANALYSIS AFTER STEP 3 --------------------

VARIABLE	TOLERANCE	MINIMUM TOLERANCE	F TO ENTER	WILKS' LAMBDA
AVGABS1	0.9432878	0.6666621	0.80599	0.7627026
NSERV1	0.9915569	0.6746220	0.97366E-01	0.7755411

F LEVEL OR TOLERANCE OR VIN INSUFFICIENT FOR FURTHER COMPUTATION.

SUMMARY TABLE

STEP	ACTION ENTERED	ACTION REMOVED	VARS IN	WILKS' LAMBDA	SIG.	LABEL
1	MATHRAW1		1	0.894936	0.0080	GRADE 1 MATH RAW SCORE
2	GPA1		2	0.810820	0.0012	GRADE POINT AVERAGE BY END OF GRADE 1
3	READRAW1		3	0.777339	0.0014	GRADE 1 READING RAW SCORE

CLASSIFICATION FUNCTION COEFFICIENTS
(FISHER'S LINEAR DISCRIMINANT FUNCTIONS)

GROUP =	1 REGULAR	2 PRESCHL ONLY	3 FOLLOW THROUGH
READRAW1	0.1306324	0.1457106	0.7404867E-01
MATHRAW1	0.3429917	0.3246603	0.2449340
GPA1	0.2797332	0.8492371	1.433289
(CONSTANT)	-9.185927	-10.05439	-7.277871

CANONICAL DISCRIMINANT FUNCTIONS

FUNCTION	EIGENVALUE	PERCENT OF VARIANCE	CUMULATIVE PERCENT	CANONICAL CORRELATION	:	AFTER FUNCTION	WILKS' LAMBDA	CHI-SQUARED	D.F.	SIGNIFICANCE
					:	0	0.7773390	21.662	6	0.0014
1*	0.24156	86.98	86.98	0.4410879	:	1	0.9651092	3.0542	2	0.2172
2	0.03615	13.02	100.00	0.1867909	:					

* MARKS THE 1 CANONICAL DISCRIMINANT FUNCTION(S) TO BE USED IN THE REMAINING ANALYSIS.

STANDARDIZED CANONICAL DISCRIMINANT FUNCTION COEFFICIENTS

	FUNC 1
READRAW1	0.49087
MATHRAW1	0.91274
GPA1	-0.87733

UNSTANDARDIZED CANONICAL DISCRIMINANT FUNCTION COEFFICIENTS

	FUNC 1
READRAW1	0.5957565E-01
MATHRAW1	0.9191458E-01
GPA1	-0.9911331
(CONSTANT)	-2.195266

CANONICAL DISCRIMINANT FUNCTIONS EVALUATED AT GROUP MEANS (GROUP CENTROIDS)

GROUP	FUNC 1
1	0.43844
2	0.24338
3	-0.62726

CASE SUBFILE	SEQNUM	MIS VAL	SEL	ACTUAL GROUP		HIGHEST PROBABILITY GROUP	P(X/G)	P(G/X)	2ND HIGHEST GROUP	P(G/X)	DISCRIMINANT SCORES
SYSFILE	1			1	***	2	0.9424	0.3791	1	0.3772	0.3156
SYSFILE	2			1	***	3	0.3856	0.6467	2	0.2080	-1.4950
SYSFILE	3			1	***	2	0.9426	0.3709	1	0.3588	0.1714
SYSFILE	4			1		1	0.9775	0.3890	2	0.3838	0.4102
SYSFILE	5			1		1	0.7308	0.4329	2	0.3971	0.7825
SYSFILE	6			1	***	2	0.7525	0.3542	1	0.3268	-0.0720
SYSFILE	7			1		1	0.8942	0.4085	2	0.3906	0.5714
SYSFILE	8			1	***	2	0.9443	0.3790	1	0.3769	0.3132
SYSFILE	9			1		1	0.3678	0.4902	2	0.4034	1.3391
SYSFILE	10			1		1	0.1844	0.5277	2	0.3996	1.7658
SYSFILE	11			1		1	0.8264	0.4186	2	0.3935	0.6577
SYSFILE	12			1	***	3	0.9155	0.4694	2	0.2930	-0.7334
SYSFILE	13			1	***	2	0.7115	0.3500	3	0.3306	-0.1265
SYSFILE	14			1		1	0.0106	0.6124	2	0.3649	2.9953
SYSFILE	15			1		1	0.9279	0.3813	2	0.3808	0.3479
SYSFILE	16			1		1	0.2138	0.5207	2	0.4009	1.6817
SYSFILE	17			1		1	0.0968	0.5536	2	0.3929	2.0992
SYSFILE	18			1	***	2	0.8351	0.3620	1	0.3410	0.0352
SYSFILE	19			1		1	0.5063	0.4671	2	0.4026	1.1030
SYSFILE	20			1	***	3	0.6789	0.3493	2	0.3429	-0.2133
SYSFILE	21			1	***	3	0.5757	0.5771	2	0.2427	-1.1869
SYSFILE	22			1	***	3	0.1707	0.7466	2	0.1551	-1.9971
SYSFILE	23			1	***	2	0.9034	0.3678	1	0.3524	0.1220
SYSFILE	24			1	***	3	0.6751	0.3482	2	0.3433	-0.2082
SYSFILE	25			1	***	2	0.7315	0.3521	3	0.3249	-0.0997
SYSFILE	26			1		1	0.6399	0.4465	2	0.3998	0.9063
SYSFILE	27			1		1	0.7835	0.4250	2	0.3952	0.7132
SYSFILE	28			1		1	0.6886	0.4391	2	0.3985	0.8392
SYSFILE	29			1		1	0.0263	0.5920	2	0.3766	2.6599
SYSFILE	30			1	***	3	0.9848	0.4397	2	0.3060	-0.6082
SYSFILE	31			1		1	0.2295	0.5172	2	0.4014	1.6401
SYSFILE	32			1		1	0.2788	0.5068	2	0.4026	1.5214
SYSFILE	33			1	***	3	0.6979	0.5368	2	0.2621	-1.0155
SYSFILE	34			1	***	3	0.6363	0.5568	2	0.2525	-1.1001
SYSFILE	35			1		1	0.4405	0.4777	2	0.4033	1.2097
SYSFILE	36			2		2	0.8990	0.3674	1	0.3517	0.1165
SYSFILE	37			2	***	3	0.8628	0.4037	2	0.3212	-0.4545
SYSFILE	38			2	***	1	0.3523	0.4929	2	0.4034	1.3685
SYSFILE	39			2	***	3	0.9178	0.4199	2	0.3145	-0.5240
SYSFILE	40			2	***	3	0.8341	0.4941	2	0.2819	-0.8368
SYSFILE	41			2	***	3	0.7513	0.3708	2	0.3345	-0.3103
SYSFILE	42			2	***	1	0.6027	0.4521	2	0.4008	0.9590
SYSFILE	43			2	***	1	0.6648	0.4427	2	0.3992	0.8717
SYSFILE	44			2	***	3	0.7971	0.5055	2	0.2766	-0.8844
SYSFILE	45			2	***	3	0.8352	0.3956	2	0.3246	-0.4192
SYSFILE	46			2	***	1	0.4061	0.4835	2	0.4034	1.2693
SYSFILE	47			2	***	1	0.5354	0.4625	2	0.4021	1.0582
SYSFILE	48			2		2	0.9754	0.3734	1	0.3641	0.2125

CASE SUBFILE	SEQNUM	MIS VAL	SEL	ACTUAL GROUP		HIGHEST PROBABILITY GROUP	P(X/G)	P(G/X)	2ND HIGHEST GROUP	P(G/X)	DISCRIMINANT SCORES
SYSFILE	49			2	***	1	0.2627	0.5101	2	0.4023	1.5584
SYSFILE	50			2	***	1	0.2435	0.5141	2	0.4018	1.6046
SYSFILE	51			2	***	3	0.5505	0.5858	2	0.2385	-1.2243
SYSFILE	52			2	***	1	0.9296	0.3816	2	0.3809	0.3501
SYSFILE	53			2	***	3	0.7937	0.3834	2	0.3295	-0.3657
SYSFILE	54			2	***	3	0.8367	0.3960	2	0.3244	-0.4212
SYSFILE	55			2	***	1	0.5309	0.4632	2	0.4022	1.0651
SYSFILE	56			2		2	0.7350	0.3524	3	0.3239	-0.0951
SYSFILE	57			2	***	1	0.9861	0.3946	2	0.3859	0.4559
SYSFILE	58			3		3	0.0826	0.8064	2	0.1218	-2.3633
SYSFILE	59			3		3	0.9650	0.4338	2	0.3085	-0.5833
SYSFILE	60			3	***	2	0.7736	0.3563	1	0.3305	-0.0443
SYSFILE	61			3		3	0.1529	0.7571	2	0.1493	-2.0567
SYSFILE	62			3	***	1	0.8767	0.4111	2	0.3914	0.5935
SYSFILE	63			3		3	0.8112	0.3885	2	0.3275	-0.3883
SYSFILE	64			3		3	0.9770	0.4374	2	0.3070	-0.5984
SYSFILE	65			3	***	2	0.9108	0.3684	1	0.3536	0.1313
SYSFILE	66			3		3	0.8981	0.4141	2	0.3169	-0.4992
SYSFILE	67			3	***	2	0.9407	0.3792	1	0.3775	0.3178
SYSFILE	68			3		3	0.3856	0.6467	2	0.2080	-1.4950
SYSFILE	69			3	***	2	0.7396	0.3529	1	0.3245	-0.0890
SYSFILE	70			3		3	0.7382	0.5239	2	0.2681	-0.9615
SYSFILE	71			3	***	1	0.9256	0.3809	2	0.3806	0.3450
SYSFILE	72			3		3	0.8050	0.5031	2	0.2778	-0.8742
SYSFILE	73			3		3	0.3422	0.6643	2	0.1989	-1.5772
SYSFILE	74			3		3	0.0334	0.8576	2	0.0921	-2.7550
SYSFILE	75			3		3	0.0998	0.7928	2	0.1295	-2.2733
SYSFILE	76			3		3	0.4844	0.6092	2	0.2269	-1.3265
SYSFILE	77			3		3	0.3571	0.6581	2	0.2021	-1.5482
SYSFILE	79			3	***	1	0.9558	0.3992	2	0.3875	0.4938
SYSFILE	80			3		3	0.6433	0.5545	2	0.2536	-1.0904
SYSFILE	81			3	***	2	0.9071	0.3681	1	0.3530	0.1267
SYSFILE	83			3		3	0.9116	0.4181	2	0.3152	-0.5163
SYSFILE	84			3		3	0.7564	0.5182	2	0.2708	-0.9374
SYSFILE	85			3		3	0.8806	0.4090	2	0.3190	-0.4771
SYSFILE	86			3	***	1	0.9620	0.3983	2	0.3872	0.4860
SYSFILE	87			3	***	1	0.9974	0.3921	2	0.3849	0.4352
SYSFILE	88			3	***	1	0.8017	0.4223	2	0.3945	0.6896
SYSFILE	89			3		3	0.5980	0.5696	2	0.2464	-1.1546
SYSFILE	90			3	***	2	0.7081	0.3496	3	0.3316	-0.1311
SYSFILE	91			3	***	2	0.9111	0.3684	1	0.3537	0.1318
SYSFILE	92			3		3	0.9338	0.4639	2	0.2954	-0.7103

SYMBOLS USED IN PLOTS

SYMBOL	GROUP	LABEL
1	1	REGULAR
2	2	PRESCHL ONLY
3	3	FOLLOW THROUGH

HISTOGRAM FOR GROUP 1 REGULAR

-- CANONICAL DISCRIMINANT FUNCTION 1 --

```
             4 +                                                                                 +
               .                                                                                 .
               .                                                                                 .
F              .                                                                                 .
R            3 +                                       1   1                                     +
E              .                                       1   1                                     .
Q              .                                       1   1                                     .
U              .                                       1   1                                     .
E            2 +                                      11   1   11                                +
N              .                                      11   1   11                                .
C              .                                      11   1   11                                .
Y              .                                      11   1   11                                .
             1 +                    1    1  111  11   1111111 1111 111 1111  1     1  1          +
               .                    1    1  111  11   1111111 1111 111 1111  1     1  1          .
               .                    1    1  111  11   1111111 1111 111 1111  1     1  1          .
               .                    1    1  111  11   1111111 1111 111 1111  1     1  1          .
              OUT.........+.........+.........+.........+.........+.........+.........+.........OUT
                         -3        -2        -1         0         1         2         3
GROUP CENTROIDS                                              1
```

```
                          HISTOGRAM FOR GROUP       2  PRESCHL ONLY

                               -- CANONICAL DISCRIMINANT FUNCTION 1 --
             4 +                                                                                 +
               .                                                                                 .
               .                                                                                 .
F              .                                                                                 .
R            3 +                                    2                                            +
E              .                                    2                                            .
Q              .                                    2                                            .
U              .                                    2                                            .
E            2 +                                   22              2    2                        +
N              .                                   22              2    2                        .
C              .                                   22              2    2                        .
Y              .                                   22              2    2                        .
             1 +                            2  22  222 2 22 22   222 22 2                        +
               .                            2  22  222 2 22 22   222 22 2                        .
               .                            2  22  222 2 22 22   222 22 2                        .
               .                            2  22  222 2 22 22   222 22 2                        .
              OUT.........+.........+.........+.........+.........+.........+.........+.........OUT
                         -3        -2        -1         0         1         2         3
GROUP CENTROIDS                                            2
```

```
                          HISTOGRAM FOR GROUP       3  FOLLOW  THROUGH

                               -- CANONICAL DISCRIMINANT FUNCTION 1 --
             4 +                                                                                 +
               .                                                                                 .
               .                                                                                 .
F              .                                                                                 .
R            3 +                                   3     3                                       +
E              .                                   3     3                                       .
Q              .                                   3     3                                       .
U              .                                   3     3                                       .
E            2 +                         3     3  33   3 3 3 3                                   +
N              .                         3     3  33   3 3 3 3                                   .
C              .                         3     3  33   3 3 3 3                                   .
Y              .                         3     3  33   3 3 3 3                                   .
             1 +            3   33 3    33 33333 3333  333 33333                                 +
               .            3   33 3    33 33333 3333  333 33333                                 .
               .            3   33 3    33 33333 3333  333 33333                                 .
               .            3   33 3    33 33333 3333  333 33333                                 .
              OUT.........+.........+.........+.........+.........+.........+.........+.........OUT
                         -3        -2        -1         0         1         2         3
GROUP CENTROIDS                                   3
```

ALL-GROUPS STACKED HISTOGRAM

-- CANONICAL DISCRIMINANT FUNCTION 1 --

```
             8 +                                                                                 +
               .                                                                                 .
               .                                                                                 .
F              .                                                                                 .
R            6 +                                       3                                         +
E              .                                       3                                         .
Q              .                                   3   3 3 3                                     .
U              .                                   3   3 3 3                                     .
E            4 +                                   33  2 3 3                                     +
N              .                                   33  2 3 3                                     .
C              .                         3  3  3  332  1 3 133 3   2    2                        .
Y              .                         3  3  3  332  1 3 133 3   2    2                        .
             2 +                         3  2333 3322 113221233112 2 2  2                        +
               .                         3  2333 3322 113221233112 2 2  2                        .
               .            3   33 31   31 31112211222111111121111211121111  1     1  1          .
               .            3   33 31   31 31112211222111111121111211121111  1     1  1          .
              OUT.........+.........+.........+.........+.........+.........+.........+.........OUT
                         -3        -2        -1         0         1         2         3
GROUP CENTROIDS                                   3        2 1
```

CLASSIFICATION RESULTS -

ACTUAL GROUP	NO. OF CASES	PREDICTED GROUP MEMBERSHIP 1	2	3
GROUP 1 REGULAR	35	18 51.4%	8 22.9%	9 25.7%
GROUP 2 PRESCHL ONLY	22	10 45.5%	3 13.6%	9 40.9%
GROUP 3 FOLLOW THROUGH	33	6 18.2%	7 21.2%	20 60.6%

PERCENT OF "GROUPED" CASES CORRECTLY CLASSIFIED: 45.56%

CLASSIFICATION PROCESSING SUMMARY

92 CASES WERE PROCESSED.
2 CASES HAD AT LEAST ONE MISSING DISCRIMINATING VARIABLE.
90 CASES WERE USED FOR PRINTED OUTPUT.

```
TRANSPACE REQUIRED..      3000 BYTES
     30 TRANSFORMATIONS
     60 RECODE VALUES + LAG VARIABLES
     95 IF/COMPUTE OPERATIONS

CPU TIME REQUIRED..     1.40 SECONDS


                 81 DISCRIMINANT   GROUPS=GROUP(1,3)/
                 82                VARIABLES=AVGABS2 NSERV2 READRAW2
                 83                          MATHRAW2 GPA2/
                 84                ANALYSIS=AVGABS2 TO GPA2(1)/
                 85                METHOD=WILKS/
                 86                FUNCTION=1
                 87 OPTIONS        5,6,7,8,11,12
                 88 STATISTICS     1,2,6

THIS DISCRIMINANT ANALYSIS REQUIRES      2940 (       2.9K) BYTES OF WORKSPACE.
```

FILE SYSFILE (CREATION DATE = 10/27/82)

- D I S C R I M I N A N T A N A L Y S I S -

ON GROUPS DEFINED BY GROUP

92 (UNWEIGHTED) CASES WERE PROCESSED.
2 OF THESE WERE EXCLUDED FROM THE ANALYSIS.
0 HAD MISSING OR OUT-OF-RANGE GROUP CODES.
2 HAD AT LEAST ONE MISSING DISCRIMINATING VARIABLE.
0 HAD BOTH.
90 (UNWEIGHTED) CASES WILL BE USED IN THE ANALYSIS.

NUMBER OF CASES BY GROUP

	NUMBER OF CASES		
GROUP	UNWEIGHTED	WEIGHTED	LABEL
1	35	35.0	REGULAR
2	22	22.0	PRESCHL ONLY
3	33	33.0	FOLLOW THROUGH
TOTAL	90	90.0	

GROUP MEANS

GROUP	AVGABS2	NSERV2	READRAW2	MATHRAW2	GPA2
1	17.48095	2.08571	21.74286	16.80000	2.16429
2	12.40151	1.22727	27.36364	18.68182	2.59091
3	18.34848	1.78788	23.69697	15.84848	2.36364
TOTAL	16.55741	1.76667	23.83333	16.91111	2.34167

GROUP STANDARD DEVIATIONS

GROUP	AVGABS2	NSERV2	READRAW2	MATHRAW2	GPA2
1	10.36655	1.01087	7.01403	5.38953	0.65006
2	10.60955	1.10978	8.26090	6.35750	0.76976
3	16.47706	1.19262	8.88990	5.59085	0.74763
TOTAL	13.07761	1.14214	8.25336	5.75071	0.72810

WILKS' LAMBDA (U-STATISTIC) AND UNIVARIATE F-RATIO
WITH 2 AND 87 DEGREES OF FREEDOM

VARIABLE	WILKS' LAMBDA	F	SIGNIFICANCE
AVGABS2	0.96612	1.525	0.2233
NSERV2	0.91405	4.090	0.0201
READRAW2	0.92944	3.302	0.0415
MATHRAW2	0.96376	1.636	0.2007
GPA2	0.94736	2.417	0.0951

FILE SYSFILE (CREATION DATE = 10/27/82)

- D I S C R I M I N A N T   A N A L Y S I S -

ON GROUPS DEFINED BY GROUP

ANALYSIS NUMBER 1

STEPWISE VARIABLE SELECTION

```
     SELECTION RULE:  MINIMIZE WILKS' LAMBDA
     MAXIMUM NUMBER OF STEPS..................       10
     MINIMUM TOLERANCE LEVEL.................. 0.00100
     MINIMUM F TO ENTER.......................  1.0000
     MAXIMUM F TO REMOVE......................  1.0000
```

CANONICAL DISCRIMINANT FUNCTIONS

```
     MAXIMUM NUMBER OF FUNCTIONS..............       1
     MINIMUM CUMULATIVE PERCENT OF VARIANCE...  100.00
     MAXIMUM SIGNIFICANCE OF WILKS' LAMBDA....  1.0000
```

PRIOR PROBABILITY FOR EACH GROUP IS 0.33333

------------------- VARIABLES NOT IN THE ANALYSIS AFTER STEP 0 -------------------

VARIABLE	TOLERANCE	MINIMUM TOLERANCE	F TO ENTER	WILKS' LAMBDA
AVGABS2	1.0000000	1.0000000	1.5254	0.9661203
NSERV2	1.0000000	1.0000000	4.0902	0.9140538
READRAW2	1.0000000	1.0000000	3.3022	0.9294427
MATHRAW2	1.0000000	1.0000000	1.6359	0.9637570
GPA2	1.0000000	1.0000000	2.4173	0.9473552

* *

AT STEP 1, NSERV2 WAS INCLUDED IN THE ANALYSIS.

		DEGREES OF FREEDOM			SIGNIFICANCE	BETWEEN GROUPS
WILKS' LAMBDA	0.9140538	1	2	87.0		
EQUIVALENT F	4.090197		2	87.0	0.0201	

---------------- VARIABLES IN THE ANALYSIS AFTER STEP 1 ----------------

VARIABLE	TOLERANCE	F TO REMOVE	WILKS' LAMBDA
NSERV2	1.0000000	4.0902	

-------------------- VARIABLES NOT IN THE ANALYSIS AFTER STEP 1 --------------------

VARIABLE	TOLERANCE	MINIMUM TOLERANCE	F TO ENTER	WILKS' LAMBDA
AVGABS2	0.9829771	0.9829771	0.99454	0.8933907
READRAW2	0.9851704	0.9851704	2.2633	0.8683477
MATHRAW2	0.9996764	0.9996764	1.4904	0.8834333
GPA2	0.9713773	0.9713773	1.3834	0.8855627

* *

AT STEP 2, READRAW2 WAS INCLUDED IN THE ANALYSIS.

		DEGREES OF FREEDOM			SIGNIFICANCE	BETWEEN GROUPS
WILKS' LAMBDA	0.8683477	2	2	87.0		
EQUIVALENT F	3.144680		4	172.0	0.0159	

---------------- VARIABLES IN THE ANALYSIS AFTER STEP 2 ----------------

VARIABLE	TOLERANCE	F TO REMOVE	WILKS' LAMBDA
NSERV2	0.9851704	3.0254	0.9294427
READRAW2	0.9851704	2.2633	0.9140538

-------------------- VARIABLES NOT IN THE ANALYSIS AFTER STEP 2 --------------------

VARIABLE	TOLERANCE	MINIMUM TOLERANCE	F TO ENTER	WILKS' LAMBDA
AVGABS2	0.9612340	0.9612340	0.70191	0.8542394
MATHRAW2	0.6303772	0.6212300	1.2910	0.8427480
GPA2	0.9306317	0.9306317	0.75526	0.8531858

* *

AT STEP 3, MATHRAW2 WAS INCLUDED IN THE ANALYSIS.

		DEGREES OF FREEDOM			SIGNIFICANCE	BETWEEN GROUPS
WILKS' LAMBDA	0.8427480	3	2	87.0		
EQUIVALENT F	2.530425		6	170.0	0.0226	

---------------- VARIABLES IN THE ANALYSIS AFTER STEP 3 ----------------

VARIABLE	TOLERANCE	F TO REMOVE	WILKS' LAMBDA
NSERV2	0.9802679	2.9513	0.9012698
READRAW2	0.6212300	2.0518	0.8834333
MATHRAW2	0.6303772	1.2910	0.8683477

-------------------- VARIABLES NOT IN THE ANALYSIS AFTER STEP 3 --------------------

VARIABLE	TOLERANCE	MINIMUM TOLERANCE	F TO ENTER	WILKS' LAMBDA
AVGABS2	0.9551237	0.6180968	0.58960	0.8310812
GPA2	0.8452837	0.5725654	1.1745	0.8198214

* *

AT STEP 4, GPA2 WAS INCLUDED IN THE ANALYSIS.

		DEGREES OF FREEDOM			SIGNIFICANCE	BETWEEN GROUPS
WILKS' LAMBDA	0.8198214	4	2	87.0		
EQUIVALENT F	2.193147		8	168.0	0.0303	

---------------- VARIABLES IN THE ANALYSIS AFTER STEP 4 ----------------

VARIABLE	TOLERANCE	F TO REMOVE	WILKS' LAMBDA
NSERV2	0.9501836	2.2613	0.8639606
READRAW2	0.6210108	2.0302	0.8594500
MATHRAW2	0.5725654	1.7093	0.8531858
GPA2	0.8452837	1.1745	0.8427480

-------------------- VARIABLES NOT IN THE ANALYSIS AFTER STEP 4 --------------------

VARIABLE	TOLERANCE	MINIMUM TOLERANCE	F TO ENTER	WILKS' LAMBDA
AVGABS2	0.9475679	0.5711665	0.57080	0.8086983

SUMMARY TABLE

STEP	ACTION ENTERED	ACTION REMOVED	VARS IN	WILKS' LAMBDA	SIG.	LABEL
1	NSERV2		1	0.914054	0.0201	NUMBER OF SERVICES BY END OF GRADE 2
2	READRAW2		2	0.868348	0.0159	GRADE 2 READING RAW SCORE
3	MATHRAW2		3	0.842748	0.0226	GRADE 2 MATH RAW SCORE
4	GPA2		4	0.819821	0.0303	GRADE POINT AVERAGE BY END OF GRADE 2

CLASSIFICATION FUNCTION COEFFICIENTS
(FISHER'S LINEAR DISCRIMINANT FUNCTIONS)

GROUP =	1 REGULAR	2 PRESCHL ONLY	3 FOLLOW THROUGH
NSERV2	2.350555	1.782622	2.207398
READRAW2	0.2346485	0.3184903	0.2983105
MATHRAW2	0.1521982	0.1096665	0.4595418E-01
GPA2	3.809587	4.405109	4.305070
(CONSTANT)	-11.50185	-13.28102	-12.05838

CANONICAL DISCRIMINANT FUNCTIONS

FUNCTION	EIGENVALUE	PERCENT OF VARIANCE	CUMULATIVE PERCENT	CANONICAL CORRELATION	:	AFTER FUNCTION	WILKS' LAMBDA	CHI-SQUARED	D.F.	SIGNIFICANCE
					:	0	0.8198214	16.986	8	0.0303
1*	0.17671	82.84	82.84	0.3875170	:	1	0.9646880	3.0738	3	0.3804
2	0.03660	17.16	100.00	0.1879148	:					

* MARKS THE 1 CANONICAL DISCRIMINANT FUNCTION(S) TO BE USED IN THE REMAINING ANALYSIS.

STANDARDIZED CANONICAL DISCRIMINANT FUNCTION COEFFICIENTS

	FUNC 1
NSERV2	-0.57884
READRAW2	0.65299
MATHRAW2	-0.27243
GPA2	0.41584

UNSTANDARDIZED CANONICAL DISCRIMINANT FUNCTION COEFFICIENTS

	FUNC 1
NSERV2	-0.5241052
READRAW2	0.8113845E-01
MATHRAW2	-0.4771017E-01
GPA2	0.5801555
(CONSTANT)	-1.559579

CANONICAL DISCRIMINANT FUNCTIONS EVALUATED AT GROUP MEANS (GROUP CENTROIDS)

GROUP	FUNC 1
1	-0.43444
2	0.62926
3	0.04126

CASE SUBFILE	SEQNUM	MIS VAL	SEL	ACTUAL GROUP		HIGHEST PROBABILITY GROUP	P(X/G)	P(G/X)	2ND HIGHEST GROUP	P(G/X)	DISCRIMINANT SCORES
SYSFILE	1			1		1	0.8501	0.3743	3	0.3657	-0.2454
SYSFILE	2			1		1	0.7478	0.4609	3	0.3532	-0.7559
SYSFILE	3			1		1	0.4770	0.5254	3	0.3345	-1.1456
SYSFILE	4			1		1	0.1880	0.6183	3	0.2952	-1.7508
SYSFILE	5			1	***	2	0.8279	0.4564	3	0.3379	0.8467
SYSFILE	6			1	***	3	0.8746	0.3664	1	0.3527	-0.1165
SYSFILE	7			1		1	0.8821	0.3812	3	0.3653	-0.2862
SYSFILE	8			1		1	0.1071	0.6591	3	0.2735	-2.0458
SYSFILE	9			1		1	0.5319	0.5114	3	0.3392	-1.0596
SYSFILE	10			1		1	0.7226	0.4665	3	0.3519	-0.7894
SYSFILE	11			1		1	0.9323	0.3919	3	0.3644	-0.3496
SYSFILE	12			1	***	2	0.2679	0.6198	3	0.2718	1.7371
SYSFILE	13			1	***	3	0.9440	0.3649	2	0.3199	0.1115
SYSFILE	14			1	***	2	0.4554	0.5558	3	0.3015	1.3756
SYSFILE	15			1	***	3	0.8909	0.3638	2	0.3318	0.1784
SYSFILE	16			1		1	0.4317	0.5375	3	0.3302	-1.2208
SYSFILE	17			1		1	0.4351	0.5366	3	0.3306	-1.2149
SYSFILE	18			1		1	0.2937	0.5788	3	0.3136	-1.4844
SYSFILE	19			1		1	0.8238	0.3687	3	0.3660	-0.2118
SYSFILE	20			1		1	0.9004	0.3851	3	0.3650	-0.3093
SYSFILE	21			1		1	0.4325	0.5373	3	0.3303	-1.2194
SYSFILE	22			1	***	3	0.9614	0.3652	1	0.3187	0.0896
SYSFILE	23			1		1	0.7555	0.4592	3	0.3536	-0.7458
SYSFILE	24			1	***	3	0.8738	0.3664	1	0.3529	-0.1176
SYSFILE	25			1	***	3	0.8467	0.3627	2	0.3419	0.2346
SYSFILE	26			1	***	3	0.8520	0.3628	2	0.3406	0.2278
SYSFILE	27			1		1	0.8442	0.4397	3	0.3576	-0.6309
SYSFILE	28			1	***	3	0.8502	0.3628	2	0.3411	0.2301
SYSFILE	29			1	***	2	0.8410	0.3774	3	0.3572	0.4286
SYSFILE	30			1		1	0.7943	0.4506	3	0.3555	-0.6952
SYSFILE	31			1	***	2	0.8963	0.3905	3	0.3547	0.4990
SYSFILE	32			1		1	0.1731	0.6248	3	0.2919	-1.7966
SYSFILE	33			1		1	0.5857	0.4982	3	0.3433	-0.9795
SYSFILE	34			1		1	0.1241	0.6492	3	0.2790	-1.9721
SYSFILE	35			1	***	3	0.9503	0.3662	1	0.3369	-0.0211
SYSFILE	36			2		2	0.3032	0.6064	3	0.2784	1.6589
SYSFILE	37			2	***	1	0.8486	0.4388	3	0.3578	-0.6253
SYSFILE	38			2	***	3	0.8724	0.3664	1	0.3532	-0.1193
SYSFILE	39			2		2	0.8879	0.4418	3	0.3421	0.7702
SYSFILE	40			2		2	0.9341	0.4308	3	0.3452	0.7119
SYSFILE	41			2		2	0.6944	0.4898	3	0.3270	1.0222
SYSFILE	42			2		2	0.7868	0.3645	3	0.3595	0.3588
SYSFILE	43			2		2	0.0563	0.7416	3	0.2031	2.5380
SYSFILE	44			2		2	0.4262	0.5648	3	0.2976	1.4249
SYSFILE	45			2	***	1	0.8951	0.4288	3	0.3596	-0.5663
SYSFILE	46			2	***	1	0.8343	0.3709	3	0.3659	-0.2252
SYSFILE	47			2	***	1	0.6978	0.4721	3	0.3505	-0.8228
SYSFILE	48			2		2	0.5332	0.5331	3	0.3109	1.2524

CASE SUBFILE	SEQNUM	MIS VAL	SEL	ACTUAL GROUP		HIGHEST GROUP	P(X/G)	P(G/X)	2ND HIGHEST GROUP	P(G/X)	DISCRIMINANT SCORES
SYSFILE	49			2		2	0.6615	0.4983	3	0.3241	1.0671
SYSFILE	50			2		2	0.6623	0.4981	3	0.3241	1.0661
SYSFILE	51			2	***	1	0.1200	0.6515	3	0.2777	-1.9894
SYSFILE	52			2		2	0.8502	0.4510	3	0.3395	0.8181
SYSFILE	53			2		2	0.0906	0.7118	3	0.2214	2.3212
SYSFILE	54			2		2	0.7277	0.4813	3	0.3299	0.9774
SYSFILE	55			2	***	3	0.8750	0.3635	2	0.3354	0.1986
SYSFILE	56			2		2	0.1368	0.6815	3	0.2390	2.1170
SYSFILE	57			2	***	3	0.8792	0.3664	1	0.3517	-0.1107
SYSFILE	58			3		3	0.9495	0.3662	1	0.3370	-0.0220
SYSFILE	59			3	***	1	0.7492	0.4606	3	0.3533	-0.7542
SYSFILE	60			3	***	1	0.8049	0.4483	3	0.3559	-0.6814
SYSFILE	61			3	***	1	0.7776	0.4543	3	0.3547	-0.7169
SYSFILE	62			3	***	1	0.8307	0.3702	3	0.3659	-0.2207
SYSFILE	63			3	***	1	0.8755	0.3798	3	0.3654	-0.2778
SYSFILE	65			3	***	2	0.1154	0.6946	3	0.2315	2.2037
SYSFILE	66			3	***	2	0.9857	0.4185	3	0.3483	0.6471
SYSFILE	67			3	***	1	0.9497	0.4171	3	0.3614	-0.4975
SYSFILE	68			3	***	1	0.1016	0.6625	3	0.2715	-2.0716
SYSFILE	69			3	***	2	0.3671	0.5839	3	0.2890	1.5311
SYSFILE	70			3	***	2	0.5968	0.5155	3	0.3177	1.1583
SYSFILE	71			3	***	2	0.5943	0.5162	3	0.3175	1.1618
SYSFILE	72			3		3	0.7801	0.3606	2	0.3575	0.3205
SYSFILE	73			3	***	1	0.5888	0.4975	3	0.3435	-0.9750
SYSFILE	74			3	***	1	0.8830	0.4314	3	0.3592	-0.5816
SYSFILE	75			3	***	2	0.6179	0.5098	3	0.3199	1.1280
SYSFILE	76			3	***	1	0.7484	0.4607	3	0.3532	-0.7552
SYSFILE	77			3	***	2	0.7845	0.4671	3	0.3346	0.9027
SYSFILE	78			3	***	2	0.2622	0.6221	3	0.2707	1.7505
SYSFILE	79			3	***	2	0.5253	0.5353	3	0.3100	1.2645
SYSFILE	80			3	***	1	0.3311	0.5667	3	0.3188	-1.4063
SYSFILE	81			3	***	1	0.9253	0.4223	3	0.3607	-0.5281
SYSFILE	82			3	***	1	0.6555	0.4818	3	0.3480	-0.8806
SYSFILE	83			3	***	2	0.8657	0.3833	3	0.3561	0.4601
SYSFILE	84			3		3	0.8214	0.3662	1	0.3641	-0.1845
SYSFILE	85			3	***	2	0.8405	0.4533	3	0.3388	0.8305
SYSFILE	86			3		3	0.9420	0.3662	1	0.3386	-0.0315
SYSFILE	87			3	***	1	0.9735	0.4120	3	0.3621	-0.4676
SYSFILE	88			3	***	1	0.7661	0.4568	3	0.3541	-0.7319
SYSFILE	89			3	***	2	0.4578	0.5551	3	0.3018	1.3718
SYSFILE	91			3		3	0.9587	0.3661	1	0.3351	-0.0105
SYSFILE	92			3	***	1	0.2543	0.5924	3	0.3076	-1.5743

SYMBOLS USED IN PLOTS

SYMBOL	GROUP	LABEL
1	1	REGULAR
2	2	PRESCHL ONLY
3	3	FOLLOW THROUGH

HISTOGRAM FOR GROUP 1 REGULAR

-- CANONICAL DISCRIMINANT FUNCTION 1 --

```
             4 +                                          1                                      +
               .                                          1                                      .
               .                                          1                                      .
F              .                                          1                                      .
R            3 +                            1        1    1                                      +
E              .                            1        1    1                                      .
Q              .                            1        1    1                                      .
U              .                            1        1    1                                      .
E            2 +                    1 1     11  11   111 11                                      +
N              .                    1 1     11  11   111 11                                      .
C              .                    1 1     11  11   111 11                                      .
Y              .                    1 1     11  11   111 11                                      .
             1 +                    1 1  1  111 111  111111 11  1     1  1                       +
               .                    1 1  1  111 111  111111 11  1     1  1                       .
               .                    1 1  1  111 111  111111 11  1     1  1                       .
               .                    1 1  1  111 111  111111 11  1     1  1                       .
              OUT.........+.........+.........+.........+.........+.........+.........+.........OUT
                         -3        -2        -1         0         1         2         3
GROUP CENTROIDS                                     1
```

```
                               HISTOGRAM FOR GROUP       2  PRESCHL ONLY

                                  -- CANONICAL DISCRIMINANT FUNCTION 1 --
             4 +                                                                                 +
               .                                                                                 .
               .                                                                                 .
F              .                                                                                 .
R            3 +                                                                                 +
E              .                                                                                 .
Q              .                                                                                 .
U              .                                                                                 .
E            2 +                                  2    2        2 22                             +
N              .                                  2    2        2 22                             .
C              .                                  2    2        2 22                             .
Y              .                                  2    2        2 22                             .
             1 +                    2           2 2   22  2 2  22 22 22  2   2 2 2               +
               .                    2           2 2   22  2 2  22 22 22  2   2 2 2               .
               .                    2           2 2   22  2 2  22 22 22  2   2 2 2               .
               .                    2           2 2   22  2 2  22 22 22  2   2 2 2               .
              OUT.........+.........+.........+.........+.........+.........+.........+.........OUT
                         -3        -2        -1         0         1         2         3
GROUP CENTROIDS                                                2

                               HISTOGRAM FOR GROUP       3  FOLLOW  THROUGH

                                  -- CANONICAL DISCRIMINANT FUNCTION 1 --
             4 +                                                                                 +
               .                                                                                 .
               .                                                                                 .
F              .                                                                                 .
R            3 +                                 3 3    3                                        +
E              .                                 3 3    3                                        .
Q              .                                 3 3    3                                        .
U              .                                 3 3    3                                        .
E            2 +                                33 3  3 3           3                            +
N              .                                33 3  3 3           3                            .
C              .                                33 3  3 3           3                            .
Y              .                                33 3  3 3           3                            .
             1 +                   3    3 3   333333 33 3  3 33 33 33333  3   3                  +
               .                   3    3 3   333333 33 3  3 33 33 33333  3   3                  .
               .                   3    3 3   333333 33 3  3 33 33 33333  3   3                  .
               .                   3    3 3   333333 33 3  3 33 33 33333  3   3                  .
              OUT.........+.........+.........+.........+.........+.........+.........+.........OUT
                         -3        -2        -1         0         1         2         3
GROUP CENTROIDS                                         3
```

```
                                        ALL-GROUPS STACKED HISTOGRAM

                                   -- CANONICAL DISCRIMINANT FUNCTION 1 --
             8 +                                                                                 +
               .                                                                                 .
               .                                                                                 .
F              .                                                                                 .
R            6 +                                                                                 +
E              .                                                                                 .
Q              .                                33    3   2                                      .
U              .                                33    3   2                                      .
E            4 +                                333  3323 1     3                                +
N              .                                333  3323 1     3                                .
C              .                    2       1   2323 1223 1     2  3  3                          .
Y              .                    2       1   2323 1223 1     2  3  3                          .
             2 +                    1 1     113 1123 111311 23  2 22332  2                       +
               .                    1 1     113 1123 111311 23  2 22332  2                       .
               .                   31 1 313 11131113 1111113113213223213 13 232 2                .
               .                   31 1 313 11131113 1111113113213223213 13 232 2                .
              OUT.........+.........+.........+.........+.........+.........+.........+.........OUT
                         -3        -2        -1         0         1         2         3
GROUP CENTROIDS                                     1    3     2
```

CLASSIFICATION RESULTS -

ACTUAL GROUP	NO. OF CASES	PREDICTED GROUP MEMBERSHIP 1	2	3
GROUP 1 REGULAR	35	21 60.0%	5 14.3%	9 25.7%
GROUP 2 PRESCHL ONLY	22	5 22.7%	14 63.6%	3 13.6%
GROUP 3 FOLLOW THROUGH	33	16 48.5%	12 36.4%	5 15.2%

PERCENT OF "GROUPED" CASES CORRECTLY CLASSIFIED: 44.44%

CLASSIFICATION PROCESSING SUMMARY

```
92 CASES WERE PROCESSED.
 2 CASES HAD AT LEAST ONE MISSING DISCRIMINATING VARIABLE.
90 CASES WERE USED FOR PRINTED OUTPUT.
```

CPU TIME REQUIRED.. 1.11 SECONDS

```
89 DISCRIMINANT   GROUPS=GROUP(1,3)/
90                VARIABLES=AVGABS3 NSERV3 READRAW3
91                          MATHRAW3 MEAPR4 MEAPM4 GPA3/
92                ANALYSIS=AVGABS3 TO GPA3(1)/
93                METHOD=WILKS/
94                FUNCTION=1
95 OPTIONS        5,6,7,8,11,12
96 STATISTICS     1,2,6
```

THIS DISCRIMINANT ANALYSIS REQUIRES 2972 (2.9K) BYTES OF WORKSPACE.

FILE SYSFILE (CREATION DATE = 10/27/82)

- D I S C R I M I N A N T A N A L Y S I S -

ON GROUPS DEFINED BY GROUP

92 (UNWEIGHTED) CASES WERE PROCESSED.
4 OF THESE WERE EXCLUDED FROM THE ANALYSIS.
0 HAD MISSING OR OUT-OF-RANGE GROUP CODES.
4 HAD AT LEAST ONE MISSING DISCRIMINATING VARIABLE.
0 HAD BOTH.
88 (UNWEIGHTED) CASES WILL BE USED IN THE ANALYSIS.

NUMBER OF CASES BY GROUP

GROUP	NUMBER OF CASES UNWEIGHTED	WEIGHTED	LABEL
1	35	35.0	REGULAR
2	20	20.0	PRESCHL ONLY
3	33	33.0	FOLLOW THROUGH
TOTAL	88	88.0	

GROUP MEANS

GROUP	AVGABS3	NSERV3	READRAW3	MATHRAW3	MEAPR4	MEAPM4	GPA3
1	16.82857	3.28571	20.60000	24.42857	8.28571	20.34286	2.22381
2	11.65000	1.90000	28.50000	28.75000	10.30000	23.70000	2.60833
3	16.79166	2.84848	29.00000	22.42424	10.72727	21.96970	2.35353
TOTAL	15.63778	2.80682	25.54545	24.65909	9.65909	21.71591	2.35985

GROUP STANDARD DEVIATIONS

GROUP	AVGABS3	NSERV3	READRAW3	MATHRAW3	MEAPR4	MEAPM4	GPA3
1	9.32117	1.42605	6.46802	9.74464	5.15964	8.75128	0.58150
2	9.52650	1.68273	10.89906	8.80714	6.08795	7.28445	0.69936
3	14.61995	1.58353	12.98075	9.82036	5.58610	7.76001	0.72739
TOTAL	11.70999	1.61785	10.98370	9.76139	5.59122	8.08425	0.67471

WILKS' LAMBDA (U-STATISTIC) AND UNIVARIATE F-RATIO
WITH 2 AND 85 DEGREES OF FREEDOM

VARIABLE	WILKS' LAMBDA	F	SIGNIFICANCE
AVGABS3	0.96550	1.519	0.2249
NSERV3	0.89228	5.131	0.0079
READRAW3	0.86429	6.673	0.0020
MATHRAW3	0.93952	2.736	0.0705
MEAPR4	0.95886	1.823	0.1677
MEAPM4	0.97417	1.127	0.3289
GPA3	0.95243	2.123	0.1260

FILE SYSFILE (CREATION DATE = 10/27/82)

--------------------- D I S C R I M I N A N T   A N A L Y S I S ---------------------

ON GROUPS DEFINED BY GROUP

ANALYSIS NUMBER 1

STEPWISE VARIABLE SELECTION

SELECTION RULE: MINIMIZE WILKS' LAMBDA
MAXIMUM NUMBER OF STEPS.................. 14
MINIMUM TOLERANCE LEVEL.................. 0.00100
MINIMUM F TO ENTER...................... 1.0000
MAXIMUM F TO REMOVE..................... 1.0000

CANONICAL DISCRIMINANT FUNCTIONS

MAXIMUM NUMBER OF FUNCTIONS.............. 1
MINIMUM CUMULATIVE PERCENT OF VARIANCE... 100.00
MAXIMUM SIGNIFICANCE OF WILKS' LAMBDA.... 1.0000

PRIOR PROBABILITY FOR EACH GROUP IS 0.33333

-------------------- VARIABLES NOT IN THE ANALYSIS AFTER STEP 0 --------------------

VARIABLE	TOLERANCE	MINIMUM TOLERANCE	F TO ENTER	WILKS' LAMBDA
AVGABS3	1.0000000	1.0000000	1.5188	0.9654968
NSERV3	1.0000000	1.0000000	5.1310	0.8922753
READRAW3	1.0000000	1.0000000	6.6735	0.8642871
MATHRAW3	1.0000000	1.0000000	2.7360	0.9395170
MEAPR4	1.0000000	1.0000000	1.8233	0.9588626
MEAPM4	1.0000000	1.0000000	1.1267	0.9741743
GPA3	1.0000000	1.0000000	2.1226	0.9524315

* *

AT STEP 1, READRAW3 WAS INCLUDED IN THE ANALYSIS.

		DEGREES OF FREEDOM			SIGNIFICANCE	BETWEEN GROUPS
WILKS' LAMBDA	0.8642871	1	2	85.0		
EQUIVALENT F	6.673476		2	85.0	0.0020	

---------------- VARIABLES IN THE ANALYSIS AFTER STEP 1 ----------------

VARIABLE	TOLERANCE	F TO REMOVE	WILKS' LAMBDA
READRAW3	1.0000000	6.6735	

-------------------- VARIABLES NOT IN THE ANALYSIS AFTER STEP 1 --------------------

VARIABLE	TOLERANCE	MINIMUM TOLERANCE	F TO ENTER	WILKS' LAMBDA
AVGABS3	0.9095092	0.9095092	1.4519	0.8354083
NSERV3	0.9308536	0.9308536	3.5137	0.7975631
MATHRAW3	0.6639668	0.6639668	6.7538	0.7445581
MEAPR4	0.7313528	0.7313528	0.22792E-01	0.8638183
MEAPM4	0.8217435	0.8217435	0.44207	0.8552848
GPA3	0.7316061	0.7316061	1.4576	0.8352986

* *

AT STEP 2, MATHRAW3 WAS INCLUDED IN THE ANALYSIS.

		DEGREES OF FREEDOM			SIGNIFICANCE	BETWEEN GROUPS
WILKS' LAMBDA	0.7445581	2	2	85.0		
EQUIVALENT F	6.674333		4	168.0	0.0001	

---------------- VARIABLES IN THE ANALYSIS AFTER STEP 2 ----------------

VARIABLE	TOLERANCE	F TO REMOVE	WILKS' LAMBDA
READRAW3	0.6639668	10.997	0.9395170
MATHRAW3	0.6639668	6.7538	0.8642871

-------------------- VARIABLES NOT IN THE ANALYSIS AFTER STEP 2 --------------------

VARIABLE	TOLERANCE	MINIMUM TOLERANCE	F TO ENTER	WILKS' LAMBDA
AVGABS3	0.9080106	0.6295861	1.0916	0.7254749
NSERV3	0.9077190	0.6474652	3.1087	0.6926704
MEAPR4	0.6048909	0.5491570	1.4949	0.7186699
MEAPM4	0.6859430	0.5542403	0.26330	0.7398639
GPA3	0.6658067	0.5969293	0.36597	0.7380495

* *

AT STEP 3, NSERV3 WAS INCLUDED IN THE ANALYSIS.

		DEGREES OF FREEDOM			SIGNIFICANCE	BETWEEN GROUPS
WILKS' LAMBDA	0.6926704	3	2	85.0		
EQUIVALENT F	5.575821		6	166.0	0.0000	

---------------- VARIABLES IN THE ANALYSIS AFTER STEP 3 ----------------

VARIABLE	TOLERANCE	F TO REMOVE	WILKS' LAMBDA
NSERV3	0.9077190	3.1087	0.7445581
READRAW3	0.6525362	9.8953	0.8578314
MATHRAW3	0.6474652	6.2844	0.7975631

-------------------- VARIABLES NOT IN THE ANALYSIS AFTER STEP 3 --------------------

VARIABLE	TOLERANCE	MINIMUM TOLERANCE	F TO ENTER	WILKS' LAMBDA
AVGABS3	0.9064227	0.6207265	0.96236	0.6767848
MEAPR4	0.5998919	0.5428449	1.5973	0.6666965
MEAPM4	0.6765540	0.5488634	0.23062	0.6887959
GPA3	0.6366391	0.5947650	0.85279E-01	0.6912327

* *

AT STEP 4, MEAPR4 WAS INCLUDED IN THE ANALYSIS.

		DEGREES OF FREEDOM			SIGNIFICANCE	BETWEEN GROUPS
WILKS' LAMBDA	0.6666965	4	2	85.0		
EQUIVALENT F	4.606707		8	164.0	0.0000	

---------------- VARIABLES IN THE ANALYSIS AFTER STEP 4 ----------------

VARIABLE	TOLERANCE	F TO REMOVE	WILKS' LAMBDA
NSERV3	0.9002174	3.1962	0.7186699
READRAW3	0.6097957	6.9546	0.7797849
MATHRAW3	0.5428449	7.8597	0.7945026
MEAPR4	0.5998919	1.5973	0.6926704

-------------------- VARIABLES NOT IN THE ANALYSIS AFTER STEP 4 --------------------

VARIABLE	TOLERANCE	MINIMUM TOLERANCE	F TO ENTER	WILKS' LAMBDA
AVGABS3	0.9063213	0.5421816	0.89365	0.6523032
MEAPM4	0.4823480	0.4276919	0.95883E-01	0.6651219
GPA3	0.5772983	0.5318262	0.46750	0.6590885

F LEVEL OR TOLERANCE OR VIN INSUFFICIENT FOR FURTHER COMPUTATION.

SUMMARY TABLE

STEP	ACTION ENTERED	ACTION REMOVED	VARS IN	WILKS' LAMBDA	SIG.	LABEL
1	READRAW3		1	0.864287	0.0020	GRADE 3 READING RAW SCORE
2	MATHRAW3		2	0.744558	0.0001	GRADE 3 MATH RAW SCORE
3	NSERV3		3	0.692670	0.0000	NUMBER OF SERVICES BY END OF GRADE 3
4	MEAPR4		4	0.666697	0.0000	GRADE 4 MEAP READING SCORE

CLASSIFICATION FUNCTION COEFFICIENTS
(FISHER'S LINEAR DISCRIMINANT FUNCTIONS)

GROUP =	1 REGULAR	2 PRESCHL ONLY	3 FOLLOW THROUGH
NSERV3	2.079110	1.577829	1.963570
READRAW3	0.1202368	0.1857179	0.2408756
MATHRAW3	0.2771012	0.2699407	0.1435667
MEAPR4	0.2076578E-01	-0.5641434E-02	0.1116172
(CONSTANT)	-9.223355	-9.095373	-9.596269

CANONICAL DISCRIMINANT FUNCTIONS

FUNCTION	EIGENVALUE	PERCENT OF VARIANCE	CUMULATIVE PERCENT	CANONICAL CORRELATION	:	AFTER FUNCTION	WILKS' LAMBDA	CHI-SQUARED	D.F.	SIGNIFICANCE
					:	0	0.6666965	33.853	8	0.0000
1*	0.31067	68.27	68.27	0.4868559	:	1	0.8738159	11.263	3	0.0104
2	0.14441	31.73	100.00	0.3552240	:					

* MARKS THE 1 CANONICAL DISCRIMINANT FUNCTION(S) TO BE USED IN THE REMAINING ANALYSIS.

STANDARDIZED CANONICAL DISCRIMINANT FUNCTION COEFFICIENTS

	FUNC 1
NSERV3	-0.12217
READRAW3	0.99655
MATHRAW3	-1.04116
MEAPR4	0.41518

UNSTANDARDIZED CANONICAL DISCRIMINANT FUNCTION COEFFICIENTS

	FUNC 1
NSERV3	-0.7901549E-01
READRAW3	0.9646533E-01
MATHRAW3	-0.1087687
MEAPR4	0.7495563E-01
(CONSTANT)	-0.2843333

CANONICAL DISCRIMINANT FUNCTIONS EVALUATED AT GROUP MEANS (GROUP CENTROIDS)

GROUP	FUNC 1
1	-0.59277
2	-0.04026
3	0.65310

CASE SUBFILE	SEQNUM	MIS VAL	SEL	ACTUAL GROUP		HIGHEST GROUP	P(X/G)	P(G/X)	2ND HIGHEST GROUP	P(G/X)	DISCRIMINANT SCORES
SYSFILE	1			1	***	2	0.9373	0.3786	1	0.3395	-0.1189
SYSFILE	2			1		1	0.4053	0.5864	2	0.3179	-1.4249
SYSFILE	3			1		1	0.7592	0.4905	2	0.3555	-0.8993
SYSFILE	4			1	***	2	0.7974	0.3777	1	0.3737	-0.2970
SYSFILE	5			1	***	2	0.9987	0.3781	1	0.3243	-0.0386
SYSFILE	6			1		1	0.4098	0.5851	2	0.3185	-1.4170
SYSFILE	7			1		1	0.8884	0.4039	2	0.3747	-0.4524
SYSFILE	8			1	***	3	0.9548	0.4577	2	0.3460	0.7098
SYSFILE	9			1		1	0.7936	0.4819	2	0.3580	-0.8544
SYSFILE	10			1	***	2	0.8959	0.3760	3	0.3237	0.0906
SYSFILE	11			1		1	0.5480	0.5454	2	0.3359	-1.1936
SYSFILE	12			1		1	0.9892	0.4286	2	0.3707	-0.5792
SYSFILE	13			1		1	0.7612	0.4900	2	0.3556	-0.8967
SYSFILE	14			1	***	2	0.9777	0.3778	1	0.3193	-0.0123
SYSFILE	15			1		1	0.2613	0.6349	2	0.2930	-1.7161
SYSFILE	16			1	***	2	0.9996	0.3781	1	0.3245	-0.0397
SYSFILE	17			1	***	2	0.9107	0.3787	1	0.3458	-0.1524
SYSFILE	18			1		1	0.5830	0.5359	2	0.3397	-1.1418
SYSFILE	19			1		1	0.3080	0.6180	2	0.3021	-1.6121
SYSFILE	20			1		1	0.2828	0.6270	2	0.2973	-1.6669
SYSFILE	21			1	***	3	0.7896	0.3864	2	0.3656	0.3863
SYSFILE	22			1	***	2	0.7884	0.3776	1	0.3759	-0.3087
SYSFILE	23			1		1	0.7766	0.4861	2	0.3568	-0.8765
SYSFILE	24			1		1	0.6126	0.5280	2	0.3427	-1.0992
SYSFILE	25			1	***	2	0.9345	0.3786	1	0.3401	-0.1224
SYSFILE	26			1		1	0.8909	0.4579	2	0.3644	-0.7299
SYSFILE	27			1		1	0.1184	0.7003	2	0.2537	-2.1542
SYSFILE	28			1		1	0.9060	0.4542	2	0.3653	-0.7109
SYSFILE	29			1		1	0.2770	0.6291	2	0.2962	-1.6799
SYSFILE	30			1		1	0.8956	0.4057	2	0.3745	-0.4616
SYSFILE	31			1	***	3	0.7687	0.5101	2	0.3271	0.9472
SYSFILE	32			1	***	3	0.8092	0.3920	2	0.3644	0.4117
SYSFILE	33			1	***	2	0.8627	0.3750	3	0.3324	0.1327
SYSFILE	34			1	***	2	0.7828	0.3775	1	0.3773	-0.3159
SYSFILE	35			1		1	0.8888	0.4040	2	0.3747	-0.4530
SYSFILE	36			2	***	3	0.0565	0.7985	2	0.1673	2.5603
SYSFILE	38			2		2	0.8523	0.3784	1	0.3600	-0.2264
SYSFILE	39			2		2	0.7643	0.3710	3	0.3591	0.2596
SYSFILE	40			2	***	3	0.7929	0.3873	2	0.3654	0.3905
SYSFILE	41			2	***	3	0.7639	0.3792	2	0.3672	0.3528
SYSFILE	42			2		2	0.9081	0.3763	3	0.3206	0.0751
SYSFILE	43			2	***	3	0.8637	0.4072	2	0.3607	0.4814
SYSFILE	44			2	***	3	0.8466	0.4024	2	0.3619	0.4597
SYSFILE	45			2	***	1	0.2412	0.6426	2	0.2887	-1.7647
SYSFILE	46			2		2	0.8189	0.3734	3	0.3441	0.1886
SYSFILE	47			2	***	1	0.5449	0.5462	2	0.3356	-1.1982
SYSFILE	48			2	***	1	0.9033	0.4076	2	0.3742	-0.4713
SYSFILE	49			2	***	1	0.6332	0.5226	2	0.3447	-1.0701

CASE SUBFILE	SEQNUM	MIS VAL	SEL	ACTUAL GROUP		HIGHEST PROBABILITY GROUP	P(X/G)	P(G/X)	2ND HIGHEST GROUP	P(G/X)	DISCRIMINANT SCORES
SYSFILE	50			2		2	0.9751	0.3784	1	0.3305	-0.0715
SYSFILE	51			2	***	1	0.4605	0.5700	2	0.3254	-1.3308
SYSFILE	52			2	***	3	0.5603	0.5721	2	0.3004	1.2355
SYSFILE	53			2	***	3	0.6601	0.5418	2	0.3141	1.0929
SYSFILE	54			2	***	1	0.2953	0.6225	2	0.2997	-1.6394
SYSFILE	55			2		2	0.9830	0.3783	1	0.3286	-0.0616
SYSFILE	56			2		2	0.9782	0.3783	1	0.3297	-0.0676
SYSFILE	58			3	***	1	0.6087	0.5291	2	0.3423	-1.1047
SYSFILE	59			3		3	0.7882	0.5045	2	0.3293	0.9218
SYSFILE	60			3	***	1	0.7826	0.3775	2	0.3775	-0.3168
SYSFILE	61			3		3	0.7487	0.3748	2	0.3681	0.3327
SYSFILE	62			3		3	0.0218	0.8427	2	0.1351	2.9469
SYSFILE	63			3	***	1	0.8985	0.4561	2	0.3649	-0.7203
SYSFILE	64			3		3	0.4787	0.5982	2	0.2879	1.3614
SYSFILE	65			3		3	0.0493	0.8058	2	0.1621	2.6191
SYSFILE	66			3		3	0.9133	0.4693	2	0.3422	0.7620
SYSFILE	67			3		3	0.0576	0.7974	2	0.1681	2.5516
SYSFILE	68			3	***	1	0.7094	0.5030	2	0.3515	-0.9654
SYSFILE	69			3		3	0.4901	0.5945	2	0.2897	1.3433
SYSFILE	70			3		3	0.4249	0.6163	2	0.2787	1.4511
SYSFILE	72			3	***	2	0.9664	0.3785	1	0.3325	-0.0824
SYSFILE	73			3		3	0.9104	0.4202	2	0.3573	0.5405
SYSFILE	74			3	***	1	0.7827	0.3776	2	0.3775	-0.3170
SYSFILE	75			3		3	0.2390	0.6879	2	0.2391	1.8307
SYSFILE	76			3		3	0.8013	0.5008	2	0.3308	0.9047
SYSFILE	77			3		3	0.0060	0.8835	2	0.1032	3.4026
SYSFILE	78			3		3	0.1734	0.7192	2	0.2201	2.0143
SYSFILE	79			3		3	0.8903	0.4147	2	0.3588	0.5152
SYSFILE	80			3		3	0.4415	0.6107	2	0.2816	1.4228
SYSFILE	82			3		3	0.6096	0.5570	2	0.3074	1.1637
SYSFILE	83			3	***	2	0.7686	0.3712	3	0.3579	0.2539
SYSFILE	84			3	***	2	0.9418	0.3771	3	0.3120	0.0328
SYSFILE	85			3	***	1	0.7148	0.5017	2	0.3519	-0.9582
SYSFILE	86			3	***	1	0.7827	0.4846	2	0.3572	-0.8685
SYSFILE	87			3	***	2	0.8819	0.3786	1	0.3528	-0.1888
SYSFILE	88			3	***	2	0.9402	0.3786	1	0.3388	-0.1153
SYSFILE	89			3		3	0.9831	0.4405	2	0.3515	0.6320
SYSFILE	90			3		3	0.7410	0.5181	2	0.3240	0.9837
SYSFILE	91			3	***	1	0.7757	0.4864	2	0.3567	-0.8777
SYSFILE	92			3	***	2	0.9038	0.3762	3	0.3217	0.0806

SYMBOLS USED IN PLOTS

SYMBOL	GROUP	LABEL
1	1	REGULAR
2	2	PRESCHL ONLY
3	3	FOLLOW THROUGH

```
                              HISTOGRAM FOR GROUP       1  REGULAR

                                    -- CANONICAL DISCRIMINANT FUNCTION 1 --
             4 +                               1                                                 +
               .                               1                                                 .
               .                               1                                                 .
F              .                               1                                                 .
R            3 +                       1       1   1 1  1                                        +
E              .                       1       1   1 1  1                                        .
Q              .                       1       1   1 1  1                                        .
U              .                       1       1   1 1  1                                        .
E            2 +                       1  1  1 1 1 1 1 111  1                                    +
N              .                       1  1  1 1 1 1 1 111  1                                    .
C              .                       1  1  1 1 1 1 1 111  1                                    .
Y              .                       1  1  1 1 1 1 1 111  1                                    .
             1 +                  1    11 1 11 1 111 11111  1  1 1                               +
               .                  1    11 1 11 1 111 11111  1  1 1                               .
               .                  1    11 1 11 1 111 11111  1  1 1                               .
               .                  1    11 1 11 1 111 11111  1  1 1                               .
              OUT.........+.........+.........+.........+.........+.........+.........+.........OUT
                         -3        -2        -1         0         1         2         3
GROUP CENTROIDS                                    1
```

```
                               HISTOGRAM FOR GROUP        2  PRESCHL ONLY

                                    -- CANONICAL DISCRIMINANT FUNCTION 1 --
              4 +                                                                               +
                .                                                                               .
                .                                                                               .
F               .                                                                               .
R             3 +                                      2                                        +
E               .                                      2                                        .
Q               .                                      2                                        .
U               .                                      2                                        .
E             2 +                                      2    22                                  +
N               .                                      2    22                                  .
C               .                                      2    22                                  .
Y               .                                      2    22                                  .
              1 +                     2 2  222     2  22 22222     22             2             +
                .                     2 2  222     2  22 22222     22             2             .
                .                     2 2  222     2  22 22222     22             2             .
                .                     2 2  222     2  22 22222     22             2             .
              OUT.........+.........+.........+.........+.........+.........+.........+.........OUT
                         -3        -2        -1         0         1         2         3
GROUP CENTROIDS                                         2

                               HISTOGRAM FOR GROUP        3  FOLLOW  THROUGH

                                    -- CANONICAL DISCRIMINANT FUNCTION 1 --
              4 +                                                                               +
                .                                                                               .
                .                                                                               .
F               .                                                                               .
R             3 +                                                                               +
E               .                                                                               .
Q               .                                                                               .
U               .                                                                               .
E             2 +                             33     3 3   3 3   3    3           3             +
N               .                             33     3 3   3 3   3    3           3             .
C               .                             33     3 3   3 3   3    3           3             .
Y               .                             33     3 3   3 3   3    3           3             .
              1 +                            333 3   33333 3 33 333 3333  3 3     3  3    3     +
                .                            333 3   33333 3 33 333 3333  3 3     3  3    3     .
                .                            333 3   33333 3 33 333 3333  3 3     3  3    3     .
                .                            333 3   33333 3 33 333 3333  3 3     3  3    3     .
              OUT.........+.........+.........+.........+.........+.........+.........+.........OUT
                         -3        -2        -1         0         1         2         3
GROUP CENTROIDS                                                3
```

ALL-GROUPS STACKED HISTOGRAM

-- CANONICAL DISCRIMINANT FUNCTION 1 --

```
             8 +                                                                                +
               .                                                                                .
               .                                       3                                        .
F              .                                       3                                        .
R            6 +                               3       3                                        +
E              .                               3       3                                        .
Q              .                               3     3 2                                        .
U              .                               3     3 2                                        .
E            4 +                             3 1   2 3 233  23                                  +
N              .                             3 1   2 3 233  23                                  .
C              .                       1     2 1 3 1 13212 323   3               3              .
Y              .                       1     2 1 3 1 13212 323   3               3              .
             2 +                       12 1 2131 1 1 12111 312   3  3 3          3              +
               .                       12 1 2131 1 1 12111 312   3  3 3          3              .
               .                  1   211 121131 111 1111122123131322333  3 3    2  3    3      .
               .                  1   211 121131 111 1111122123131322333  3 3    2  3    3      .
              OUT.........+.........+.........+.........+.........+.........+.........+........OUT
                         -3        -2        -1         0         1         2         3
GROUP CENTROIDS                                    1    2      3
```

CLASSIFICATION RESULTS -

ACTUAL GROUP	NO. OF CASES	PREDICTED GROUP MEMBERSHIP 1	2	3
GROUP 1 REGULAR	35	20 57.1%	11 31.4%	4 11.4%
GROUP 2 PRESCHL ONLY	20	6 30.0%	7 35.0%	7 35.0%
GROUP 3 FOLLOW THROUGH	33	8 24.2%	6 18.2%	19 57.6%

PERCENT OF "GROUPED" CASES CORRECTLY CLASSIFIED: 52.27%

CLASSIFICATION PROCESSING SUMMARY

```
92 CASES WERE PROCESSED.
 4 CASES HAD AT LEAST ONE MISSING DISCRIMINATING VARIABLE.
88 CASES WERE USED FOR PRINTED OUTPUT.
```

```
CPU TIME REQUIRED..    1.05 SECONDS


                 97 DISCRIMINANT   GROUPS=GROUP(1,3)/
                 98                VARIABLES=AVGABS4 NSERV4 READRAW4
                 99                          MATHRAW4 GPA4/
                100                ANALYSIS=AVGABS4 TO GPA4(1)/
                101                METHOD=WILKS/
                102                FUNCTION=1
                103 OPTIONS        5,6,7,8,11,12
                104 STATISTICS     1,2,6

THIS DISCRIMINANT ANALYSIS REQUIRES      2940 (       2.9K) BYTES OF WORKSPACE.
```

FILE SYSFILE (CREATION DATE = 10/27/82)

- D I S C R I M I N A N T   A N A L Y S I S -

ON GROUPS DEFINED BY GROUP

92 (UNWEIGHTED) CASES WERE PROCESSED.
1 OF THESE WERE EXCLUDED FROM THE ANALYSIS.
0 HAD MISSING OR OUT-OF-RANGE GROUP CODES.
1 HAD AT LEAST ONE MISSING DISCRIMINATING VARIABLE.
0 HAD BOTH.
91 (UNWEIGHTED) CASES WILL BE USED IN THE ANALYSIS.

NUMBER OF CASES BY GROUP

GROUP	NUMBER OF CASES UNWEIGHTED	WEIGHTED	LABEL
1	35	35.0	REGULAR
2	22	22.0	PRESCHL ONLY
3	34	34.0	FOLLOW THROUGH
TOTAL	91	91.0	

GROUP MEANS

GROUP	AVGABS4	NSERV4	READRAW4	MATHRAW4	GPA4
1	15.48571	4.54286	25.34286	25.85714	2.26071
2	11.65909	2.86364	29.68182	28.04545	2.55114
3	16.73529	3.61765	32.79412	25.67647	2.39706
TOTAL	15.02747	3.79121	29.17582	26.31868	2.38187

GROUP STANDARD DEVIATIONS

GROUP	AVGABS4	NSERV4	READRAW4	MATHRAW4	GPA4
1	8.71736	1.72086	9.98511	8.06278	0.53668
2	8.48139	2.27398	10.86447	12.40767	0.63698
3	14.80413	2.04517	12.43597	10.51902	0.70002
TOTAL	11.39339	2.07373	11.51674	10.10047	0.62925

WILKS' LAMBDA (U-STATISTIC) AND UNIVARIATE F-RATIO
WITH 2 AND 88 DEGREES OF FREEDOM

VARIABLE	WILKS' LAMBDA	F	SIGNIFICANCE
AVGABS4	0.96952	1.383	0.2561
NSERV4	0.89736	5.033	0.0085
READRAW4	0.91916	3.870	0.0245
MATHRAW4	0.99052	0.4213	0.6575
GPA4	0.96768	1.470	0.2356

FILE SYSFILE (CREATION DATE = 10/27/82)

- D I S C R I M I N A N T   A N A L Y S I S -

ON GROUPS DEFINED BY GROUP

ANALYSIS NUMBER 1

STEPWISE VARIABLE SELECTION

SELECTION RULE: MINIMIZE WILKS' LAMBDA
MAXIMUM NUMBER OF STEPS.................. 10
MINIMUM TOLERANCE LEVEL.................. 0.00100
MINIMUM F TO ENTER....................... 1.0000
MAXIMUM F TO REMOVE...................... 1.0000

CANONICAL DISCRIMINANT FUNCTIONS

MAXIMUM NUMBER OF FUNCTIONS.............. 1
MINIMUM CUMULATIVE PERCENT OF VARIANCE... 100.00
MAXIMUM SIGNIFICANCE OF WILKS' LAMBDA.... 1.0000

PRIOR PROBABILITY FOR EACH GROUP IS 0.33333

------------------- VARIABLES NOT IN THE ANALYSIS AFTER STEP 0 -------------------

VARIABLE	TOLERANCE	MINIMUM TOLERANCE	F TO ENTER	WILKS' LAMBDA
AVGABS4	1.0000000	1.0000000	1.3834	0.9695170
NSERV4	1.0000000	1.0000000	5.0330	0.8973552
READRAW4	1.0000000	1.0000000	3.8697	0.9191627
MATHRAW4	1.0000000	1.0000000	0.42128	0.9905163
GPA4	1.0000000	1.0000000	1.4698	0.9676756

* *

AT STEP 1, NSERV4 WAS INCLUDED IN THE ANALYSIS.

		DEGREES OF FREEDOM			SIGNIFICANCE	BETWEEN GROUPS
WILKS' LAMBDA	0.8973552	1	2	88.0		
EQUIVALENT F	5.032982		2	88.0	0.0085	

---------------- VARIABLES IN THE ANALYSIS AFTER STEP 1 ----------------

VARIABLE	TOLERANCE	F TO REMOVE	WILKS' LAMBDA
NSERV4	1.0000000	5.0330	

-------------------- VARIABLES NOT IN THE ANALYSIS AFTER STEP 1 --------------------

VARIABLE	TOLERANCE	MINIMUM TOLERANCE	F TO ENTER	WILKS' LAMBDA
AVGABS4	0.9683942	0.9683942	0.99583	0.8772720
READRAW4	0.9427339	0.9427339	2.7932	0.8432104
MATHRAW4	0.8140653	0.8140653	0.48836	0.8873926
GPA4	0.7153455	0.7153455	0.20285E-01	0.8969369

* *

AT STEP 2, READRAW4 WAS INCLUDED IN THE ANALYSIS.

		DEGREES OF FREEDOM			SIGNIFICANCE	BETWEEN GROUPS
WILKS' LAMBDA	0.8432104	2	2	88.0		
EQUIVALENT F	3.871951		4	174.0	0.0049	

---------------- VARIABLES IN THE ANALYSIS AFTER STEP 2 ----------------

VARIABLE	TOLERANCE	F TO REMOVE	WILKS' LAMBDA
NSERV4	0.9427339	3.9183	0.9191627
READRAW4	0.9427339	2.7932	0.8973552

-------------------- VARIABLES NOT IN THE ANALYSIS AFTER STEP 2 --------------------

VARIABLE	TOLERANCE	MINIMUM TOLERANCE	F TO ENTER	WILKS' LAMBDA
AVGABS4	0.9572162	0.9218346	1.2367	0.8196373
MATHRAW4	0.5839258	0.5839258	3.1788	0.7851660
GPA4	0.5661086	0.5661086	0.92543	0.8254455

* *

AT STEP 3, MATHRAW4 WAS INCLUDED IN THE ANALYSIS.

		DEGREES OF FREEDOM			SIGNIFICANCE	BETWEEN GROUPS
WILKS' LAMBDA	0.7851660	3	2	88.0		
EQUIVALENT F	3.684986		6	172.0	0.0018	

---------------- VARIABLES IN THE ANALYSIS AFTER STEP 3 ----------------

VARIABLE	TOLERANCE	F TO REMOVE	WILKS' LAMBDA
NSERV4	0.8140113	4.8263	0.8732928
READRAW4	0.6762194	5.5985	0.8873926
MATHRAW4	0.5839258	3.1788	0.8432104

-------------------- VARIABLES NOT IN THE ANALYSIS AFTER STEP 3 --------------------

VARIABLE	TOLERANCE	MINIMUM TOLERANCE	F TO ENTER	WILKS' LAMBDA
AVGABS4	0.9497911	0.5793963	0.99667	0.7671749
GPA4	0.4328026	0.4328026	0.72526E-01	0.7838284

F LEVEL OR TOLERANCE OR VIN INSUFFICIENT FOR FURTHER COMPUTATION.

SUMMARY TABLE

STEP	ACTION ENTERED	ACTION REMOVED	VARS IN	WILKS' LAMBDA	SIG.	LABEL
1	NSERV4		1	0.897355	0.0085	NUMBER OF SERVICES BY END OF GRADE 4
2	READRAW4		2	0.843210	0.0049	GRADE 4 READING RAW SCORE
3	MATHRAW4		3	0.785166	0.0018	GRADE 4 MATH RAW SCORE

CLASSIFICATION FUNCTION COEFFICIENTS
(FISHER'S LINEAR DISCRIMINANT FUNCTIONS)

GROUP =	1 REGULAR	2 PRESCHL ONLY	3 FOLLOW THROUGH
NSERV4	2.087729	1.620962	1.791256
READRAW4	0.1055929	0.1415740	0.1957725
MATHRAW4	0.3601231	0.3194789	0.2770348
(CONSTANT)	-11.83463	-10.00059	-11.10541

CANONICAL DISCRIMINANT FUNCTIONS

FUNCTION	EIGENVALUE	PERCENT OF VARIANCE	CUMULATIVE PERCENT	CANONICAL CORRELATION	:	AFTER FUNCTION	WILKS' LAMBDA	CHI-SQUARED	D.F.	SIGNIFICANCE
					:	0	0.7851660	21.042	6	0.0018
1*	0.20393	77.89	77.89	0.4115655	:	1	0.9452839	4.8955	2	0.0865
2	0.05788	22.11	100.00	0.2339147	:					

* MARKS THE 1 CANONICAL DISCRIMINANT FUNCTION(S) TO BE USED IN THE REMAINING ANALYSIS.

STANDARDIZED CANONICAL DISCRIMINANT FUNCTION COEFFICIENTS

	FUNC 1
NSERV4	0.74616
READRAW4	-0.90347
MATHRAW4	0.78182

UNSTANDARDIZED CANONICAL DISCRIMINANT FUNCTION COEFFICIENTS

	FUNC 1
NSERV4	0.3755910
READRAW4	-0.8091061E-01
MATHRAW4	0.7690452E-01
(CONSTANT)	-1.087336

CANONICAL DISCRIMINANT FUNCTIONS EVALUATED AT GROUP MEANS (GROUP CENTROIDS)

GROUP	FUNC 1
1	0.55695
2	-0.25653
3	-0.40734

CASE SUBFILE	SEQNUM	MIS VAL	SEL	ACTUAL GROUP		HIGHEST PROBABILITY GROUP	P(X/G)	P(G/X)	2ND HIGHEST GROUP	P(G/X)	DISCRIMINANT SCORES
SYSFILE	1			1		1	0.3161	0.6424	2	0.2041	1.5595
SYSFILE	2			1		1	0.4661	0.5855	2	0.2324	1.2858
SYSFILE	3			1		1	0.7369	0.3556	2	0.3356	0.2210
SYSFILE	4			1		1	0.9289	0.4070	2	0.3144	0.4678
SYSFILE	5			1		1	0.5673	0.5516	2	0.2488	1.1289
SYSFILE	6			1	***	2	0.7988	0.3527	3	0.3356	-0.0017
SYSFILE	7			1		1	0.3910	0.6127	2	0.2190	1.4148
SYSFILE	8			1		1	0.3469	0.6298	2	0.2105	1.4976
SYSFILE	9			1		1	0.6861	0.5148	2	0.2662	0.9611
SYSFILE	10			1		1	0.9870	0.4227	2	0.3076	0.5407
SYSFILE	11			1	***	3	0.5246	0.4468	2	0.4013	-1.0437
SYSFILE	12			1		1	0.8264	0.4741	2	0.2849	0.7763
SYSFILE	13			1		1	0.9814	0.4211	2	0.3083	0.5336
SYSFILE	14			1	***	3	0.2103	0.4985	2	0.4080	-1.6601
SYSFILE	15			1		1	0.3014	0.6486	2	0.2010	1.5903
SYSFILE	16			1		1	0.9314	0.4077	2	0.3141	0.4709
SYSFILE	17			1	***	3	0.6955	0.4232	2	0.3945	-0.7988
SYSFILE	18			1		1	0.7918	0.3703	2	0.3297	0.2930
SYSFILE	19			1	***	2	0.7424	0.3473	3	0.3268	0.0721
SYSFILE	20			1	***	2	0.6962	0.3426	1	0.3381	0.1339
SYSFILE	21			1	***	2	0.8935	0.3610	3	0.3498	-0.1226
SYSFILE	22			1	***	2	0.9188	0.3631	3	0.3535	-0.1546
SYSFILE	23			1		1	0.7345	0.5005	2	0.2728	0.8961
SYSFILE	24			1		1	0.9081	0.4513	2	0.2951	0.6724
SYSFILE	25			1	***	3	0.9888	0.3806	2	0.3771	-0.3933
SYSFILE	26			1		1	0.0826	0.7735	2	0.1354	2.2927
SYSFILE	27			1		1	0.8466	0.4684	2	0.2874	0.7504
SYSFILE	28			1		1	0.8157	0.3767	2	0.3271	0.3238
SYSFILE	29			1		1	0.8187	0.4763	2	0.2839	0.7862
SYSFILE	30			1		1	0.6692	0.5199	2	0.2638	0.9842
SYSFILE	31			1		1	0.9949	0.4248	2	0.3067	0.5505
SYSFILE	32			1		1	0.0888	0.7683	2	0.1382	2.2588
SYSFILE	33			1		1	0.7047	0.3469	2	0.3391	0.1780
SYSFILE	34			1		1	0.1657	0.7155	2	0.1664	1.9431
SYSFILE	35			1	***	3	0.6112	0.4347	2	0.3981	-0.9157
SYSFILE	36			2	***	3	0.3178	0.4784	2	0.4069	-1.4063
SYSFILE	37			2	***	3	0.8653	0.4005	2	0.3859	-0.5770
SYSFILE	38			2	***	3	0.9824	0.3797	2	0.3767	-0.3853
SYSFILE	39			2	***	3	0.5336	0.4455	2	0.4010	-1.0298
SYSFILE	40			2		2	0.9642	0.3720	3	0.3703	-0.3015
SYSFILE	41			2	***	1	0.8419	0.4697	2	0.2869	0.7564
SYSFILE	42			2		2	0.7980	0.3526	3	0.3354	-0.0006
SYSFILE	43			2		2	0.9775	0.3711	3	0.3684	-0.2848
SYSFILE	44			2		2	0.9785	0.3678	3	0.3622	-0.2296
SYSFILE	45			2	***	1	0.8442	0.4691	2	0.2871	0.7535
SYSFILE	46			2	***	3	0.7599	0.4146	2	0.3914	-0.7129
SYSFILE	47			2	***	1	0.6856	0.3417	2	0.3412	0.1521
SYSFILE	48			2	***	3	0.7341	0.4181	2	0.3927	-0.7470

CASE SUBFILE	SEQNUM	MIS VAL	SEL	ACTUAL GROUP		HIGHEST GROUP	P(X/G)	P(G/X)	2ND HIGHEST GROUP	P(G/X)	DISCRIMINANT SCORES
SYSFILE	49			2		2	0.7759	0.3506	3	0.3320	0.0281
SYSFILE	50			2	***	3	0.9945	0.3814	2	0.3775	-0.4004
SYSFILE	51			2	***	1	0.3556	0.6264	2	0.2122	1.4808
SYSFILE	52			2	***	3	0.0622	0.5404	2	0.4033	-2.2723
SYSFILE	53			2	***	3	0.4843	0.4525	2	0.4026	-1.1067
SYSFILE	54			2	***	1	0.8797	0.3938	2	0.3199	0.4056
SYSFILE	55			2		2	0.8402	0.3565	3	0.3419	-0.0549
SYSFILE	56			2	***	3	0.6930	0.4236	2	0.3946	-0.8022
SYSFILE	57			2	***	1	0.5933	0.5433	2	0.2527	1.0910
SYSFILE	58			3	***	1	0.9639	0.4164	2	0.3103	0.5117
SYSFILE	59			3	***	1	0.8716	0.4614	2	0.2906	0.7185
SYSFILE	60			3	***	1	0.5552	0.5555	2	0.2469	1.1470
SYSFILE	61			3	***	1	0.6856	0.3417	2	0.3412	0.1521
SYSFILE	62			3		3	0.9722	0.3860	2	0.3796	-0.4422
SYSFILE	63			3	***	1	0.8973	0.3985	2	0.3180	0.4278
SYSFILE	64			3		3	0.1007	0.5261	2	0.4061	-2.0487
SYSFILE	65			3		3	0.4843	0.4525	2	0.4026	-1.1067
SYSFILE	66			3		3	0.9928	0.3831	2	0.3783	-0.4164
SYSFILE	67			3	***	2	0.8895	0.3607	3	0.3492	-0.1176
SYSFILE	68			3		3	0.8083	0.4081	2	0.3890	-0.6500
SYSFILE	69			3		3	0.7028	0.4223	2	0.3941	-0.7889
SYSFILE	70			3		3	0.9651	0.3773	2	0.3755	-0.3635
SYSFILE	71			3		3	0.6683	0.4269	2	0.3957	-0.8358
SYSFILE	72			3	***	1	0.6919	0.5131	2	0.2670	0.9532
SYSFILE	73			3		3	0.6552	0.4287	2	0.3962	-0.8539
SYSFILE	74			3	***	1	0.7434	0.4979	2	0.2740	0.8843
SYSFILE	75			3		3	0.5986	0.4364	2	0.3986	-0.9338
SYSFILE	76			3	***	1	0.4866	0.5784	2	0.2359	1.2527
SYSFILE	77			3		3	0.0473	0.5477	2	0.4015	-2.3911
SYSFILE	78			3		3	0.0991	0.5266	2	0.4060	-2.0567
SYSFILE	79			3		3	0.0245	0.5630	2	0.3965	-2.6568
SYSFILE	80			3		3	0.5098	0.4489	2	0.4018	-1.0664
SYSFILE	81			3		3	0.5299	0.4460	2	0.4011	-1.0355
SYSFILE	82			3	***	2	0.9983	0.3695	3	0.3655	-0.2587
SYSFILE	83			3		3	0.9402	0.3738	2	0.3738	-0.3323
SYSFILE	84			3	***	1	0.6441	0.5275	2	0.2602	1.0189
SYSFILE	85			3	***	2	0.7735	0.3503	3	0.3317	0.0313
SYSFILE	86			3	***	1	0.8079	0.3746	2	0.3279	0.3138
SYSFILE	87			3	***	1	0.9248	0.4467	2	0.2971	0.6513
SYSFILE	89			3		3	0.0008	0.6165	2	0.3681	-3.7526
SYSFILE	90			3	***	2	0.9608	0.3664	3	0.3596	-0.2074
SYSFILE	91			3		3	0.9513	0.3888	2	0.3809	-0.4684
SYSFILE	92			3	***	1	0.7533	0.4950	2	0.2753	0.8713

SYMBOLS USED IN PLOTS

SYMBOL	GROUP	LABEL
1	1	REGULAR
2	2	PRESCHL ONLY
3	3	FOLLOW THROUGH

HISTOGRAM FOR GROUP 1 REGULAR

-- CANONICAL DISCRIMINANT FUNCTION 1 --

```
             4 +                                             1                                   +
               .                                             1                                   .
               .                                             1                                   .
F              .                                             1                                   .
R            3 +                                             1  1                                +
E              .                                             1  1                                .
Q              .                                             1  1                                .
U              .                                             1  1                                .
E            2 +                                         111 1  1 1     1      1                 +
N              .                                         111 1  1 1     1      1                 .
C              .                                         111 1  1 1     1      1                 .
Y              .                                         111 1  1 1     1      1                 .
             1 +                       1      111   1 111111 1111111 1111  1   1                 +
               .                       1      111   1 111111 1111111 1111  1   1                 .
               .                       1      111   1 111111 1111111 1111  1   1                 .
               .                       1      111   1 111111 1111111 1111  1   1                 .
              OUT.........+.........+.........+.........+.........+.........+.........+.........OUT
                         -3        -2        -1         0         1         2         3
GROUP CENTROIDS                                               1
```

```
                                   HISTOGRAM FOR GROUP       2  PRESCHL ONLY

                                        -- CANONICAL DISCRIMINANT FUNCTION 1 --
             4 +                                                                                 +
               .                                                                                 .
               .                                                                                 .
F              .                                                                                 .
R            3 +                                                                                 +
E              .                                                                                 .
Q              .                                                                                 .
U              .                                                                                 .
E            2 +                                 2  22  2       2                                +
N              .                                 2  22  2       2                                .
C              .                                 2  22  2       2                                .
Y              .                                 2  22  2       2                                .
             1 +                 2        2  22 222 22222 2 2   2  2   2                         +
               .                 2        2  22 222 22222 2 2   2  2   2                         .
               .                 2        2  22 222 22222 2 2   2  2   2                         .
               .                 2        2  22 222 22222 2 2   2  2   2                         .
              OUT.........+.........+.........+.........+.........+.........+.........+.........OUT
                         -3        -2        -1         0         1         2         3
GROUP CENTROIDS                                       2

                                   HISTOGRAM FOR GROUP       3  FOLLOW  THROUGH

                                        -- CANONICAL DISCRIMINANT FUNCTION 1 --
             4 +                                                                                 +
               .                                                                                 .
               .                                                                                 .
F              .                                                                                 .
R            3 +                                    3                                            +
E              .                                    3                                            .
Q              .                                    3                                            .
U              .                                    3                                            .
E            2 +                             3 33   33         3 33                              +
N              .                             3 33   33         3 33                              .
C              .                             3 33   33         3 33                              .
Y              .                             3 33   33         3 33                              .
             1 +  3          3  3  33        33333 333333 3333 3 333 3                           +
               .  3          3  3  33        33333 333333 3333 3 333 3                           .
               .  3          3  3  33        33333 333333 3333 3 333 3                           .
               .  3          3  3  33        33333 333333 3333 3 333 3                           .
              OUT.........+.........+.........+.........+.........+.........+.........+.........OUT
                         -3        -2        -1         0         1         2         3
GROUP CENTROIDS                                     3
```

ALL-GROUPS STACKED HISTOGRAM

-- CANONICAL DISCRIMINANT FUNCTION 1 --

```
             8 +                                                                                 +
               .                                                                                 .
               .                                                                                 .
F              .                                                                                 .
R            6 +                                    3                                            +
E              .                                    3                                            .
Q              .                                    3        3  2                                .
U              .                                    3        3  2                                .
E            4 +                                3   33  3 3  1  2 3                              +
N              .                                3   33  3 3  1  2 3                              .
C              .                             33333  23332 23 1 31333                             .
Y              .                             33333  23332 23 1 31333                             .
             2 +                             32322  2222211131 31312 3 21      1                 +
               .                             32322  2222211131 31312 3 21      1                 .
               .  3          3  32 33  1  2  2111223121111112111111  1111  1   1                 .
               .  3          3  32 33  1  2  2111223121111112111111  1111  1   1                 .
              OUT.........+.........+.........+.........+.........+.........+.........+.........OUT
                         -3        -2        -1         0         1         2         3
GROUP CENTROIDS                                     3 2       1
```

CLASSIFICATION RESULTS -

ACTUAL GROUP	NO. OF CASES	PREDICTED GROUP MEMBERSHIP 1	2	3
GROUP 1 REGULAR	35	25 71.4%	5 14.3%	5 14.3%
GROUP 2 PRESCHL ONLY	22	6 27.3%	6 27.3%	10 45.5%
GROUP 3 FOLLOW THROUGH	34	12 35.3%	4 11.8%	18 52.9%

PERCENT OF "GROUPED" CASES CORRECTLY CLASSIFIED: 53.85%

CLASSIFICATION PROCESSING SUMMARY

```
92 CASES WERE PROCESSED.
 1 CASES HAD AT LEAST ONE MISSING DISCRIMINATING VARIABLE.
91 CASES WERE USED FOR PRINTED OUTPUT.
```

```
CPU TIME REQUIRED..     1.02 SECONDS


              105 DISCRIMINANT   GROUPS=GROUP(1,3)/
              106                VARIABLES=AVGABS5 NSERV5 READRAW5
              107                          MATHRAW5 GPA5/
              108                ANALYSIS=AVGABS5 TO GPA5(1)/
              109                METHOD=WILKS/
              110                FUNCTION=1
              111 OPTIONS        5,6,7,8,11,12
              112 STATISTICS     1,2,6

THIS DISCRIMINANT ANALYSIS REQUIRES      2940 (       2.9K) BYTES OF WORKSPACE.
```

FILE SYSFILE (CREATION DATE = 10/27/82)

- D I S C R I M I N A N T A N A L Y S I S -

ON GROUPS DEFINED BY GROUP

92 (UNWEIGHTED) CASES WERE PROCESSED.
1 OF THESE WERE EXCLUDED FROM THE ANALYSIS.
0 HAD MISSING OR OUT-OF-RANGE GROUP CODES.
1 HAD AT LEAST ONE MISSING DISCRIMINATING VARIABLE.
0 HAD BOTH.
91 (UNWEIGHTED) CASES WILL BE USED IN THE ANALYSIS.

NUMBER OF CASES BY GROUP

	NUMBER OF CASES		
GROUP	UNWEIGHTED	WEIGHTED	LABEL
1	35	35.0	REGULAR
2	22	22.0	PRESCHL ONLY
3	34	34.0	FOLLOW THROUGH
TOTAL	91	91.0	

GROUP MEANS

GROUP	AVGABS5	NSERV5	READRAW5	MATHRAW5	GPA5
1	14.94523	5.85714	18.28571	39.17143	2.24286
2	11.10605	3.68182	21.90909	41.40909	2.48636
3	14.52695	4.44118	19.55882	34.73529	2.33235
TOTAL	13.86080	4.80220	19.63736	38.05495	2.33516

GROUP STANDARD DEVIATIONS

GROUP	AVGABS5	NSERV5	READRAW5	MATHRAW5	GPA5
1	8.51085	2.11636	6.42866	12.96712	0.51064
2	7.81072	2.96626	11.19910	12.49251	0.61667
3	11.28891	2.33798	9.82326	13.83739	0.69532
TOTAL	9.52927	2.55699	9.06828	13.32447	0.61108

WILKS' LAMBDA (U-STATISTIC) AND UNIVARIATE F-RATIO
WITH 2 AND 88 DEGREES OF FREEDOM

VARIABLE	WILKS' LAMBDA	F	SIGNIFICANCE
AVGABS5	0.97269	1.235	0.2957
NSERV5	0.87934	6.037	0.0035
READRAW5	0.97599	1.082	0.3433
MATHRAW5	0.95833	1.913	0.1537
GPA5	0.97615	1.075	0.3458

FILE SYSFILE (CREATION DATE = 10/27/82)

\- D I S C R I M I N A N T A N A L Y S I S -

ON GROUPS DEFINED BY GROUP

ANALYSIS NUMBER 1

STEPWISE VARIABLE SELECTION

SELECTION RULE: MINIMIZE WILKS' LAMBDA
MAXIMUM NUMBER OF STEPS.................. 10
MINIMUM TOLERANCE LEVEL.................. 0.00100
MINIMUM F TO ENTER....................... 1.0000
MAXIMUM F TO REMOVE...................... 1.0000

CANONICAL DISCRIMINANT FUNCTIONS

MAXIMUM NUMBER OF FUNCTIONS.............. 1
MINIMUM CUMULATIVE PERCENT OF VARIANCE... 100.00
MAXIMUM SIGNIFICANCE OF WILKS' LAMBDA.... 1.0000

PRIOR PROBABILITY FOR EACH GROUP IS 0.33333

-------------------- VARIABLES NOT IN THE ANALYSIS AFTER STEP 0 --------------------

VARIABLE	TOLERANCE	MINIMUM TOLERANCE	F TO ENTER	WILKS' LAMBDA
AVGABS5	1.0000000	1.0000000	1.2354	0.9726897
NSERV5	1.0000000	1.0000000	6.0373	0.8793440
READRAW5	1.0000000	1.0000000	1.0824	0.9759912
MATHRAW5	1.0000000	1.0000000	1.9132	0.9583310
GPA5	1.0000000	1.0000000	1.0749	0.9761530

* *

AT STEP 1, NSERV5 WAS INCLUDED IN THE ANALYSIS.

		DEGREES OF FREEDOM			SIGNIFICANCE	BETWEEN GROUPS
WILKS' LAMBDA	0.8793440	1	2	88.0		
EQUIVALENT F	6.037301		2	88.0	0.0035	

--------------- VARIABLES IN THE ANALYSIS AFTER STEP 1 ---------------

VARIABLE	TOLERANCE	F TO REMOVE	WILKS' LAMBDA
NSERV5	1.0000000	6.0373	

------------------- VARIABLES NOT IN THE ANALYSIS AFTER STEP 1 -------------------

VARIABLE	TOLERANCE	MINIMUM TOLERANCE	F TO ENTER	WILKS' LAMBDA
AVGABS5	0.9891442	0.9891442	0.80240	0.8634174
READRAW5	0.8922573	0.8922573	0.17915	0.8757374
MATHRAW5	0.7982619	0.7982619	3.6851	0.8106684
GPA5	0.6307946	0.6307946	0.56040	0.8681597

* *

AT STEP 2, MATHRAW5 WAS INCLUDED IN THE ANALYSIS.

		DEGREES OF FREEDOM			SIGNIFICANCE	BETWEEN GROUPS
WILKS' LAMBDA	0.8106684	2	2	88.0		
EQUIVALENT F	4.813404		4	174.0	0.0010	

--------------- VARIABLES IN THE ANALYSIS AFTER STEP 2 ---------------

VARIABLE	TOLERANCE	F TO REMOVE	WILKS' LAMBDA
NSERV5	0.7982619	7.9235	0.9583310
MATHRAW5	0.7982619	3.6851	0.8793440

------------------- VARIABLES NOT IN THE ANALYSIS AFTER STEP 2 -------------------

VARIABLE	TOLERANCE	MINIMUM TOLERANCE	F TO ENTER	WILKS' LAMBDA
AVGABS5	0.9196180	0.7421527	0.91100	0.7938499
READRAW5	0.7758062	0.6940784	0.39034	0.8033756
GPA5	0.3912705	0.3912705	0.40369	0.8031286

SUMMARY TABLE

STEP	ACTION ENTERED	ACTION REMOVED	VARS IN	WILKS' LAMBDA	SIG.	LABEL
1	NSERV5		1	0.879344	0.0035	NUMBER OF SERVICES BY END OF GRADE 5
2	MATHRAW5		2	0.810668	0.0010	GRADE 5 MATH RAW SCORE

CLASSIFICATION FUNCTION COEFFICIENTS
(FISHER'S LINEAR DISCRIMINANT FUNCTIONS)

GROUP =	1 REGULAR	2 PRESCHL ONLY	3 FOLLOW THROUGH
NSERV5	1.936885	1.512799	1.557184
MATHRAW5	0.3850286	0.3628733	0.3281851
(CONSTANT)	-14.31198	-11.39666	-10.25628

CANONICAL DISCRIMINANT FUNCTIONS

FUNCTION	EIGENVALUE	PERCENT OF VARIANCE	CUMULATIVE PERCENT	CANONICAL CORRELATION	:	AFTER FUNCTION	WILKS' LAMBDA	CHI-SQUARED	D.F.	SIGNIFICANCE
					:	0	0.8106684	18.366	4	0.0010
1*	0.18587	82.21	82.21	0.3958968	:	1	0.9613440	3.4495	1	0.0633
2	0.04021	17.79	100.00	0.1966114	:					

* MARKS THE 1 CANONICAL DISCRIMINANT FUNCTION(S) TO BE USED IN THE REMAINING ANALYSIS.

STANDARDIZED CANONICAL DISCRIMINANT FUNCTION COEFFICIENTS

	FUNC 1
NSERV5	1.10661
MATHRAW5	0.64688

UNSTANDARDIZED CANONICAL DISCRIMINANT FUNCTION COEFFICIENTS

	FUNC 1
NSERV5	0.4563595
MATHRAW5	0.4903858E-01
(CONSTANT)	-4.057689

CANONICAL DISCRIMINANT FUNCTIONS EVALUATED AT GROUP MEANS (GROUP CENTROIDS)

GROUP	FUNC 1
1	0.53618
2	-0.34681
3	-0.32755

CASE SUBFILE	SEQNUM	MIS VAL	SEL	ACTUAL GROUP		HIGHEST PROBABILITY GROUP	P(X/G)	P(G/X)	2ND HIGHEST GROUP	P(G/X)	DISCRIMINANT SCORES
SYSFILE	1			1		1	0.1192	0.7405	3	0.1328	2.0942
SYSFILE	2			1		1	0.7372	0.3533	3	0.3250	0.2007
SYSFILE	3			1		1	0.7627	0.4880	3	0.2589	0.8382
SYSFILE	4			1		1	0.8506	0.3831	3	0.3105	0.3478
SYSFILE	5			1		1	0.7259	0.3503	3	0.3265	0.1857
SYSFILE	6			1		1	0.3652	0.6175	3	0.1945	1.4416
SYSFILE	7			1	***	2	0.7262	0.4016	3	0.3988	-0.6970
SYSFILE	8			1		1	0.4597	0.5827	3	0.2119	1.2755
SYSFILE	9			1		1	0.2642	0.6600	3	0.1733	1.6528
SYSFILE	10			1		1	0.8623	0.3862	3	0.3090	0.3628
SYSFILE	11			1	***	2	0.8926	0.3849	3	0.3838	-0.4819
SYSFILE	12			1		1	0.9938	0.4243	3	0.2903	0.5439
SYSFILE	13			1		1	0.9547	0.4348	3	0.2851	0.5930
SYSFILE	14			1	***	2	0.2879	0.4455	3	0.4364	-1.4096
SYSFILE	15			1		1	0.2421	0.6703	3	0.1681	1.7058
SYSFILE	16			1		1	0.9428	0.4381	3	0.2835	0.6080
SYSFILE	17			1		1	0.7143	0.5020	3	0.2520	0.9022
SYSFILE	18			1		1	0.2642	0.6600	3	0.1733	1.6528
SYSFILE	19			1	***	3	0.7398	0.3435	2	0.3413	0.0045
SYSFILE	20			1		1	0.9515	0.4357	3	0.2847	0.5970
SYSFILE	21			1	***	3	0.8651	0.3579	2	0.3567	-0.1576
SYSFILE	22			1	***	2	0.8390	0.3903	3	0.3887	-0.5499
SYSFILE	23			1		1	0.1192	0.7405	3	0.1328	2.0942
SYSFILE	24			1	***	2	0.8157	0.3927	3	0.3909	-0.5800
SYSFILE	25			1		1	0.7627	0.4880	3	0.2589	0.8382
SYSFILE	26			1		1	0.6426	0.5234	3	0.2414	1.0003
SYSFILE	27			1		1	0.2063	0.6882	3	0.1591	1.7999
SYSFILE	28			1	***	2	0.8273	0.3915	3	0.3898	-0.5649
SYSFILE	29			1		1	0.8038	0.3708	3	0.3165	0.2877
SYSFILE	30			1		1	0.5214	0.5617	3	0.2223	1.1774
SYSFILE	31			1	***	3	0.8003	0.3507	2	0.3489	-0.0746
SYSFILE	32			1		1	0.8150	0.4732	3	0.2662	0.7701
SYSFILE	33			1	***	2	0.3840	0.4353	3	0.4280	-1.2175
SYSFILE	34			1		1	0.9699	0.4308	3	0.2871	0.5740
SYSFILE	35			1		1	0.6781	0.5127	3	0.2467	0.9513
SYSFILE	36			2		2	0.1960	0.4563	3	0.4450	-1.6398
SYSFILE	37			2	***	1	0.4393	0.5899	3	0.2083	1.3095
SYSFILE	38			2		2	0.6084	0.4131	3	0.4090	-0.8592
SYSFILE	39			2	***	3	0.9125	0.3630	2	0.3622	-0.2177
SYSFILE	40			2		2	0.1277	0.4657	3	0.4521	-1.8700
SYSFILE	41			2		2	0.2441	0.4505	3	0.4404	-1.5117
SYSFILE	42			2	***	1	0.7630	0.3601	3	0.3217	0.2347
SYSFILE	43			2		2	0.7924	0.3950	3	0.3930	-0.6100
SYSFILE	44			2		2	0.7663	0.3976	3	0.3953	-0.6440
SYSFILE	45			2	***	1	0.1842	0.7001	3	0.1531	1.8640
SYSFILE	46			2	***	1	0.9547	0.4348	3	0.2851	0.5930
SYSFILE	47			2	***	1	0.5740	0.5447	3	0.2308	1.0984
SYSFILE	48			2		2	0.4602	0.4276	3	0.4215	-1.0853

CASE SUBFILE	CASE SEQNUM	MIS VAL	SEL	ACTUAL GROUP		HIGHEST PROBABILITY GROUP	P(X/G)	P(G/X)	2ND HIGHEST GROUP	P(G/X)	DISCRIMINANT SCORES
SYSFILE	49			2	***	3	0.8150	0.3523	2	0.3507	-0.0936
SYSFILE	50			2	***	3	0.8887	0.3605	2	0.3594	-0.1876
SYSFILE	51			2	***	1	0.1496	0.7204	3	0.1429	1.9771
SYSFILE	52			2		2	0.2135	0.4542	3	0.4433	-1.5907
SYSFILE	53			2		2	0.3944	0.4343	3	0.4271	-1.1984
SYSFILE	54			2		2	0.7663	0.3976	3	0.3953	-0.6440
SYSFILE	55			2		2	0.1642	0.4605	3	0.4482	-1.7379
SYSFILE	56			2		2	0.5343	0.4203	3	0.4152	-0.9683
SYSFILE	57			2	***	1	0.7006	0.3435	3	0.3298	0.1516
SYSFILE	58			3	***	1	0.4194	0.5971	3	0.2047	1.3436
SYSFILE	59			3	***	1	0.8384	0.4666	3	0.2695	0.7401
SYSFILE	60			3	***	1	0.9910	0.4203	3	0.2923	0.5249
SYSFILE	61			3		3	0.7398	0.3435	2	0.3413	0.0045
SYSFILE	62			3	***	2	0.9936	0.3729	3	0.3728	-0.3388
SYSFILE	63			3		3	0.9308	0.3649	2	0.3642	-0.2407
SYSFILE	64			3	***	2	0.0579	0.4783	3	0.4610	-2.2433
SYSFILE	65			3	***	2	0.7924	0.3950	3	0.3930	-0.6100
SYSFILE	66			3	***	2	0.4694	0.4267	3	0.4207	-1.0703
SYSFILE	67			3		3	0.8651	0.3579	2	0.3567	-0.1576
SYSFILE	68			3	***	1	0.7860	0.3661	3	0.3188	0.2647
SYSFILE	69			3	***	2	0.5745	0.4164	3	0.4118	-0.9082
SYSFILE	70			3	***	1	0.8154	0.3739	3	0.3150	0.3027
SYSFILE	71			3	***	2	0.5542	0.4184	3	0.4136	-0.9382
SYSFILE	72			3	***	1	0.5740	0.5447	3	0.2308	1.0984
SYSFILE	73			3	***	1	0.9786	0.4284	3	0.2883	0.5629
SYSFILE	74			3	***	2	0.4578	0.4279	3	0.4217	-1.0894
SYSFILE	75			3	***	2	0.5643	0.4174	3	0.4127	-0.9232
SYSFILE	76			3	***	1	0.7486	0.3563	3	0.3236	0.2157
SYSFILE	77			3	***	2	0.2248	0.4528	3	0.4422	-1.5607
SYSFILE	78			3	***	2	0.1909	0.4570	3	0.4455	-1.6548
SYSFILE	79			3	***	2	0.6816	0.4060	3	0.4027	-0.7571
SYSFILE	80			3	***	1	0.7887	0.4806	3	0.2626	0.8041
SYSFILE	81			3	***	2	0.3656	0.4372	3	0.4296	-1.2515
SYSFILE	82			3	***	1	0.9396	0.4389	3	0.2831	0.6120
SYSFILE	83			3	***	2	0.5193	0.4218	3	0.4165	-0.9913
SYSFILE	84			3		3	0.6781	0.3359	2	0.3331	0.0876
SYSFILE	85			3	***	2	0.6897	0.4052	3	0.4020	-0.7461
SYSFILE	87			3	***	1	0.9551	0.4107	3	0.2970	0.4799
SYSFILE	88			3	***	1	0.4482	0.5867	3	0.2099	1.2945
SYSFILE	89			3	***	2	0.0285	0.4863	3	0.4661	-2.5375
SYSFILE	90			3	***	2	0.9163	0.3824	3	0.3816	-0.4518
SYSFILE	91			3	***	2	0.1845	0.4578	3	0.4462	-1.6738
SYSFILE	92			3	***	1	0.8919	0.4519	3	0.2767	0.6720

SYMBOLS USED IN PLOTS

SYMBOL	GROUP	LABEL
1	1	REGULAR
2	2	PRESCHL ONLY
3	3	FOLLOW THROUGH

```
                                   HISTOGRAM FOR GROUP       1  REGULAR

                                        -- CANONICAL DISCRIMINANT FUNCTION 1 --
              4 +                                              1                                  +
                .                                              1                                  .
                .                                              1                                  .
F               .                                              1                                  .
R             3 +                                              1 1        1                       +
E               .                                              1 1        1                       .
Q               .                                              1 1        1                       .
U               .                                              1 1        1                       .
E             2 +                                  11      11  1 1 1      1   1                   +
N               .                                  11      11  1 1 1      1   1                   .
C               .                                  11      11  1 1 1      1   1                   .
Y               .                                  11      11  1 1 1      1   1                   .
              1 +                          1 1    111  111 11111 111 111  11  1                   +
                .                          1 1    111  111 11111 111 111  11  1                   .
                .                          1 1    111  111 11111 111 111  11  1                   .
                .                          1 1    111  111 11111 111 111  11  1                   .
              OUT..........+.........+.........+.........+.........+.........+.........+........OUT
                          -3        -2        -1         0         1         2         3
GROUP CENTROIDS                                                1
```

```
                              HISTOGRAM FOR GROUP       2  PRESCHL ONLY

                                   -- CANONICAL DISCRIMINANT FUNCTION 1 --
             4 +                                                                                 +
               .                                                                                 .
               .                                                                                 .
F              .                                                                                 .
R            3 +                                  2                                              +
E              .                                  2                                              .
Q              .                                  2                                              .
U              .                                  2                                              .
E            2 +                        2         2   2   2                                      +
N              .                        2         2   2   2                                      .
C              .                        2         2   2   2                                      .
Y              .                        2         2   2   2                                      .
             1 +                     2 222  2222  2   22  2   2    2 2     22                    +
               .                     2 222  2222  2   22  2   2    2 2     22                    .
               .                     2 222  2222  2   22  2   2    2 2     22                    .
               .                     2 222  2222  2   22  2   2    2 2     22                    .
              OUT.........+.........+.........+.........+.........+.........+.........+.........OUT
                         -3        -2        -1         0         1         2         3
GROUP CENTROIDS                                      2

                              HISTOGRAM FOR GROUP       3  FOLLOW  THROUGH

                                   -- CANONICAL DISCRIMINANT FUNCTION 1 --
             4 +                                                                                 +
               .                                                                                 .
               .                                                                                 .
F              .                                                                                 .
R            3 +                               3                                                 +
E              .                               3                                                 .
Q              .                               3                                                 .
U              .                               3                                                 .
E            2 +                       3     3 3      3    3 333     3                           +
N              .                       3     3 3      3    3 333     3                           .
C              .                       3     3 3      3    3 333     3                           .
Y              .                       3     3 3      3    3 333     3                           .
             1 +               3  3    33  3 3333333 33 3333 3333  3 3                           +
               .               3  3    33  3 3333333 33 3333 3333  3 3                           .
               .               3  3    33  3 3333333 33 3333 3333  3 3                           .
               .               3  3    33  3 3333333 33 3333 3333  3 3                           .
              OUT.........+.........+.........+.........+.........+.........+.........+.........OUT
                         -3        -2        -1         0         1         2         3
GROUP CENTROIDS                                      3
```

ALL-GROUPS STACKED HISTOGRAM

-- CANONICAL DISCRIMINANT FUNCTION 1 --

```
             8 +                                                                                 +
               .                                                                                 .
               .                                              3                                  .
F              .                                              3                                  .
R            6 +                                  3           3                                  +
E              .                                  3           3                                  .
Q              .                                  2   3   3   2                                  .
U              .                                  2   3   3   2                                  .
E            4 +                               3  2   3   23  1 3    3                           +
N              .                               3  2   3   23  1 3    3                           .
C              .                       33    3 3  23  2   23 31 1    3   1                       .
Y              .                       33    3 3  23  2   23 31 1    3   1                       .
             2 +                       32   2333 311  223 11 3131 13 2   1   1                   +
               .                       32   2333 311  223 11 3131 13 2   1   1                   .
               .               3  3  2 2221312223111 311131111131112111  11221                   .
               .               3  3  2 2221312223111 311131111131112111  11221                   .
              OUT.........+.........+.........+.........+.........+.........+.........+.........OUT
                         -3        -2        -1         0         1         2         3
GROUP CENTROIDS                                       3        1
```

CLASSIFICATION RESULTS -

ACTUAL GROUP	NO. OF CASES	PREDICTED GROUP MEMBERSHIP 1	2	3
GROUP 1 REGULAR	35	25 71.4%	7 20.0%	3 8.6%
GROUP 2 PRESCHL ONLY	22	7 31.8%	12 54.5%	3 13.6%
GROUP 3 FOLLOW THROUGH	34	13 38.2%	17 50.0%	4 11.8%

PERCENT OF "GROUPED" CASES CORRECTLY CLASSIFIED: 45.05%

CLASSIFICATION PROCESSING SUMMARY

```
92 CASES WERE PROCESSED.
 1 CASES HAD AT LEAST ONE MISSING DISCRIMINATING VARIABLE.
91 CASES WERE USED FOR PRINTED OUTPUT.
```

CPU TIME REQUIRED..   0.96 SECONDS

```
DISCRIMINANT   GROUPS=GROUP(1,3)/
               VARIABLES=AVGABS6 NSERV6 READRAW6
                         MATHRAW6 MEAPR7 MEAPM7 GPA6/
               ANALYSIS=AVGABS6 TO GPA6(1)/
               METHOD=WILKS/
               FUNCTION=1
OPTIONS        5,6,7,8,11,12
STATISTICS     1,2,6
```

THIS DISCRIMINANT ANALYSIS REQUIRES   2972 (2.9K) BYTES OF WORKSPACE.

FILE SYSFILE (CREATION DATE = 10/27/82)

- D I S C R I M I N A N T A N A L Y S I S -

ON GROUPS DEFINED BY GROUP

92 (UNWEIGHTED) CASES WERE PROCESSED.
2 OF THESE WERE EXCLUDED FROM THE ANALYSIS.
0 HAD MISSING OR OUT-OF-RANGE GROUP CODES.
2 HAD AT LEAST ONE MISSING DISCRIMINATING VARIABLE.
0 HAD BOTH.
90 (UNWEIGHTED) CASES WILL BE USED IN THE ANALYSIS.

NUMBER OF CASES BY GROUP

	NUMBER OF CASES		
GROUP	UNWEIGHTED	WEIGHTED	LABEL
1	35	35.0	REGULAR
2	22	22.0	PRESCHL ONLY
3	33	33.0	FOLLOW THROUGH
TOTAL	90	90.0	

GROUP MEANS

GROUP	AVGABS6	NSERV6	READRAW6	MATHRAW6	MEAPR7	MEAPM7	GPA6
1	14.23468	6.62857	19.37143	40.45714	13.85714	17.28571	2.19762
2	11.13960	4.40909	22.72727	39.27273	14.54545	19.54545	2.41288
3	14.79003	5.57576	20.69697	38.21212	14.24242	16.96970	2.23232
TOTAL	13.68174	5.70000	20.67778	39.34444	14.16667	17.72222	2.26296

GROUP STANDARD DEVIATIONS

GROUP	AVGABS6	NSERV6	READRAW6	MATHRAW6	MEAPR7	MEAPM7	GPA6
1	8.30650	2.57917	5.84146	15.19741	5.83671	4.81158	0.46971
2	7.41778	3.33323	7.07229	14.15957	6.29987	4.85727	0.62227
3	12.48922	2.63427	7.43087	11.48030	6.69902	5.78514	0.68267
TOTAL	9.87917	2.90079	6.81180	13.56065	6.21208	5.24892	0.59228

WILKS' LAMBDA (U-STATISTIC) AND UNIVARIATE F-RATIO
WITH 2 AND 87 DEGREES OF FREEDOM

VARIABLE	WILKS' LAMBDA	F	SIGNIFICANCE
AVGABS6	0.97773	0.9906	0.3755
NSERV6	0.91007	4.299	0.0166
READRAW6	0.96316	1.664	0.1954
MATHRAW6	0.99476	0.2291	0.7957
MEAPR7	0.99805	0.8501E-01	0.9186
MEAPM7	0.95983	1.820	0.1681
GPA6	0.97838	0.9611	0.3865

FILE SYSFILE (CREATION DATE = 10/27/82)

- - - - - - - - - - D I S C R I M I N A N T A N A L Y S I S - - - - - - - - - -

ON GROUPS DEFINED BY GROUP

ANALYSIS NUMBER 1

STEPWISE VARIABLE SELECTION

```
     SELECTION RULE:  MINIMIZE WILKS' LAMBDA
     MAXIMUM NUMBER OF STEPS..................      14
     MINIMUM TOLERANCE LEVEL.................. 0.00100
     MINIMUM F TO ENTER.......................  1.0000
     MAXIMUM F TO REMOVE......................  1.0000
```

CANONICAL DISCRIMINANT FUNCTIONS

```
     MAXIMUM NUMBER OF FUNCTIONS..............       1
     MINIMUM CUMULATIVE PERCENT OF VARIANCE...  100.00
     MAXIMUM SIGNIFICANCE OF WILKS' LAMBDA....  1.0000
```

PRIOR PROBABILITY FOR EACH GROUP IS 0.33333

-------------------- VARIABLES NOT IN THE ANALYSIS AFTER STEP 0 --------------------

VARIABLE	TOLERANCE	MINIMUM TOLERANCE	F TO ENTER	WILKS' LAMBDA
AVGABS6	1.0000000	1.0000000	0.99064	0.9777337
NSERV6	1.0000000	1.0000000	4.2986	0.9100684
READRAW6	1.0000000	1.0000000	1.6640	0.9631565
MATHRAW6	1.0000000	1.0000000	0.22914	0.9947601
MEAPR7	1.0000000	1.0000000	0.85014E-01	0.9980495
MEAPM7	1.0000000	1.0000000	1.8203	0.9598343
GPA6	1.0000000	1.0000000	0.96106	0.9783841

* *

AT STEP 1, NSERV6 WAS INCLUDED IN THE ANALYSIS.

		DEGREES OF FREEDOM			SIGNIFICANCE	BETWEEN GROUPS
WILKS' LAMBDA	0.9100684	1	2	87.0		
EQUIVALENT F	4.298606		2	87.0	0.0166	

---------------- VARIABLES IN THE ANALYSIS AFTER STEP 1 ----------------

VARIABLE	TOLERANCE	F TO REMOVE	WILKS' LAMBDA
NSERV6	1.0000000	4.2986	

-------------------- VARIABLES NOT IN THE ANALYSIS AFTER STEP 1 --------------------

VARIABLE	TOLERANCE	MINIMUM TOLERANCE	F TO ENTER	WILKS' LAMBDA
AVGABS6	0.9793945	0.9793945	0.62236	0.8970844
READRAW6	0.8171956	0.8171956	0.19312	0.9059993
MATHRAW6	0.8688049	0.8688049	1.2569	0.8842231
MEAPR7	0.7827796	0.7827796	0.52677	0.8990545
MEAPM7	0.8683043	0.8683043	0.92371	0.8909298
GPA6	0.5921660	0.5921660	0.48393	0.8999403

* *

AT STEP 2, MATHRAW6 WAS INCLUDED IN THE ANALYSIS.

		DEGREES OF FREEDOM			SIGNIFICANCE	BETWEEN GROUPS
WILKS' LAMBDA	0.8842231	2	2	87.0		
EQUIVALENT F	2.728560		4	172.0	0.0309	

---------------- VARIABLES IN THE ANALYSIS AFTER STEP 2 ----------------

VARIABLE	TOLERANCE	F TO REMOVE	WILKS' LAMBDA
NSERV6	0.8688049	5.3754	0.9947601
MATHRAW6	0.8688049	1.2569	0.9100684

-------------------- VARIABLES NOT IN THE ANALYSIS AFTER STEP 2 --------------------

VARIABLE	TOLERANCE	MINIMUM TOLERANCE	F TO ENTER	WILKS' LAMBDA
AVGABS6	0.9619605	0.8533395	0.69140	0.8700687
READRAW6	0.6427709	0.6427709	0.98846	0.8641254
MEAPR7	0.6505307	0.6505307	0.15536	0.8810027
MEAPM7	0.6496934	0.6496934	1.5231	0.8536313
GPA6	0.4734853	0.4734853	0.10113	0.8821240

* *

AT STEP 3, MEAPM7 WAS INCLUDED IN THE ANALYSIS.

		DEGREES OF FREEDOM			SIGNIFICANCE	BETWEEN GROUPS
WILKS' LAMBDA	0.8536313	3	2	87.0		
EQUIVALENT F	2.333047		6	170.0	0.0343	

---------------- VARIABLES IN THE ANALYSIS AFTER STEP 3 ----------------

VARIABLE	TOLERANCE	F TO REMOVE	WILKS' LAMBDA
NSERV6	0.8322600	4.1365	0.9367140
MATHRAW6	0.6500680	1.8570	0.8909298
MEAPM7	0.6496934	1.5231	0.8842231

-------------------- VARIABLES NOT IN THE ANALYSIS AFTER STEP 3 --------------------

VARIABLE	TOLERANCE	MINIMUM TOLERANCE	F TO ENTER	WILKS' LAMBDA
AVGABS6	0.9614495	0.6429909	0.61608	0.8412906
READRAW6	0.6396368	0.5539372	0.85403	0.8366194
MEAPR7	0.5903210	0.5895612	0.62112	0.8411913
GPA6	0.4134058	0.4134058	0.16126	0.8503663

F LEVEL OR TOLERANCE OR VIN INSUFFICIENT FOR FURTHER COMPUTATION.

SUMMARY TABLE

STEP	ACTION ENTERED	ACTION REMOVED	VARS IN	WILKS' LAMBDA	SIG.	LABEL
1	NSERV6		1	0.910068	0.0166	NUMBER OF SERVICES BY END OF GRADE 6
2	MATHRAW6		2	0.884223	0.0309	GRADE 6 MATH RAW SCORE
3	MEAPM7		3	0.853631	0.0343	GRADE 7 MEAP MATH SCORE

CLASSIFICATION FUNCTION COEFFICIENTS
(FISHER'S LINEAR DISCRIMINANT FUNCTIONS)

GROUP =	1 REGULAR	2 PRESCHL ONLY	3 FOLLOW THROUGH
NSERV6	1.640542	1.334849	1.456768
MATHRAW6	0.1929519	0.1426373	0.1703097
MEAPM7	0.6714729	0.7703731	0.6576834
(CONSTANT)	-16.24242	-14.37087	-13.99420

CANONICAL DISCRIMINANT FUNCTIONS

FUNCTION	EIGENVALUE	PERCENT OF VARIANCE	CUMULATIVE PERCENT	CANONICAL CORRELATION	:	AFTER FUNCTION	WILKS' LAMBDA	CHI-SQUARED	D.F.	SIGNIFICANCE
					:	0	0.8536313	13.610	6	0.0343
1*	0.14961	88.72	88.72	0.3607443	:	1	0.9813392	1.6200	2	0.4449
2	0.01902	11.28	100.00	0.1366044	:					

* MARKS THE 1 CANONICAL DISCRIMINANT FUNCTION(S) TO BE USED IN THE REMAINING ANALYSIS.

STANDARDIZED CANONICAL DISCRIMINANT FUNCTION COEFFICIENTS

	FUNC 1
NSERV6	0.88186
MATHRAW6	0.70308
MEAPM7	-0.50701

UNSTANDARDIZED CANONICAL DISCRIMINANT FUNCTION COEFFICIENTS

	FUNC 1
NSERV6	0.3150715
MATHRAW6	0.5139574E-01
MEAPM7	-0.9748013E-01
(CONSTANT)	-2.090480

CANONICAL DISCRIMINANT FUNCTIONS EVALUATED AT GROUP MEANS (GROUP CENTROIDS)

GROUP	FUNC 1
1	0.39231
2	-0.58814
3	-0.02399

CASE SUBFILE	SEQNUM	MIS VAL	SEL	ACTUAL GROUP		HIGHEST PROBABILITY GROUP	P(X/G)	P(G/X)	2ND HIGHEST GROUP	P(G/X)	DISCRIMINANT SCORES
SYSFILE	1			1		1	0.6923	0.4551	3	0.3540	0.7880
SYSFILE	2			1	***	3	0.9316	0.3597	2	0.3220	-0.1098
SYSFILE	3			1		1	0.0045	0.7578	3	0.2132	3.2310
SYSFILE	4			1	***	3	0.8962	0.3622	1	0.3507	0.1064
SYSFILE	5			1	***	2	0.7820	0.3561	3	0.3550	-0.3114
SYSFILE	6			1	***	3	0.9917	0.3609	1	0.3295	-0.0343
SYSFILE	7			1	***	3	0.8518	0.3625	1	0.3593	0.1628
SYSFILE	8			1		1	0.0548	0.6639	3	0.2737	2.3128
SYSFILE	9			1		1	0.4532	0.5083	3	0.3411	1.1424
SYSFILE	10			1		1	0.5778	0.4795	3	0.3487	0.9489
SYSFILE	11			1	***	2	0.9190	0.4228	3	0.3405	-0.6899
SYSFILE	12			1	***	2	0.8734	0.3765	3	0.3513	-0.4288
SYSFILE	13			1		1	0.8725	0.3698	3	0.3625	0.2319
SYSFILE	14			1	***	2	0.4182	0.5495	3	0.2968	-1.3977
SYSFILE	15			1	***	2	0.9504	0.3936	3	0.3477	-0.5259
SYSFILE	16			1		1	0.4352	0.5127	3	0.3398	1.1726
SYSFILE	17			1		1	0.6577	0.4623	3	0.3525	0.8355
SYSFILE	18			1		1	0.6825	0.4571	3	0.3536	0.8014
SYSFILE	19			1		1	0.9160	0.4106	3	0.3604	0.4978
SYSFILE	20			1		1	0.9110	0.3773	3	0.3624	0.2805
SYSFILE	21			1	***	2	0.9193	0.3867	3	0.3492	-0.4868
SYSFILE	22			1		1	0.9767	0.3899	3	0.3619	0.3631
SYSFILE	23			1		1	0.6434	0.4653	3	0.3519	0.8553
SYSFILE	24			1	***	2	0.6905	0.4762	3	0.3245	-0.9863
SYSFILE	25			1	***	3	0.9528	0.3602	1	0.3222	-0.0832
SYSFILE	26			1	***	3	0.8238	0.3568	2	0.3450	-0.2466
SYSFILE	27			1		1	0.4405	0.5114	3	0.3402	1.1637
SYSFILE	28			1	***	2	0.8839	0.3788	3	0.3508	-0.4421
SYSFILE	29			1	***	2	0.9508	0.3937	3	0.3477	-0.5265
SYSFILE	30			1		1	0.0411	0.6779	3	0.2656	2.4351
SYSFILE	31			1	***	3	0.8165	0.3565	2	0.3466	-0.2561
SYSFILE	32			1		1	0.3786	0.5273	3	0.3352	1.2728
SYSFILE	33			1	***	2	0.8255	0.4442	3	0.3345	-0.8086
SYSFILE	34			1		1	0.4131	0.5183	3	0.3380	1.2108
SYSFILE	35			1		1	0.3900	0.5243	3	0.3361	1.2519
SYSFILE	36			2		2	0.6348	0.4900	3	0.3197	-1.0631
SYSFILE	37			2	***	1	0.4838	0.5009	3	0.3432	1.0924
SYSFILE	38			2		2	0.4118	0.5515	3	0.2960	-1.4089
SYSFILE	39			2		2	0.2844	0.5943	3	0.2771	-1.6586
SYSFILE	40			2		2	0.9144	0.3856	3	0.3494	-0.4807
SYSFILE	41			2	***	1	0.8501	0.3655	3	0.3626	0.2034
SYSFILE	42			2	***	3	0.9486	0.3617	1	0.3407	0.0405
SYSFILE	43			2		2	0.5852	0.5028	3	0.3152	-1.1340
SYSFILE	44			2		2	0.8104	0.3625	3	0.3539	-0.3483
SYSFILE	45			2	***	1	0.4579	0.5071	3	0.3414	1.1346
SYSFILE	46			2		2	0.9820	0.4006	3	0.3461	-0.5656
SYSFILE	47			2	***	1	0.7524	0.4429	3	0.3561	0.7078
SYSFILE	48			2		2	0.4856	0.5298	3	0.3049	-1.2854

CASE SUBFILE	SEQNUM	MIS VAL	SEL	ACTUAL GROUP		HIGHEST PROBABILITY GROUP	P(X/G)	P(G/X)	2ND HIGHEST GROUP	P(G/X)	DISCRIMINANT SCORES
SYSFILE	49			2	***	1	0.9749	0.3992	3	0.3614	0.4237
SYSFILE	50			2		2	0.6155	0.4950	3	0.3180	-1.0904
SYSFILE	51			2	***	1	0.8263	0.4281	3	0.3583	0.6117
SYSFILE	52			2		2	0.0136	0.7894	3	0.1672	-3.0569
SYSFILE	53			2		2	0.4190	0.5493	3	0.2969	-1.3963
SYSFILE	54			2		2	0.6257	0.4924	3	0.3189	-1.0759
SYSFILE	55			2		2	0.5477	0.5127	3	0.3115	-1.1893
SYSFILE	56			2		2	0.5952	0.5002	3	0.3161	-1.1194
SYSFILE	57			2	***	3	0.7974	0.3559	2	0.3508	-0.2807
SYSFILE	59			3	***	1	0.9852	0.3916	3	0.3618	0.3737
SYSFILE	60			3	***	1	0.6615	0.4615	3	0.3527	0.8301
SYSFILE	61			3	***	1	0.3556	0.5336	3	0.3331	1.3162
SYSFILE	62			3	***	1	0.5333	0.4894	3	0.3463	1.0153
SYSFILE	63			3	***	1	0.7091	0.4517	3	0.3546	0.7654
SYSFILE	64			3	***	2	0.0831	0.6974	3	0.2237	-2.3214
SYSFILE	65			3	***	2	0.9432	0.4174	3	0.3419	-0.6594
SYSFILE	66			3	***	2	0.7786	0.4551	3	0.3312	-0.8692
SYSFILE	67			3		3	0.9088	0.3592	2	0.3268	-0.1385
SYSFILE	68			3	***	1	0.1389	0.6097	3	0.3019	1.8723
SYSFILE	69			3	***	2	0.9014	0.3827	3	0.3500	-0.4642
SYSFILE	70			3	***	2	0.5665	0.5077	3	0.3134	-1.1614
SYSFILE	71			3	***	2	0.9415	0.3916	3	0.3481	-0.5148
SYSFILE	72			3	***	1	0.6845	0.4567	3	0.3536	0.7986
SYSFILE	73			3		3	0.9663	0.3615	1	0.3374	0.0182
SYSFILE	74			3		3	0.9064	0.3591	2	0.3273	-0.1416
SYSFILE	75			3		3	0.8093	0.3563	2	0.3482	-0.2653
SYSFILE	76			3	***	1	0.3122	0.5460	3	0.3287	1.4030
SYSFILE	77			3	***	2	0.9705	0.4112	3	0.3435	-0.6251
SYSFILE	78			3	***	2	0.9125	0.4243	3	0.3401	-0.6980
SYSFILE	79			3	***	2	0.7768	0.4556	3	0.3311	-0.8717
SYSFILE	80			3	***	1	0.6257	0.4691	3	0.3511	0.8802
SYSFILE	82			3	***	2	0.7529	0.4612	3	0.3293	-0.9030
SYSFILE	83			3		3	0.9257	0.3620	1	0.3451	0.0693
SYSFILE	84			3	***	1	0.9453	0.4050	3	0.3609	0.4609
SYSFILE	85			3	***	2	0.7990	0.3599	3	0.3544	-0.3335
SYSFILE	86			3	***	1	0.9220	0.4095	3	0.3605	0.4902
SYSFILE	87			3	***	1	0.9487	0.3845	3	0.3622	0.3280
SYSFILE	88			3	***	1	0.6424	0.4655	3	0.3519	0.8567
SYSFILE	89			3	***	2	0.2606	0.6034	3	0.2728	-1.7131
SYSFILE	90			3	***	1	0.9961	0.3952	3	0.3616	0.3972
SYSFILE	91			3	***	2	0.2173	0.6213	3	0.2642	-1.8220
SYSFILE	92			3	***	1	0.6577	0.4623	3	0.3525	0.8355

SYMBOLS USED IN PLOTS

SYMBOL	GROUP	LABEL
1	1	REGULAR
2	2	PRESCHL ONLY
3	3	FOLLOW THROUGH

```
                                 HISTOGRAM FOR GROUP       1  REGULAR

                                         -- CANONICAL DISCRIMINANT FUNCTION 1 --
             4 +                                                                                +
               .                                                                                .
               .                                                                                .
F              .                                                                                .
R            3 +                                   1            1   1                           +
E              .                                   1            1   1                           .
Q              .                                   1            1   1                           .
U              .                                   1            1   1                           .
E            2 +                                   111 1  1     11  11                          +
N              .                                   111 1  1     11  11                          .
C              .                                   111 1  1     11  11                          .
Y              .                                   111 1  1     11  11                          .
             1 +                          1   1 11 11111111111  11 111        11       1        +
               .                          1   1 11 11111111111  11 111        11       1        .
               .                          1   1 11 11111111111  11 111        11       1        .
               .                          1   1 11 11111111111  11 111        11       1        .
              OUT.........+.........+.........+.........+.........+.........+.........+........OUT
                         -3        -2        -1         0         1         2         3
GROUP CENTROIDS                                             1
```

```
                               HISTOGRAM FOR GROUP       2  PRESCHL ONLY

                                    -- CANONICAL DISCRIMINANT FUNCTION 1 --
             8 +                                                                                 +
               .                                                                                 .
               .                                                                                 .
F              .                                                                                 .
R            6 +                                                                                 +
E              .                                                                                 .
Q              .                             2                                                   .
U              .                             2                                                   .
E            4 +                             2                                                   +
N              .                             2                                                   .
C              .                             2                                                   .
Y              .                             2                                                   .
             2 +                          2  2       2             2                             +
               .                          2  2       2             2                             .
               .         2             2  2222    22 2  2 2 2 22   2                             .
               .         2             2  2222    22 2  2 2 2 22   2                             .
              OUT.........+.........+.........+.........+.........+.........+.........+.........OUT
                         -3        -2        -1         0         1         2         3
GROUP CENTROIDS                                    2

                               HISTOGRAM FOR GROUP       3  FOLLOW  THROUGH

                                    -- CANONICAL DISCRIMINANT FUNCTION 1 --
             4 +                                                3                                +
               .                                                3                                .
               .                                                3                                .
F              .                                                3                                .
R            3 +                               3                3                                +
E              .                               3                3                                .
Q              .                               3                3                                .
U              .                               3                3                                .
E            2 +                               3 3 3 3 3    33  33                               +
N              .                               3 3 3 3 3    33  33                               .
C              .                               3 3 3 3 3    33  33                               .
Y              .                               3 3 3 3 3    33  33                               .
             1 +                  3   33    3  3 333 3 333 333  333  33    3                     +
               .                  3   33    3  3 333 3 333 333  333  33    3                     .
               .                  3   33    3  3 333 3 333 333  333  33    3                     .
               .                  3   33    3  3 333 3 333 333  333  33    3                     .
              OUT.........+.........+.........+.........+.........+.........+.........+.........OUT
                         -3        -2        -1         0         1         2         3
GROUP CENTROIDS                                         3
```

ALL-GROUPS STACKED HISTOGRAM

-- CANONICAL DISCRIMINANT FUNCTION 1 --

```
             8 +                                                                                 +
               .                                                                                 .
               .                                                3                                .
F              .                                                3                                .
R            6 +                                   3 3          3                                +
E              .                                   3 3          3                                .
Q              .                             2     3 3          3                                .
U              .                             2     3 3          3                                .
E            4 +                             2     2 2 3    3   33                               +
N              .                             2     2 2 3    3   33                               .
C              .                          2  2 3 3 1 2 33 2 33  13 213                           .
Y              .                          2  2 3 3 1 2 33 2 33  13 213                           .
             2 +                       3  2 32 3 33111 1231323  11 211                           +
               .                       3  2 32 3 33111 1231323  11 211                           .
               .         2       3    32  12221311211111111111221131113    3   11       1        .
               .         2       3    32  12221311211111111111221131113    3   11       1        .
              OUT.........+.........+.........+.........+.........+.........+.........+.........OUT
                         -3        -2        -1         0         1         2         3
GROUP CENTROIDS                                    2    3   1
```

CLASSIFICATION RESULTS -

ACTUAL GROUP	NO. OF CASES	PREDICTED GROUP MEMBERSHIP 1	2	3
GROUP 1 REGULAR	35	18 51.4%	10 28.6%	7 20.0%
GROUP 2 PRESCHL ONLY	22	6 27.3%	14 63.6%	2 9.1%
GROUP 3 FOLLOW THROUGH	33	15 45.5%	13 39.4%	5 15.2%

PERCENT OF "GROUPED" CASES CORRECTLY CLASSIFIED: 41.11%

CLASSIFICATION PROCESSING SUMMARY

```
        92 CASES WERE PROCESSED.
         2 CASES HAD AT LEAST ONE MISSING DISCRIMINATING VARIABLE.
        90 CASES WERE USED FOR PRINTED OUTPUT
```

```
CPU TIME REQUIRED..     1.00 SECONDS


                121 FINISH

        NORMAL END OF JOB.
          121 CONTROL CARDS WERE PROCESSED.
            0 ERRORS WERE DETECTED.
```

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ABSTRACT

THE LONGITUDINAL EFFECTS OF CONTINUOUS EARLY CHILDHOOD COMPENSATORY EDUCATION ON THE ACHIEVEMENT OF DETROIT PUBLIC SCHOOL PUPILS

by

John Andary

April, 1983

Advisor: Dr. Claire C. Irwin

Major: Educational Evaluation and Research

Degree: Doctor of Philosophy

The purpose of the study was to investigate the long-range effects of a preschool experience which had been reinforced by planned followup compensatory education services on the school achievement of pupils. Several cognitive measures were singled out for study and three groups of subjects were identified for comparative analyses. One of the comparison groups had no preschool experience, another had prekindergarten schooling, and the third group participated in both a Head Start and a Follow Through Program. Data covering the subjects' first seven years of schooling were gathered on the cognitive measures, attendance, report card marks in reading and mathematics, Michigan Educational Achievement Program test scores, number of compensatory education services, and norm-referenced test scores in reading and mathematics.

One-way analyses of variance were performed on the selected measures. Except for significant differences in the third and fourth grade norm-referenced reading test scores in favor of the Follow Through pupils over only one of the two comparison groups in each instance, there were no other differences in their favor on any of the other measures. Pupils who had a preschool experience only attained two significant differences in their favor, one on the second grade norm-referenced reading test and the other on the first grade norm-referenced mathematics test.

Discriminant analyses, conducted in an attempt to obtain additional information about relationships among the variables, produced results consistent with the analyses of variance. Multiple regression analyses showed norm-referenced reading and mathematics test scores to be most predictive of Michigan Educational Achievement Program scores. Norm-referenced test score rates of gain revealed increasing digression from the norm and a continuation of a cumulative deficit as defined by Deutsch's hypothesis.

The results of this study appear to support research conducted by the Westinghouse/Ohio University group (1969) on Head Start and by Abt Associates on Follow Through (1977) in which the effectiveness of the programs in promoting lasting cognitive gains was questioned.

AUTOBIOGRAPHICAL STATEMENT

Name

John Andary

Educational Background

B.A., Wayne State University

M.Ed., Wayne State University

Ph.D., Wayne State University

Professional Experience

1950-59, Teacher, Detroit Public Schools

1959-66, Counselor, Detroit Public Schools

1966-83, Research Supervisor, Detroit Public Schools

Professional Affiliations

American Educational Research Association

Michigan Educational Research Association

Association for Supervision and Curriculum Development

Association for Institutional Research