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ABSTRACT

A study in 18 schools in the Alum Rock (California) Union Elementary School District investigated the educational effects of differential distribution of compensatory resources and services to educationally disadvantaged pupils. The study focused on the relative effects on reading skills of two methods for resource targeting: (1) concentration, or the targeting of additional resources and services only to those pupils who meet the entitlement criteria in a school; and (2) saturation, or the distribution of additional resources and services to any and all pupils in the school. In addition, the study investigated the contextual and instructional conditions that might account for differences in reading skills. Classroom observations were conducted to examine (1) types of teacher and student activities; (2) time spent on instruction; (3) teacher-pupil interaction; (4) materials; (5) teachers' interpersonal styles; (6) instructional modes; and (7) group size. Data analysis indicated that concentrated services produced higher mean reading scores than saturated services among fourth graders, although no significant differences were found among second graders; and that more time spent in noninstructional activities tended to lower reading scores. In general, however, the analysis did not identify the instructional components associated with the benefits of concentrated compensatory services. (Author/MJL)

DRAFT

FINAL REPORT
RESOURCE ALLOCATION STUDY

SUBMITTED TO THE NATIONAL INSTITUTE OF EDUCATION

Prepared by:

Alum Rock Union School Distri
2930 Gay Avenue
San Jose, California 95127

William J. Jefferds
Superintendent

California State Dept.
of Education

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INTRODUCTION

GENERAL

This report presents the findings of a study of the relative educational effects of differential distribution of compensatory resources and services to educationally disadvantaged pupils in the Alum Rock Union Elementary School District. The National Institute of Education (NIE) sanctioned and supported this study as part of a study of improvements in ESEA Title I. Additional authorization came from State and local agencies. Alum Rock Union Elementary School District participated as one of 11 national demonstration sites with specific interest in assessing the relative educational effects of variations in school wide targeting of compensatory services. The effects of the concentration and saturation methods provides the general focus of this report.

Two methods for resource targeting were designed to satisfy the study objective:

(a) Concentration--or the targeting of additional resources and services only to those pupils who meet the entitlement criteria in a school.

(b) Saturation--or the distribution of additional resources and services to any and all pupils in a school.

The data base used in assessing the relative effects of these two resource provision conditions was provided by establishing a matched sample of 18 schools which were randomly assigned to *"saturation"* or *"concentration"* of EDY resources. In the Fall of 1976 (school year 1976-77), administration and faculty at each school were provided guidelines for implementation of their respective resource *treatment: concentration* or *saturation*. To avoid administrative and legal problems associated with compensatory programs, necessary waivers from State and Federal agencies were solicited and obtained prior to actual implementation of the *treatment*. In fact, resources from these waived programs (ECE, SB90 and Title I) were pooled at the district level and reallocated to participating buildings on a direct EDY targeting basis. Therefore, a uniform EDY resource share per pupil was established, and the number of EDY pupils in a given building determined the resource allocation (i.e., number of shares) for that building. It should be noted that a pupil was defined as EDY based on reading performance on a standardized achievement test: viz. at or below the 50th percentile on the Metro 70 (Harcourt, Brace, Jovanovich, 1972).

Many issues contemplated by this study are extremely complex. To address those issues, a multifaceted research model was designed consisting of two components: The Observational Component, and the Analysis of Effect. The following questions provided guidance in the design and implementation of the research model:

General Questions:

1. Does saturation or concentration of compensatory resources and services relate to meaningful and reliable differences in basic reading skill acquisitions for either EDY pupils, non-EDY pupils, or both?

2. From a logistical standpoint, what is the utility of saturation vs. concentration as a means for improvement in the acquisition of reading skills?

3. To what extent do indicators of concentration vs. saturation relate to improvements in the acquisition of reading skills by EDY pupils?

4. To what extent does saturation vs. concentration produce general educational benefits, in terms of overall (class level) achievement in reading skills?

5. What are the implications of findings from this study for:
   1) Inservicing policy at the District level?
   2) Guidelines for targeting and coordination/integration of overlapping programs at the State level?
   3) Resource allocation, targeting and compensatory service policy guidelines at the Federal level?

6. What are the implications of unanticipated findings (or lack of anticipated findings) for designing follow-up studies, including reanalyses of the current data?

Observational Questions

1. What are the resources and processes used for reading instruction?

2. How are these processes and resources used differently in saturated vs. concentrated classes?

3. Do teachers use different materials and/or methods with EDY as opposed to non-EDY pupils? In the concentrated class? In the saturated class?

4. What are the contextual and procedural (instructional) conditions which account for differences in reading skill attainment?

5. How were the guidelines for concentration or saturation of compensatory services and resources actually implemented in the demonstration schools as manifest by instructional and administrative staff attitudes and behaviors?

Analysis Questions

1. What are the more salient characteristics (in a statistical sense) of teacher effectiveness, in terms developed by this study, and how do these effectiveness characteristics compare with those identified through other studies?

2. What are the important resources and service components and their use configuration which best accounts for improved reading skill attainment among EDY pupils?

3. How do instructional effects or saturation vs. concentration differ at individual pupil vs. class aggregated levels? That is, to what extent must class (or school) context variable be taken into account in understanding the impacts of the implementation of resource and service?

This report presents discussions pertaining to the two components of the research mode. In addition, a brief summation of the overall findings is presented.

OVERVIEW OF OBSERVATIONAL COMPONENT

The observational component of the research model was designed to accomplish three general objectives. First, a description of the resources and processes used during reading instruction was desired. Secondly, difference in how the two treatments (concentration vs. saturation) were implemented was to be observed in terms of what resources and processes were used. Finally, instructional process variables were generated and defined to become part of the basis for analysis in the analytical component.

To accomplish these ends, observation model was developed consisting of two observation instruments: *Classroom Observation Treatment* and *Individual Student Instrument*.

The *CLASSROOM OBSERVATION INSTRUMENT* was designed to obtain information about activities and materials used by the teacher and the class as a unit. Most of the observations focused on both the teacher's interaction with the students and how the teacher utilized the materials in the classroom. The instrument consisted of two ten-minute teacher-focused observations episodes, separated by a ten-minute observation focusing on the class in general. Most of the information for study purposes was obtained during the teacher-focused observation.

During the classroom observation, the observer examined the relationships between EDY funding strategies and patterns of classroom processes such as teacher decision making; teacher role orientation, classroom content, classroom organization, and patterns of student interaction with staff, other students, and material resources. This instrument examined classroom implementation patterns in terms of the relationship between funding strategy (treatment) and student outcomes.* The classroom observation instrument provided a depiction of differences in student classroom experiences under the two funding conditions, and a determination of the relationship between the differences in classroom processes and student outcomes under the two funding conditions. This instrument did not contemplate generalizations about funds in any given school or classroom since the analysis was designed for district wide results.

*Measures of student outcomes were gathered from student scores on achievement tests (n=2,100), teacher assessment of the proportion of students' objectives accomplished for a small portion of the class, and observation of task engagement.

The *INDIVIDUAL STUDENT INSTRUMENT* was designed to obtain information about how specific students were involved in class activities and what materials these students used. The observer focused on individual students who were pre-selected according to grade level, sex, ethnicity, EDY status and the type of class treatment in which the students were involved. Each of four students per classroom was observed for approximately 30 minutes.

The individual student observations were designed to obtain information describing instructional resources and processes used by teachers in the two treatment conditions. Unlike the teacher-focused observations, the individual student observations provided unique information about the implementation of the saturated or concentrated treatment, specifically, in determining how teachers differentiate resources and processes used on the basis of pupil's EDY status.

During the individual student observation, the observer examined the relationships between EDY funding strategies and patterns of student interactions within the class. The observer noted student role orientation, how student was involved in classroom grouping, how student used funded resources and additional relationships and patterns concerning student use of EDY materials and resources.

The combined information obtained from the use of these two observation instruments provided for the generation of instructional process variables. These variables were part of the data base for the analytical component of the research model.

OVERVIEW OF ANALYTICAL COMPONENT

Two basic issues guided the analysis of study data for evidence of treatment effects:

1) Does saturation or concentration of compensatory resources and services--to the extent such occurred in this study--relate to reliable and meaningful differences in basic reading skill attainment?

2) What are the contextual and procedural (instructional) conditions which account for differences in reading skill attainment.

The first question focuses on the effectiveness of the implementation of the two treatments. More succinctly, which treatment of allocating educational resources and services provides the highest pupil reading achievement?

An additional objective was to determine the central and peripheral effects of the allocations of these treatments on class practices and pupil learning (reading, as measured by MAT). The second analysis question focuses on the more general domain of instructional effects. The objective here was to determine what the characteristics of pupils, resources, and instructional procedures which taken together, accounted for learning outcomes (i.e., reading skills, as measured by the MAT).

To properly address these two issues and the other general study issues, the analysis was divided into four parts. Part I contains a discussion about the development of analysis variables. Part II contains an examination of the data for evidence of effects due to saturation or concentration, using data collected at the class-level. Results of these analyses are reported separately for the second and fourth grades. Part III contains an extension of the analysis to include information on the relative effects of the two alternative modes of delivering compensatory resources and services at the individual pupil level. This provides an examination of pre-post test patterns in terms of degree of educational disadvantage, ethnicity, gender, and the interactions of these conditions with the alternative "treatments" as implemented by the teachers. Finally, Part IV deals with the more general question of how this information regarding contextual and instructional processes used in the class explain outcomes observed at the class level.

In Part I, statistical tests of probability were used in the effects of saturation vs. concentration; however, greater emphasis was placed on identifying and better understanding the proximal (near) and distal (far) consequences of this attempted intervention. Additional emphasis was placed on evaluating such effects against alternative input-process-outcome patterns detected in the data. Variables designed to accomplish these analyses were derived from consideration of the fundamental issues regarding saturation vs. concentration of compensatory resources and the results of contemporary teacher effectiveness research.

In Part II, the information obtained either during the classroom observations, through interviews and test data, or through additional methods was scrutinized to determine whether complete data on all relevant measures were available for each class. The requisite complete data set was found for 56 of the teacher/class units observed.

Two types of conditional analysis were subsequently performed on these data. Both types are based on the general linear hypothesis. First, two-way analyses of covariance were performed on each of the four outcome variables (total reading, word knowledge subscore, word analysis subscore, and reading subscore) within grade level (second and fourth). The treatment condition (saturated or concentrated) was used as the between-group variable. The five context or process measures which showed the closest relationship were treated as covariables. Secondly, multiple linear regressions were performed on these data. The mean reading achievement scores were regressed on several combinations of context and process variables to identify the most significant determinants of outcome score variance. Through this analytical technique, an assessment of the instructional effects of several process variables was possible when the effects of context variables were sufficiently controlled.

In Part III, multiple linear regressions were performed on samples within grade-level to identify reliable context and process covariates of pupil achievement. The available measures for each pupil included prescore (previous MAT standard scores for sub and total tests), design variables (EDY status, resource treatment, ethnicity, gender, and a set of process observation descriptors. Consequently, within each grade level post-scores were regressed on available process and context variables, including the corresponding prescore. The identification of relevant process covariates of outcomes was enhanced by attaching differential weight factors to the process variables in the stepwise procedures.

In Part IV, additional analysis was performed to attempt to evaluate the instructional components and other features associated with the possible benefits (in terms of reading achievement) of concentrating compensatory services and resources. To facilitate the analyses and evaluation of these features, a series of stepwise multiple linear regressions were performed on outcome measu-es within each grade-level sample. Basically, this analysis attempts to discover what are the process and context characteristics at the classroom level which best account for differences in mean achievement?

THE OBSERVATION COMPONENT

The observational phase of this study was designed to achieve three objectives:

- To describe and define resources and processes used for reading instruction;
- To detect differences in how the resources and processes are used between the saturated and concentrated classes and to determine how these differences are related to the implementation of the two treatments;
- To generate instructional process variables which, when integrated with interview and test data, provide a basis for studying the relationships between the processes used and the pupil outcomes. (See Analysis of Effects section for discussion of process/outcome study.)

The findings relating to these objectives are presented in this section. Additional analyses utilizing these findings are discussed in subsequent chapters.

All observations were conducted during reading instruction. The rationale for this is twofold. The primary reason is basically methodological. Since one of the objectives was to determine differences both within and between class treatment types (e.g., differences between individual children, variations over time), it was necessary to minimize the inherently convoluted effects on the data which would have resulted had the observations also been taken during math, science or art instruction. The second reason is primarily political. The relative success or failure of providing basic reading skills to elementary students is presently a topic of widespread attention and concern. Consequently, improving the effectiveness of reading instruction remains a high priority for Title I and other compensatory education programs.

Two observation instruments were developed for this study. The *CLASSROOM OBSERVATION INSTRUMENT* was designed to obtain information about the activities and materials used by the teacher and the class as a unit. Most of the observations focused on both the teacher's interaction with the students and how the teacher used the materials in the classroom. The *INDIVIDUAL STUDENT INSTRUMENT* was designed to obtain information about how specific students were involved in these or other

activities and what materials those students used. This combined observation procedure provided a multiple perspective on the phenomenon of reading instruction as it occurred within the second and fourth grade classrooms.

Observer Training and Reliability

Six substitute teachers participated as observers for this study along with two supervisory observers. The six were selected based on these criteria: analytical skills, superior memory, prior classroom observation experience, the ability to objectively stay within the study's definitional bounds, and a willingness to work unusual part-time hours.

Each observer received a minimum 100 hours of training before taking observation in the classroom. The training involved lecture discussions, homework and review of each section of the instruments. Role playing and classroom video tape analysis supplemented these activities.

In addition, the observers conducted practice observations in over 30 different classrooms. During these practice sessions, the reliability of the observer was evaluated. The observer had to attain at least 90% proficiency on the reliability test in order to continue in the study. The reliability of observer was evaluated throughout the study.

Unfortunately, insufficient time had been allocated to test the six observers for reliability, and it was necessary to extend this testing process into the first week of the actual observations. Consequently, to assure reliability of the data collected during this period, trainees were required to conduct classroom observations under the supervision of a reliable observer. Observers were allowed to conduct observations alone only after they had demonstrated satisfactory reliability. Every trainee had repeatedly and satisfactorily demonstrated reliability by the end of the first week of actual observations.

Instrumentation and Data Collection

The Classroom Observation instrument was designed to include two ten-minute observation episodes during which the observer recorded detailed information about activities and materials used by the teacher and students working with the teacher. The pupils working either with an aide or on their own (e.g., self-instruction activities not supervised by teacher) were not observed during the teacher-focused observation. The observer recorded information including: the number of pupils in the teacher's group, the nature and duration of the teacher activities, the nature and duration of the pupil activities, the type of materials used, and the frequency of approval and disapproval of pupil work or behavior.

The two ten-minute observations were separated by a ten-minute class observation during which the observer recorded less detailed information about activities and materials used in the class and pupil grouping patterns throughout the classroom. This information provided background and supplementary data and was not generally included in the analysis presented in this report. Therefore, the information obtained during the teacher-focused observation provides the bulk of the data presented for the classroom observation component.

Only 56 second and fourth grade classes from the 72 originally considered provided the requisite complete data set (i.e., teacher and principal interviews, classroom and individual observations, and test results for the teacher's previous and present class). Each of these classes was observed for two ten-minute episodes during the reading instruction period on four separate days; therefore, providing a total of eight separate ten-minute classroom observation episodes. The data from these eight observation episodes were combined to calculate measure of central tendency (mean) and variation (standard deviation) for the class.

The development of analysis variable based on the data from the Classroom Observation Instrument is presented in this chapter. The results of descriptive analysis used to examine the types of resources and processes used for reading instruction is also presented. In addition, the result of analysis of variance, conducted to detect differences in resources and processes across treatment groups and grade levels, is reported.

Classroom Demographics

Class Size and Pupil-Adult Ratio

The average number of pupils present during the observation period was 17.8. The size of a class ranged from 5 to 32 pupils; however, approximately half the classes consisted of 12-24 pupils. The average number of pupils present during reading instructi was approximately the same for saturated and concentrated classes.

One reason for the wide range in class size during reading instruction was the use of different scheduling procedures. Approximately one-third of the classes operated unde a regular total class schedule. The staggered schedule was adopted in the remaining two-thirds of the classes. The classes using this procedure divided the students into two groups based on reading aptitude or some other criterion. One group arrived at school on hour early for reading instruction. This group left an hour earlier than the second group, which had reading instruction at the end of the day. The staggered schedule was used equally by concentrated and saturated classes. This type of schedule significantly reduced class size during reading instruction; however, it lengthened the teaching day.* The classes using the staggered schedule succeeded in lowering the pupil-adult ratio during reading instruction.

An additional method used to lower the pupil-adult ratio during reading instructio was the use of instructional aides. Aides were present during 44% of the observations. Aides were found more often in saturated classes (53%) than in concentrated classes (36%) and considerably more often in total-class situations (73%) than in classes using the staggered schedule (28%). (Both the treatment group and schedule differences are significant at $p \leq .05$, the significance level used in this study as the criterion for identifying reliable differences.) Therefore, aides were most often present in saturated total-class situations--classrooms in which larger numbers of pupils were present and aides were permitted to work with any pupil. Conversely, aides were least likely to be found in classes in which the staggered schedule was used to reduce class size and the aide was restricted to working with pupils classified as EDY.

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*Average size of the teacher's total class was about 28 for both the concentrated and saturated groups.

The use of the staggered schedule and the use of aides enable the district to realize an average pupil-adult ratio of 13:1 for reading instruction in the classroom observed. However, because of the widespread use of aides in classes operating under the total-class schedule, pupil-adult ratio did not differ as widely between the staggered classes (average of 12:1) and total classes (average of 16:1) as might have been expected. Reliable differences across treatment groups were not found.

Pupil Teacher Grouping Size

Teachers worked with an average of about 10 pupils during a ten-minute episode. This represents slightly over half the pupils present. Group size did not differ significantly across treatment types or grade levels.

Use of Instructional Resources Outside the Classroom

Under both treatment conditions, instructional resources were rarely used outside the classroom during reading instruction. One or more pupils were sent to a reading specialist or a resource center in only 7% of the observations. This finding, however, does not indicate that these resources have not been fully utilized, primarily because federal regulations specify that resources purchased with Title I funds should be used to supplement rather than supplant basic instruction. Therefore, limited use of thse resources during the basic reading instruction period is in accord with these regulations.

Classroom Composition

Saturated and concentrated classes in the sample were similar in composition. In both groups, approximately two-thirds of the pupils present during the observations were classified as EDY. The average ethnic composition in both groups was 58% Spanish surname, 23% caucasian, 12% black and 7% other. The average age was 8 years 11 months for second-grade and 10 years 4 months for fourth grade. In addition, both groups consisted of equal proportions of boys and girls.

Descriptive Results -- Teacher-focused Observations

Teacher Roles

The observer recorded the teacher's activities during the ten-minute teacher-focused observation using a role code. (See Appendix A.1 for operational definitions.) The analysis variables developed from the teacher role code include measure of role diversity (average number of different roles per episode), and role types (instructional vs. noninstructional, directive vs. self-instruction, interactive vs. facilitative).

The observer could record up to six roles per observation episode; however, the average number observed was moderately low (2.26).* In only 10% of the teacher-focused observations were more than three roles observed. The maximum number observed was five. Diversity of teacher roles did not differ reliably across treatment group or grade levels.

Virtually all of the 25 roles codified were observed in at least one observation episode; however, a relatively few roles accounted for the substantial percentage of all roles observed.+ The most common teacher activities observed were oral or silent reading and reviewing (24%),** drill (23%), classroom management (15%), and assigning tasks (9%). Together these four activities represented 71% of all teacher roles observed. These roles were predominant across treatment groups and grade levels.

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*Roles could be interspersed, as in the case of a teacher who alternated between making assignments and drill activities. However, a given role code was recorded only once during an episode. The time recorded for the role reflected total number of minutes across all occurrences of the role within the episode.

+Frequency of occurrence for each of the 25 roles is shown in Appendix B.3.

**This group activity is actually a combination of three codes: oral/silent reading, reviewing, and oral/silent reading with review. The distinction between the first two codes and the third is essentially one of pacing. Observers used the third code when the teacher continually alternated between asking pupils to read passages aloud or silently and asking questions about the passages. When either the reading or the questioning persisted for two minutes or longer, without interruption by the other, the component activity was coded.

Pupil Roles

The roles in which the pupils were involved while working with the teachers were also recorded. (See Appendix A.2 for operational definition.) The observer could observe up to six different roles per episode, although the average number observed per episode was moderately low (2.59).* In only 20% of the groups observed were more than three pupil roles recorded. The diversity of pupil roles did not differ reliably across treatment groups or grade levels.

As with the teacher roles, numerous pupil roles were observed with only a few predominating.+ The pupils' predominating roles and the teachers' predominating roles were related to involvement by both pupil and teacher in the same activities; therefore, many of the pupil roles were counterpart to the teacher roles. The most common activities involving pupils working with the teacher were oral/silent reading and review (22%) and drill (20%). Receiving assignments and participation in classroom management activities represented 8% and 9% of all pupil roles, respectively. Two additional roles were fairly common among pupils; seatwork (completing assignments--11%) and transition (waiting for a new task or the teacher's attention--6%). Together these activities accounted for three-fourths of all the pupil roles observed.

Teacher and Pupil Time Engaged in Instructional Activities

In the previous two sections, the frequency of specific teacher and pupil roles was examined without regard to the amount of time spent in those roles. The observers did, however, record the number of minutes associated with each role. Two dimensions

*Multiple pupil roles were recorded when the whole teacher's group switched from one activity to another or when different members of the group were simultaneously engaged in different roles.

+Relative frequencies of all pupil roles are shown in Appendix B.4.

were developed both to examine any patterns associated with how the teachers and the pupils used their time during reading instruction and to determine whether any relationship existed between those patterns and test outcomes. The first dimension, *engaged time* was a measure of the proportion of time devoted to instruction and activities directly related to instruction. The second dimension, *instructional style*, was a characterizatic of the activity level or mode of instruction associated with each role observed.

Engaged Time

In order to measure the proportion of time devoted to instruction and the association with the instructor, all of the teacher and pupil roles were classified as instructional or noninstructional in nature.* Then the proportion of teacher and pupil time associated with instructional roles was calculated for each observation episode. Complete data from all observations of a given class were combined to derive measures of average pupil and teacher engaged time. This measure was found for all 56 classes.

The results presented in Table 1 indicate consistently high proportions of engaged time. Generally, pupils and teachers spent about 90% of their time in activitie of an instructional nature. This indicates that out of the 80 minutes of total observation time per classroom, an average of less than nine was devoted to classroom managemen discipline, and other activities not directly related to instruction. This pattern of high engaged time is consistent across treatment groups and grade levels.

Table 1

Teacher and Pupil Engaged Time during Teacher-Focused Observations

	Average Percent of Time				
	Saturated		Concentrated		All
	Grade 2	Grade 4	Grade 2	Grade 4	Classes
Engaged Time--Teachers	90.97%	87.31%	91.29%	83.42%	88.29%
Engaged Time--Pupils	89.60	87.99	90.24	87.97	88.94
(Number of Cases	(15)	(14)	(13)	(14)	(56)

*A breakdown of instructional vs. noninstructional roles is shown in Appendices A.1 and A.2.

Instructional Style

Activities levels or modes of instruction were developed to facilitate the examination of patterns of time utilization associated with each role observed. Teacher roles were grouped into five nonoverlapping modes, each of which is described below. The specific roles included in each category, and their relative prominence within the category, are shown in Table 2.

Teacher directive roles. In these roles, the teacher is the primary actor. Where pupils are involved, they are typically receiving directions or other information from the teacher, with no immediate response or participation (other than listening) required on their part. Teachers observed in directive roles were most often performing classroom management tasks, making assignments, or instructing (lecturing). Other activities included in this category but observed much less often are reading aloud, discipline, and praise.

Teacher-initiated interactive roles. In these roles, the teacher also acts as instructional leader, but pupils are assumed to take a more active part. Basically these roles represent several variations on a question-and-response format, with pupils making frequent group or individual responses in these interactive roles. Teachers were usually leading drill (for example, on word-attack skills or vocabulary), leading group oral or silent reading and review, and administering tests.

Discussion and social interaction with pupils. This category indexes a somewhat different type of teacher-pupil interaction. Discussion and social interaction involve more extended pupil talk, and pupils' comments are not generally restricted to reading aloud and answering specific questions from the teacher. The pupils interact with teacher on a much higher level of creative or interpretiv thought than in interactive roles.

Teacher assisting and monitoring pupil work (facilitative). In these roles, the teacher provides support and assistance to pupils who are engaged in

relatively independent activities. The teacher is facilitating assigned seatwork (reading stories, using workbooks or dittos, etc.) or self-instructional activities (instructional games, audiovisual equipment, or creative work).

Teacher idle. The teacher has been coded as *doing nothing* for a period of at least one minute during the ten-minute observation episode.

Table 2

Relative Contributions of Teacher Roles to Instructional Mode Scales

Name of Teacher Mode	Major Contributors	Other Contributors
Teacher directive roles	Managing (51%) Assigning task (32%) Instructing (10%)	Story telling, reading aloud (3%) Disciplining (2%) Reciting poetry) less Interrupted by office) than Praising) 1%
Teacher-initiated interactive roles	Drilling (42%) Oral/Silent reading and review (42%) Testing, assessing (12%)	Tutoring (5%)
Discussion and social interaction with pupils	Discussion (66%) Social interaction (34%)	
Teacher assisting and monitoring pupil work	Facilitating pupil seatwork (85%) Facilitate self-instruction activities (15%)	
Teacher idle	Doing nothing (100%)	

A profile reflecting the proportion of a given teacher's time in these five modes was generated by calculating the proportion of time in each mode within each observation episode then taking the average across all episodes for the teacher. Mean proportions of time in these modes, averaged across all 56 teachers, are displayed in Table 3. The teacher-initiated interactive mode clearly dominates, accounting for an average of 70% of teacher time. The directive and facilitative modes together represent an average of 25% of teacher time. Discussion and social interaction are comparatively rare, accounting for an average of less than half a minute per episode.

Table 3

Average Proportion of Teacher Time in Five Activity Modes during Teacher-Focused Observations

Activity Mode	Proportion of Time in Mode	
	Mean	Standard Deviation
Directive	14.43%	10.665%
Teacher-initiated interactive	70.28	21.235
Discussion and social interaction	3.25	6.590
Assisting and monitoring pupil work	10.63	13.111
Idle	1.41	3.237

Pupil roles were grouped into four nonoverlapping participation modes which generally correspond to the teacher modes. The roles in each mode, and their relative prominence within the mode, are displayed in Table 4. The four pupil modes or levels of activity are:

Pupils receiving directions. In these roles no immediate verbal response or activity (other than listening) is required of pupils. These roles are most often observed in conjunction with teacher directive roles, as pupils listen to the teacher make an assignment, carry out classroom management tasks, or lecture.

Pupils responding to teacher. Pupils are involved in activities that are led by the teacher but that call for them to respond, either as individuals or in a group. These roles are the pupil counterparts to the teacher-initiated interactive roles--drill, oral/silent reading and review, and testing.

Pupils engaged in seatwork and self-instruction. These roles call for the most active level of participation from pupils. Most often pupils are working fairly independently, completing seatwork assignments or carrying out self-instructional activities (working with audiovisual

equipment or instructional games, working on creative tasks. Less often pupils are involved in discussions or social interactions.*

Pupils idle. Pupils have been coded as *in transition* (waiting to begin a new task or to get the teacher's attention) or as *not attending to task* for at least one minute.

Table 4

Relative Contributions of Pupil Roles to Instructional Mode Scales

Name of Pupil Mode	Major Contributors	Other Contributors
Pupils receiving directions	Being managed (42%) Being assigned task (38%) Being instructed (12%)	Listening to story (5%) Being disciplined (3%) Being praised (less than 1%)
Pupils responding to teacher	Oral/silent reading and review (45%) Drill (40%) Being tested, assessed (11%)	Being tutored (5%)
Pupils engaged in seatwork and self-instruction	Seatwork (64%) Self instruction--AV games, creative work (19%)	Discussion (13%) Social interaction (3%) Clean-up)less Reciting poems)than Visit resource ctr) 1%
Pupils idle	In transition (65%) Not attending to task (35%)	

A profile of pupil time in each mode was generated for each classroom using essentially the same procedure followed in generating the teacher profiles. Proportions of pupil time in the four modes is presented in Table 5. Pupils working with the teacher during reading instruction spend an average of 65% of their time in the responding mode.

*Discussion and social interaction were included in this category rather than treated separately because, like seatwork and self-instruction, they were assumed to involve highly active participation of pupils. For teachers, discussion and social interaction were treated separately in order to examine differences in instructional style. These two roles were rare for both teachers and pupils.

Table 5

Average Proportion of Pupil Time in Four Activity Modes during Teacher-Focused Observations

Activity Mode	Proportion of Time in Mode	
	Mean	Standard Deviation
Pupils receiving directions	9.02%	18.209%
Pupils responding to teacher	65.10	20.128
Pupils engaged in seatwork and self-instruction	20.35	7.202
Pupils idle	5.52	5.764

Most of their remaining time is spent completing seatwork assignments or working on self-instructional activities. On the average, comparatively little pupil time is spent receiving directions. The low proportion of idle time among pupils may be due in part to the observers' focus on only those pupils who were working with the teacher.*

The relative proportions of a given teacher's time in the five teacher activity modes were used as a profile of that teacher's instructional style. The pattern of pupil time use within the teacher's classroom has been treated as a second profile, reflecting how pupils in the classroom experience reading instruction. A comparison of the teacher and pupil profiles shows strong similarities in the relative proportion of time spent in corresponding teacher-pupil modes. The correlation between use of pupils and teachers time (presented in Table 6) indicates these strong similarities. Correlations between the time the teacher spent in the directive, interactive, and facilitative modes and the time the pupils spent in the counterparts of those modes (i.e., receiving directions, responding to teacher, and seatwork/self-instruction, respectively) are high and positive. Correlations for time spent in noncorresponding modes are generally negative.

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*In another section of the instrument, observers recorded information about grouping patterns and pupil activities for the classroom as a whole. Data from these observations showed a higher frequency of *down time* among pupils not working with the teacher or an ai

**Perferct correlations would be obtained only if all pupils in the teacher's group were engaged in a single type of activity, corresponding to the teacher's activity, and pupils were never idle unless the teacher was also idle.

Table 6

Correlations between Proportions of Teacher and Pupil Time Corresponding and Noncorresponding Modes during Teacher-focused Observations

	Teacher Mode			
Pupil Mode	Directive	Interactive	Facilitative	Idle
Receiving directions	.71	-.31	-.08	.00
Responding to teacher	-.49	.94	-.64	-.40
Seatwork, self-instruction	.08	-.80	.78	.32
Idle	.58	-.38	-.12	.36

Profiles of teacher and pupil time use by treatment group and grade level are displayed in Table 7. Reliable differences across treatment groups are found in both the teacher and pupil profiles.

Teachers in the saturated classes spent 70% of the time in the interactive mode. Correspondingly, the pupils in those classes spent 72% of the time in the interactive mode. The teachers in the concentrated classes, although spending a majority of the time in the interactive mode, used seatwork and self-instruction activities for their pupils significantly more often than the teachers in the saturated classes. Consequently, the teachers in the concentrated classes spent more time monitoring or assisting their pupils in these activities than the teachers in the saturated classes. Pupils in the concentrate classes spent an average of 28% of the time in seatwork and self-instruction. This represents almost twice the amount spent by pupils in the saturated classes.

Table 7

Average Proportions of Teacher and Pupil Time in Instructional Modes during Teacher-Focused Observations by Treatment Group and Grade

Instructional Mode	Average Proportion of Time in Mode: Saturated Grade 2	Saturated Grade 4	Concentrated Grade 2	Concentrated Grade 4	Tmt. Group Difference Signif. at p <.05
Teachers					
Directive	12.28%	14.27%	15.00%	16.00%	
Interactive	78.26	77.06	69.04	56.15	X
Disc. & soc. interaction	1.63	3.07	3.83	4.46	
Assisting & monitoring	7.28	4.28	12.13	19.37	X
Idle	0.54	1.32	0.00	3.91	
Pupils					
Receiving directions	6.88	7.99	12.33	9.25	
Responding to teacher	74.23	69.58	66.64	49.41	X
Seatwork & self-instruct.	12.40	15.69	17.65	36.02	X
Idle	6.52	6.64	3.38	5.33	
(Number of Cases)	(15)	(14)	(13)	(14)	

Likewise, teachers in concentrated classes spend a significantly greater amount of time (16%) facilitating these activities than do teachers in saturated classes (6%).

Examination of grade-level differences within treatment group reveals an additional pattern. In saturated classes, the profiles are very similar in both grades. However, the concentrated classes' profiles apparently differed from second to fourth grade. Specifically, the diversity of teacher and pupil activities increases from second to fourth grade. Fourth-grade pupils in concentrated classes spend more than a third of their time in seatwork and self-instruction--twice as much time as the second graders. Likewise, fourth-grade teachers in concentrated classes spend more of their time assisting pupils than any other group of teachers.

The data in Table 7 indicates that the teachers in saturated classes relied almost exclusively on the interactive mode. The instructional style of the teachers in the concentrated classes is more diverse, thereby allowing pupils to experience a wider range of activities in teacher-led reading groups. This diversity is more pronounced in the fourth grade. One possible explanation is that teachers in concentrated classes use various modes of instruction as a technique for concentrating services on EDY pupils. Unfortunately, data from the individual observation instrument (which will be discussed in a subsequent section) do not show systematic differences in use of time by EDY and nonEDY pupils in the concentrated classes.*

The use of aides in the classroom contributed to the differences between the treatment group's instructional profiles. Aides were used more frequently in the saturated classes. Data from the whole-class indicated that aides frequently assisted and monitored pupils in seatwork and self-instruction activities (the whole-class observation was made during ten-minute break between the two teacher-focused observations When an aide was available, pupils using audiovisual equipment and games or completing their assigned seatwork apparently worked unsupervised or with the aide, rather than with the teacher. Consequently, seatwork and self-instruction were rarely observed in the teacher-focused observations when an aide was present. In classrooms without aides, these activities were generally pursued within the context of the teacher's group, and therefore were more likely to be included in the teacher-focused observations.

Data from the individual observations, which were not limited to pupils working with the teacher showed that pupils in saturated classes spent more time in seatwork and self-instruction than was indicated by the teacher-focused observations.

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*The individual data do not indicate that concentrated teachers vary instructional modes in the same way for all pupils, only that variations in mode are not reliably associated with the child's EDY status.

However, the data from the individual observation instrument reaffirmed that pupils in the concentrated clases spent significantly more time involved in seatwork and self-instruction than the pupils in the saturated classes. Therefore, using more aides in saturated classes apparently accounts for only part of the observed differences in instructional style across treatment groups.

Instructional Materials

The observers also recorded information concerning the types and diversity of instructional materials used during the teacher-focused observations. The primary materials used were textbooks (used during about half the teacher observations) and workbooks (about 38% of the observations). Other materials include blackboard or magic slate (21%), paper and pencil (16%), flashcards or teacher-made materials (13%), and dittos (11%).

The average number of different materials used during a ten-minute episode was 2.00. An average of 2.20 materials per episode were used in the concentrated classes, which is significantly higher than the average of 1.86 materials used in the saturated classes ($p < .05$). In addition, teachers in concentrated classes were more likely to use materials purchased with EDY funds. Approximately 43% of the materials used in concentrated classes were purchased with EDY funds. Teachers in saturated classes used approximately 27% EDY materials ($p < .05$). Although no reliable differences in overall materials usage were found across grade levels, fourth-grade teachers in both treatment groups made proportionately greater use of EDY materials than second-grade teachers.

Teachers' Interpersonal Style

The teachers' interpersonal style was also observed during the teacher-focused observations. Observers recorded both the frequency and the intensity of the following teacher behaviors:

Supportive verbal expression--comments from the teacher praising pupil work or behavior.*

Supportive nonverbal expression--actions by the teacher indicating approval of pupil work or behavior, ranging from smiling or putting stars on pupils' work to putting an arm around a pupil.

Nonsupportive verbal expression--comments from the teacher criticizing or showing disapproval of pupil work or behavior.*

Nonsupportive nonverbal expression--actions by the teacher indicating disapproval or criticism of pupil work or behavior, such as frowning, distributing markers of poor performance, or making a list of disruptive pupils.

Behavioral data for each of the 56 teachers were combined across observations to form several indices of the teacher's interpersonal style or responsiveness. The measures are described in Table 8, which also shows the mean score across all 56 teachers for each scale. Fundamentally, scales were developed on three levels. On the first level, scores on verbal and nonverbal responses were combined, retaining both the distinctions between frequency and intensity of these responses and the distrinction between supportive and nonsupportive teacher behaviors. On the second level, frequency and intensity were combined to generate separate measures of supportive and nonsupportive affect. On the third level, the supportive and nonsupportive scales were combined to provide an overall index of the teacher's responsiveness or interpersonal style.

The mean scores presented in Table 8 suggest two general findings: First, even though virtually all teachers displayed some supportive affect, the display was relatively infrequent and at a low level of intensity. The majority of teachers took care to praise the students only when appropriate. Second, the vast majority of teachers rarely commented or acted in a manner which indicated disapproval of pupils' work or

*Statement such as "Yes, that's right" or "No, that's wrong" were regarded as neutral feedback and were not counted as instances of supportive or nonsupportive verbal expression. Only comments that included praise or criticism were counted.

Table 8

Teachers' Interpersonal Style Variables Created from Data Collected during Teacher-Focused Observations

Interpersonal Style Variables	Contents of Variables	Score Range	Mean Score (n=56)
First-level variables			
Frequency of supportive responses	Frequency of supportive verbal + nonverbal	2-8	3.95
Intensity of supportive responses	Intensity of supportive verbal + nonverbal	2-8	3.80
Frequency of nonsupportive responses	Frequency of nonsupportive verbal + nonverbal	2-8	2.13
Intensity of nonsupportive responses	Intensity of nonsupportive verbal + nonverbal	2-8	2.15
Second-level variables			
Supportive affect	Freq of supp X intensity of supp	4-64	18.65
Nonsupportive affect	Freq of nonsupp X intensity of nonsupp	4-64	4.83
Third-level variable			
Teacher responsiveness	Supportive affect X nonsupportive affect	16-4096	88.21

behavior. No criticism or disapproval was observed during any of the eight ten-minute episodes for 52% of the teachers. Only 11% of the teachers averaged more than one instance of criticism or disapproval per episode.

Correlative analysis of the affect variables revealed additional general findings regarding teachers' interpersonal style: Teacher praise and approval are not related to criticism and disapproval (at least for this group of teachers). Essentially, teachers who score relatively high on the positive measures are neither more nor less likely than other teachers in the sample to score high on the negative (nonsupportive) measures. Supportive and nonsupportive responsiveness apparently function as relatively independent components of these teachers' interpersonal styles.

Mean scores on the responsiveness scales are displayed by grade level within treatment group in Table 9. Teachers in concentrated classes made more frequent supportive affect than teachers in saturated classes. (Only the intensity measure reaches the criterion significance level of .05 for treatment group differences; however, difference between teachers in saturated classes and teachers in concentrated classes on both the frequency scale and the overall measure of supportive affect are in the same direction and approach the criterion significance level.) Reliable differences across treatment groups were not found for the nonsupportive scales or for the overall responsiveness ind

Table 9

Teachers' Interpersonal Style by Treatment Group and Grade Level

Variable	Average Score on Variable				Tmt Group Difference Signif at P<.05
	Saturated		Concentrated		
	Grade 2	Grade 4	Grade 2	Grade 4	
Frequency of supportive responses	3.56	2.92	4.12	3.44	
Intensity of supportive responses	3.51	2.86	4.04	3.46	X
Frequency of nonsupportive responses	2.44	2.23	2.35	2.20	
Intensity of nonsupportive responses	2.49	2.25	2.47	2.27	
Supportive affect	15.03	9.40	19.26	13.93	
Nonsupportive affect	7.04	5.75	6.42	5.35	
Teacher responsiveness	116.05	47.41	121.98	78.97	
(Number of cases)	(15)	(14)	(13)	(14)	

In both treatment groups, the second-grade teachers consistently received higher scores than the fourth grade teachers on the supportive and nonsupportive measures. This indicates that the second grade teachers used immediate praise or disapproval more frequently than the fourth grade teachers (disapproval was relatively rare response towards pupils). Therefore, with the sample of second and fourth grade teachers, the interpersonal style was found to be related more to grade than to treatment group, with teachers responding more frequently to second grade pupils.

Individual Pupil Observations

The Individual Student Instrument was designed to focus on specific students, selected in advance, to obtain information about their activities, use of materials and shifts in group involvement during the entire reading period. The observer focused on individual students who were pre-selected according to grade level, EDY status and the type of class treatment in which the students were involved. Each of four students per classroom was observed for approximately 30 minutes.

The individual pupil observations were designed to obtain information describing instructional resources and processes used by teachers in the two treatment conditions. Unlike the teacher-focused observations, the focus on individual pupils provided additional information about the implementation of the saturated or concentrated treatment - i.e., how teachers differentiate resources and processes used on the basis of pupil EDY status. The additional information was used to address the basic issue of whether teachers used different materials and/or methods with EDY student than those used with nonEDY students, and if so, under what treatment conditions did such differentiation occur. The use of different methods and materials for EDY and nonEDY is assumed to be consistent with implementation of the concentrated treatment, providing that the use reflects the focusing of EDY resources and services on EDY pupils. In saturated classes, however, differences between EDY and nonEDY would not necessarily be expected.

The individual instrument was structured around instructional activities in which the target pupil was engaged over the observation period. An activity is defined as including four elements:

Pupil role. The nature of the task in which the child is engaged (e.g., drill, oral/silent reading, receiving assignment).*

Materials usage. The type(s) of material with which the child is working (e.g., textbook, workbook, blackboard, dittos); the source of funds used to purchase each material being used (EDY, other, combination of EDY and other funds).

Group leadership. The instructional leader(s) of the group in which the child is working (teacher, aide, other adult, cross-age tutor); activities not led by an adult or cross-age tutor are defined as self-directed.

Group size. The total number of pupils in the group of which the target child is a member.+

Whenever one or more of these elements changed, the current activity was considered complete and a new activity (combination of pupil role, materials, group leadership, and group size) was recorded. Observers also recorded the number of minutes associated with each activity in which target children were engaged.

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*The pupil role codes developed for the Classroom Observation Instrument were also used in the individual observations.

+A group is defined as two or more pupils working with the same group leader and/or involved in the same activity (with or without a leader) and arranged in close physical proximity to each other. Pupils working on a common task but not seated together were considered to constitute a group only if a teacher or other leader identified them as such.

Sample

A two-stage sampling procedure was used to select pupils for individual observations on the basis of three sampling variables: treatment condition (first stage), grade level (first stage) and EDY classification (second stage). The two first-stage variables were determined at the classroom level; that is, four pupils were selected from each of the 72 classrooms representing the four treatment group/grade level permutations. Within each classroom, individual pupils were chosen on the basis of their EDY classification.* Whenever possible, EDY pupils were selected from the lowest quartile (first to twenty-fifth percentile) and nonEDY pupils from the highest quartile (seventy-sixth to ninety-ninth percentile). This procedure facilitated the determination of whether instructional patterns (resource utilization, mode of instruction, etc.) differed for EDY and nonEDY children in either treatment condition. The assumption was made that whatever distinctions a teacher made between EDY and nonEDY pupils would be most apparent by focusing on the individual observations on very low-scoring EDY pupils and comparatively high-scoring nonEDY pupils.

The three sampling variables constitute an eight-cell matrix (see Figure 1), with 36 children in each cell. Within each cell children were selected to reflect as closely as possible the ethnic composition of the overall 72-classroom population (approximately 58% Spanish surname, 23% caucasian, 12% black and 7% other) and to include equal numbers of boys and girls.

GRADE LEVEL	TREATMENT CONDITIONS: Concentrated	Saturated
GRADE 2	EDY (36)	EDY (36
	nonEDY (36)	nonEDY (36)
GRADE 4	EDY (36)	EDY (36
	nonEDY (36)	nonEDY (36)

Figure 1

Target Sample for the Individual Pupil Observations

* EDY status was determined by Total Reading score obtained on the MAT administered in Fall 1977. Children scoring the 50th percentile (according to the national norms developed by the publisher) were
percentile were classified as nonEDY.

The results reported here are based on the 219 pupils with individual observation data and pre- and post-scores on the MAT. These 219 children constitute the analysis file for the integrated analyses of pupil-level data reported in the analysis section. Demographic characteristics of the 219 pupils are displayed in Tables 10 and 11.

Table 10

Demographic Characteristics of Pupils in the Individual Pupil File: Second Grade Subset (N=118)

	Concentrated (63)		Saturated (55)	
	EDY (32)	nonEDY (31)	EDY (32)	nonEDY (23)
Spanish surname	21	17	21	31
Caucasian	7	9	6	8
Black	3	1	5	2
Other	1	4	-	-

Table 11

Demographic Characteristics of Pupils in the Individual Pupil File: Fourth Grade Subset (N=101)

	Concentrated (51)		Saturated (50)	
	EDY (29)	nonEDY (22)	EDY (25)	nonEDY (24)
Spanish surname	16	10	15	14
Caucasian	7	7	4	8
Black	3	3	4	2
Other	1	2	2	-

Individual Pupil Observations--Descriptive Results

Engaged Time

A measure of engaged time was generated for each of the 219 pupils by calculating the total number of minutes the child spent in all roles classified as instructional (see Appendix A.2). The results, displayed in Table 12, are very similar to those obtained from the analysis of the teacher-focused observations. Specifically, second- and fourth-grade pupils spent an average of 87% and 90% of their time, respectively, engaged in activities directly related to instruction. Reliable differences between treatment groups were not found at either grade level. EDY and nonEDY students in both saturated and concentrated classes generally had a high proportion of engaged time. In only one EDY-nonEDY comparison is there a significant difference in engaged time. In the fourth-grade concentrated classes, EDY pupils spent an average of 95% of their time in instructional roles, while the nonEDY pupils spent an average of 85% of theirs in instructional roles. This difference (largely due to the differences between these two groups in average proportion of idle time) accounts for about three minutes during the half-hour observation period. The average engaged time did not fall below 25 out of the 30 minutes for any of the groups.

Table 12

Pupil Engaged Time during Individual Pupil Observations

	Average Proportion of Engaged Time						
	Concentrated		Saturated		All	All	All
	EDY	nonEDY	EDY	nonEDY	Concentrated	Saturated	Pupils
Grade 2	85.2%	89.7%	89.1%	83.7%	87.5%	86.8%	87.2%
Grade 4	95.2	85.7	90.2	88.9	91.2	89.2	90.2

Instructional Modes

To examine relationships between EDY status and instructional processes, pupil roles were grouped into the four previously discussed activity modes (receiving directions, responding to teacher or other group leader, seatwork and self-instruction, and idle--see Table 4 above). The average proportions of time spent in these modes by second and fourth grade pupils are displayed in Table 13 and Table 14. Generally, the results are similar to the results obtained from the teacher-focused observations, with the exception that time spent in seatwork and self-instructional activities is proportionately higher in the individual data.

Second grade teachers in the concentrated classes apparently made some distinctions between EDY and nonEDY pupils. EDY pupils spend somewhat more time than nonEDY in the responding mode (drill, oral/silent reading, etc.). Moreover, nonEDY children spend more time receiving directions (e.g., being given assignments) and completing seatwork and self-instruction tasks. Within the saturated classes, the majority of time was fairly evenly divided between the responding mode and the seatwork/self-instruction mode for both EDY and nonEDY pupils.

The results from the fourth grade differ. Fourth grade teachers from neither treatment groups made systematically different use of the three instructional modes for EDY and nonEDY. Within the fourth grade, patterns were very similar <u>within</u> treatment type but very different <u>between</u> treatment type. Specifically, pupils in concentrated classes spent an average of half their time in seatwork and self-instruction (the responding (interacting) mode no longer dominates). However, in saturated classes, the teachers generally use the interactive mode for EDY and nonEDY children alike.

Table 13

Average Proportion of Pupil Time in Four Activity Modes during Individual Pupil Observations:

Second Grade (N=118)

	Average Proportion of Time in Mode							Tmt. Grp Diff. Signif. (p<.05)
	Concentrated		Saturated		All	All	All	
	EDY	nonEDY	EDY	nonEDY	Conc.	Sat.	Pupils	
Receiving directions	5.6%	5.0%	5.9%	3.9%	5.5%	5.0%	5.2%	X
Responding	52.6	43.4	45.6	39.4	47.9	43.0	45.7	
Seatwork/self-instruct.	29.1	36.3	42.4	42.1	32.8	42.3	37.1	
Idle	12.1	8.2	7.7	14.2	10.4	10.4	10.4	

Table 14

Average Proportion of Pupil Time in Four Activity Modes during Individual Pupil Observations:

Fourth Grade (N=101)

	Average Proportion of Time in Mode							Tmt. Grp Diff. Signif. (p<.05)
	Concentrated		Saturated		All	All	All	
	EDY	nonEDY	EDY	nonEDY	Conc.	Sat.	Pupils	
Receiving directions	5.8%	5.0%	5.9%	3.9%	5.5%	5.0%	5.2%	
Responding	34.3	35.5	62.2	61.0	34.8	60.4	47.4	X
Seatwork/self-instruct.	57.4	48.7	24.4	26.0	53.8	26.1	40.2	X
Idle	2.4	10.8	7.4	9.0	5.9	8.5	7.2	

In the concentrated classes, results from the individual students observations are similar to the findings from the teacher-focused observations. Within the second grade classes, teacher- (or other group leader) initiated interactions represented the primary instructional mode, particularly for EDY pupils; however, teachers frequently used independent seatwork activities as a secondary instructional mode, especially for nonEDY pupils. Within the fourth grade classes, pupils did more, although the interactive question-response mode still accounts for about a third of EDY and nonEDY pupils' time.

The pattern of time use for fourth grade pupils in saturated classes is consistent with findings from the teacher-focused observations. Group interaction with the teacher or other leader dominated pupils were involved in seatwork about 25% of the time--half as much as in concentrated fourth-grade classrooms. Findings from the second-grade saturated group observations are less consistent with the teacher-focused observations. Seatwork and self-instruction, which accounted for comparatively little time in the teacher-focused observations conducted in second grade saturated classes, are relatively prominent in the individual data. This is probably because second grade teachers in the saturated classes generally used seatwork and self-instruction for pupils outside the group with which the teacher was working.

Instructional Materials

Patterns of materials usage recorded during the individual observations are similar to the patterns found in the teacher-focused data. Pupils used textbooks and workbooks most often; however, pupils commonly used paper and pencil, dittos, and blackboard.

Diverse use of materials apparently does not differ as a function of grade level, treatment condition, or EDY classification. However, fourth grade pupils in concentrated classes used EDY materials more often than fourth grade pupils in the saturated classes. EDY materials were directed mainly to EDY pupils in these fourth grade concentrated classes (see Table 15). Proportional use of EDY materials was at least two times greater among EDY pupils in concentrated classes than among any other

group of fourth graders. Fourth grade EDY pupils used EDY materials proportionally greater than any group of second graders. This finding is consistent with implementation of the concentrated treatment.

Table 15

Proportion of EDY materials Used during Individual Pupil Observations

	Average Proportion of EDY Materials Used							Tmt Grp Difference Signif. (p<.05)
	Concentrated EDY	Concentrated nonEDY	Saturated EDY	Saturated nonEDY	All Conc.	All Sat.	All Pupils	
Grade 2	23.5%	29.5%	15.0%	29.7%	26.5%	21.2%	24.0%	
Grade 4	48.9	25.2	15.0	22.4	38.7	18.7	28.7	X

Group Size

Average group size was about 10 in both the second and fourth-grade classes. Group size did not differ reliably between treatment groups in either grade. In the concentrated classes, groupings do not appear to differ between EDY and nonEDY pupils. In saturated second-grade classes, however, nonEDY pupils generally worked in smaller groups than EDY pupils. This distinction was not found in the fourth grade saturated classes.

Table 16

Average Size of Instructional Groups during Individual Pupil Observations

	Average Size of Instructional Group							Tmt Grp Difference Signif. (p<.05)
	Concentrated EDY	Concentrated nonEDY	Saturated EDY	Saturated nonEDY	All Conc.	All Sat.	All Pupils	
Grade 2	10.4	11.4	11.0	8.0	10.9	9.7	10.3	
Grade 4	9.7	11.1	9.3	10.3	10.3	10.0	10.1	

Two basic questions guided the analysis of study data for evidence of treatment effects:

(1) Does saturation or concentration of compensatory resources and services--to the extent such occurred in this study--relate to reliable and meaningful differences in basic reading skill attainment?

(2) What are the contextual and procedural (instructional) conditions which account for differences in reading skill attainment?

The first question focuses on the effectiveness of the implementation of the two treatments. Given the administrative, logistic and financial aspects of saturation vs. concentration of treatment, the essential objective was to determine which method (treatment) of dispensing compensatory educational resources and services should be utilized to attain highest pupil reading aptitude. An additional objective was to determine the central and peripheral effects of the allocations of these treatments on both class practices and pupil learning (reading, as measured by MAT). Throughout the analysis, an awareness of additional issues was essential to determine whether they should be included in this study or further studies.

The second analysis question focuses on the more general domain of instructional effects. The primary objective here was to determine, from evidence gathered in this study, which characteristics of pupils, resources, and instructional proceudres taken together, accounted for learning outcomes (i.e., reading skills, as measured by the MAT). This "input-process-outcome" analysis represents an empirical extension of the emerging teacher effectiveness research and provides a basis for policy alternatives to the saturation-concentration intervention being investigated. In other words, how do these findings compare with those from other major studies of teacher effectiveness (e.g., the Beginning Teacher Effects Study), and how these findings might include alternative interventions for improvement of reading skills?

The remainder of this section is divided into four parts. Part I contains a discussion about the development of analysis variables. Part II contains an examination of the data for evidence of effects due to saturation or concentration, using data

collected at the class-level. Results of these analyses are reported separately for the second and fourth grades. Part III contains an extension of the analysis to include information on the relative effects of the two alternative modes of delivering compensatory resources and services at the individual pupil level, using evidence gathered from the sample of 219 children. This provides an examination of pre-post test patterns in terms of degree of educational disadvantage, ethnicity, gender, and the interactions of these conditions with the alternative "treatments" as implemented by the teachers. Finally, Part IV deals with the more general question of how this information regarding contextual and instructional processes used in the class explain outcomes observed at the class level.

I. Development of Analysis Variables

These analyses have not been carried out as a set of hypothesis-testing activities. Although statistical tests of probability were used in the effects of saturation vs. concentration, greater emphasis was placed on identifying and better understanding the proximal (near) and distal (far) consequences of this attempted intervention. Additional emphasis was placed on evaluating such effects against alternative input-process-outcome patterns detected in the data. Variables designed to accomplish these analyses were derived from both consideration of the fundamental issues in the demonstration project (i.e., saturation vs. concentration of resources and services) and from an awareness of the results of contemporary teacher effectiveness research. Therefore, two criteria were employed in defining and developing variables for formal analysis of the data:

(1) A logical or manifest relationship to the demonstration project's goals and objectives (referred to as "implementation" variables); and/or

(2) A logical or manifest relationship to constructs identified as important in contemporary teacher effectiveness research.

Variables developed from either criteria can be analyzed as input, process, or outcome indicators. Consequently, a measure of group size (pupil-teacher ratio) could be used as either an outcome indicator in an analysis of treatment implementation, or an input or process measure in an analysis of determinants of variation in reading scores.

A brief summary of the variables or constructs developed for data analysis, including the source, operational definition, and descriptive statistics, is presented in Appendix B.

Moreover, the analysis of each data source was performed both independent of and concurrent with all other data sources in attempting to identify the optimal reduced set of variables for formal statistical treatment. The final set of analysis variables and their descriptive parameters are summarized in Appendix B. Since

these are data sets for integrated analyses (at the teacher and pupil levels, respectively), the requirement that each case be based on complete data from all sources resulted in a reduction of approximately 20% in the overall data base (i.e., from 72 to 56 teachers, and from 244 to 219 pupils).

Since measurements are aggregated over multiple observations (usually eight ten-minute observation episodes for teacher/class variables, and up to 16 "roles" for individual pupil observations), both the mean (central tendency) and standard deviation (variability) for each variable are employed in subsequent analyses. This provides a basis for indirectly assessing the relative importance of stability and variability of process variables in accounting for outcome variance. For example, "individualization" as an instructional technique would imply higher standard deviations on process measures over the eight observations than would "routinization" as a technique. Although the converse of the previous statement is not logically sufficient (i.e., high standard deviations on process measures do not themselves provide a sufficient condition to conclude that a teacher is "individualizing"), the inclusion of both moments (means and standard deviations) is useful in developing a better understanding of complex instructional processes and their relationships to criterion patterns.

II. Analyses of the Effects at the Teacher/Class Level

The information obtained either during the classroom observations, through interviews and test data, or through additional methods was scrutinized to determine whether complete data on all relevant measures were available for each class.* The requisite complete data set was found for 56 of the teacher/class units observed. The teacher/class unit was the elementary unit of analysis; therefore, any data not specifically measured on the level of the teacher/class unit was aggregated into the data base for the teacher/class unit as follows:

(1) Teacher interview variables remained unmodified.

(2) Role descriptors gathered for individual observation procedures were aggregated to the classroom level, and appropriate statistics (mean and standard deviation) were computed.

(3) Means and standard deviations were computed across successive observation episodes for each candidate variable.

(4) Principal interview variables were imputed to teachers within their respective schools.

(5) Average classroom compositional and performance (MAT score) indicators were calculated for current year and prior year classes for teacher.+

The resultant data set, showing mean values (and standard deviations, where relevant) on each of the final analysis variables, is presented in Appendix B.1. (See Appendix C for intercorrelations among these variables.

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*Relevant measures are defined as those showing a both substantial ($p<.2$) and a non-overlapping relationship either to the treatment variable; therefore, approximating and implementation variable and/or to the outcome measures.

+The alternative procedure of combining prior year scores of current pupils was rejected because of a variety of technical and analytic considerations, such as pupil mobility and attrition (ranging from 20-85%), different pretest form, nonheterogeneous prior cla assignments and prior research on the stability of teacher effects. Moreover, the procedure adopted for this analysis better assures identification of instructional trai among "truly" effective teachers (i.e., those who consistently produce high-scoring pup rather than focusing on instructional effects at individual pupil level. The latter is is addressed by the individual pupil analysis, the results of which are presented in Part II of this chapter.

Two types of conditional analysis were subsequently performed on these data. Both types are based on the general linear hypothesis.

In the first analyses, two-way analyses of covariance were performed on each of the four outcome variables (total reading, word knowledge subscore, word analysis subscore, and reading subscore) within grade level (second and fourth). The treatment condition (saturated or concentrated) was used as the between-group variable. The five context or process measures which showed the closest relationship were treated as covariables.

In the second analysis, multiple linear regressions were performed on these data. The mean reading achievement scores were regressed on several combinations of context and process variables to identify the most significant determinants of outcome score variance. Through this analytical technique, an assessment of the instructional effects of several process variables was possible when the effects of context variables were sufficiently controlled. Put more succinctly, once the class composition was controlled, the process (or instructional) variables that accounted for differences in reading achievement were identifiable. The "process" determinants identified by these multiple regression techniques were used as covariables in the analysis of covariance. The findings from the multiple regressions are reported in Part IV.

Table 16

Outcome Score Analysis for Grade 2 Classes (Class-level Data)

Outcome Measure	Unadjusted Treatment Means		Significance of diff (∝)	Adjusted Means		Beta	R^2
	Conc. (n=13)	Sat. (n=15)		Conc.	Sat.		
Total Reading	49.4	49.8	0.79	49.7	59.6	0.01	.3
Word Knowledge	52.8	52.4	0.76	52.4	52.7	0.04	.2
Word Analysis	48.2	48.4	0.83	47.9	48.6	0.12	.3
Reading Subtest	50.2	49.8	0.89	49.4	50.4	0.12	.2
Average	50.1	50.1	0.82	49.8	50.3	0.07	.2

Results of Covariance on the 28 Second Grade Classes

The results of the classroom-level analysis of effects within the second grade subsample (28 classes) are summarized in Table 16. Clearly, none of the observed treatment effects are statistically reliable. Less than one-third of the criterion variance (average R^2=.296; maximum=.37; minimum=.21) is demonstrated even when context and process covariables are included. The magnitude and direction of the observed and adjusted mean differences for the second grade subsample clearly indicate the absence of reliable effects. In fact, the average of observed means across the four outcome measures is virtually identical across the two treatments (50.1), and nearly identical for adjusted means (49.8 for concentrated classes, 50.3 for saturated classes). Moreover, as indicated in a subsequent section of this study, the context and process covariables usually did not account for much additional criterion variance within this second grade sample.

Table 17

Outcome Score Analysis for Grade 4 Classes (Class-level Data)

Outcome Measure	Unadjusted Treatment Means		Significance of Diff (α)	Adjusted Means		Beta	R^2
	Conc. (n=14)	Sat. (n=14)		Conc.	Sat.		
Total Reading	65.3	61.6	0.05	65.2	61.7	0.29	.56
Word Knowledge	67.6	63.4	0.02	67.5	63.5	0.33	.64
Word Analysis	(not applicable)			- - - -	- - - -	- - - -	- - -
Reading Subtest	64.6	61.4	0.09	64.7	61.3	0.27	.54

Results of Analysis of Covariance on the 28 Grade 4 Classes

The results of the class-level analysis of effects within the fourth grade subsample (28 classes) are summarized in Table 17. These results can be interpreted as follows:

(a) For both the total reading and the word knowledge measures, concentrated services produced reliably greater mean scores than did saturated services. These effects were evident both before and after adjustment for process-context covariates (which include prescores).

(b) Mean differences on the reading subscore (basically a reading comprehension subtest) favor the concentrated condition ($p<.09$).

c) The magnitude of these mean differences averages approximately four standard score points, or about 15 percentile points (based on the MAT equipercentile scale). Specifically, based on national norms, the approximate percentile equivalents of the fourth-grade average scores are:

	Adjusted Mean Score	
	Concentrated	Saturated
Total Reading	38	24
Word Knowledge	40	24
Reading Comprehension	36	26

III. Results from Analyses of the Within-Class Pupil Samples

As was described in the observation component section, a carefully defined sample was drawn for the purposes of identifying differences in instructional procedure which might correspond to resource allocation condition (i.e., concentrated vs. saturate "treatments"). The differences were sought in terms of pupil characteristics (gender, ethnicity, and relative disadvantage), which could relate to outcome patterns. Therefo the observation component was primarily designed to obtain evidence of differential effectiveness of either of the two resource targeting strategies in terms of individual differences among pupils.

The basic within-class samples were selected to maximize EDY differences, while retaining an appropriate gender and ethnic composition across classes. Specifically class rosters were prioritized in terms of pupil quartile on the previous year's MAT reading score. A sample of four pupils (two EDY, or Q1; two nonEDY or Q3)* were drawn at random from each class so that within grade level the samples were reasonably well balanced on gender and ethnicity as well. (Two alternate pupils were also designated—one EDY and one nonEDY—within each class.) The resultant pupil samples constituted the targets for the individually focused instructional observation procedures, and for the pupil-focused analysis of effects.

Even with these over-sampling precautions, problems of attrition and incomplete teacher data reduced the original sample of 288 pupils to a final sample of 219 pupils (56 teachers X 4 pupils/teacher should have yielded 224 pupils). These resultant overall and within-grade pupil samples are displayed in Table 10 and Table 11 on page 31.

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*Because very few Alum Rock elementary pupils score in Q4, Q3 was selected as the more representative nonEDY population.

Multiple linear regressions were performed on samples within grade-level to identify reliable context and process covariates of pupil achievement. The available measures for each pupil included prescore (previous MAT standard scores for sub and total tests), design variables (EDY status, resource treatment, ethnicity, gender), and a set of process observation descriptors. Means and standard deviations on these variables are displayed in Appendix B.3. Consequently, within each grade level post-scores were regressed on available process and context variables, including the corresponding prescore.

The identification of relevant process covariates of outcomes was enhanced by attaching differential weight factors to the process variables in the stepwise procedures (i.e., "process" variables were weighted more heavily than prescores such that the regression analysis was "forced" to consider process variables before stepping prescores into the equation).

A) Grade 2 Regression Results

Results of the regression analyses on the four outcome measures for the second grade sample are summarized in Appendix D.1. As demonstrated by these results, pupil outcomes apparently are not well explained by available observation measures. The highest proportion of outcome variance explained by prescores and process measures is for the Total Reading score; however, this only amounts to 53.7%. Even for those process measures which apparently account for significant proportions of criterion score variance (e.g., typical role-group leader and total number of minutes the pupil was observed to be idle), the anticipated relationships materialized differently than expected. For examp time idle positively relates to outcome score, indicating that pupils with higher observec idle time score higher on the post-tests. This probably indicates that teachers spent more time with EDY pupils, therefore neglecting nonEDY pupils, at least during the one-time pupil observation session.

B) Grade 4 Regression Results

Formally identical regression analyses were performed on fourth grade pupil sample outcomes (see Appendix D.2). Although the amount of outcome variance was only slightly greater for these 113 grade 4 pupils (maximum = 57.9% for Total Reading Score), the

significant process predictors are apparently in accord with findings reported in related research. Specifically, there is consistently an inverse relationship between the amount of time these pupils were engaged in noninstructional activities and outcome scores ($p<.05$). In other words, the more observed noninstructional time, the lower the subsequent scores.

Other measures which reliably account for outcome-specific results are both the relative amount of time pupils were observed to be in the "receiving directions or assignments" mode (again negatively relating to outcomes) and the overall instructional grouping (whole class vs. staggered). The data apparently indicates that whole-class instruction is more effective.

Regressions without EDY Status as a Context Variable

When EDY status is excluded from the set of available regressor (i.e., context and process) variables, the results of the regression change in terms of both the relevant process-outcome predictors and the magnitude of explained criterion variance. The results of the second grade regression under this constraint indicate that patterns of materials usage (both in terms of amount and variability) marginally effect outcomes and accounts for, at most, 6% of the criterion variance (see Appendix E.1). The instruction modes observed in use during the 30-minute pupil observation sessions were even less effective (accounting for generally not more than 3% of the outcome variance).

This pattern of results also occurred for regressions of fourth grade measures on process variables (excluding EDY status), (see Appendix E.2). Essentially, the only cle distinction between second and fourth grade regression results is the total outcome variance explained (maximum for grade 2 = 46%; maximum for grade 4 -= 68%), which is a direct consequence of the stronger pre-post correlations observed for grade 4 data. The process variables collectively never exceed 10% explanation of criterion variance, regardless of measure or grade level. Accordingly, these "best available" process covariates were included with the relevant prescores in the subsequent analysis of variance/covariance of pupil-level learning outcomes.

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*It should be noted that although EDY status was defined as a context variable, it actually strongly aliases prescores, which are used to establish EDY status.

Analysis of Covariance Results

Results from regressions on each within-grade level sample were used to define the most relevant covariables for each outcome measure, which would be subsequently analyzed in terms of the sampling design. Moreover, two forms of the outcome measures were analyzed:

(1) the Spring 1978 MAT standard scores

(2) Spring 1977 to Spring 1978 MAT "change" scores (standard).

Results are reported separately within each grade level sample.

A) Grade 2 Spring 1978 Outcomes

The results of the four-way analyses of covariance for the second grade pupil sample for the Word Knowledge, Word Analysis, Reading Comprehension, and Total Reading measures are presented in Appendices F.1 through F.4. Although some differences in significant main effects and interactions are obtained from measure to measure, the general pattern of findings appears to be as follows:

(a) Evidence for overall superiority of concentration or saturation did not approach statistical significance.

(b) Even after adjusting for prescores as covariables, differences in outcomes in terms of initial EDY status remained highly significant ($p<.001$).

(c) Evidence of differential effectiveness of treatment (concentration vs. saturation) by EDY condition did not approach significance.

(d) Only for Word Knowledge scores were reliable patterns of differential effects of treatments in terms of ethnicity or gender within EDY status found to occur.

Table 18

Spring Test Scores--Grade 2

WORD KNOWLEDGE

	Concentrated (52.7)				Saturated (53.8)				
	EDY (46.8)		NON-EDY (59.3)		EDY (49.0)		NON-EDY (59.7)		
	Girl	Boy	Girl	Boy	Girl	Boy	Girl	Boy	
Spanish	47.4	46.2	51.7	61.4	48.3	49.7	62.7	58.7	
Caucasian	-	49.0	62.8	67.0	67.0	50.2	53.0	63.0	
Black	52.0	-	-	57.0	50.5	41.0	54.5	-	
Other	-	46.0	67.0	51.0	-	-	-	-	
Total	42.4	45.4	58.0	60.4	49.9	48.1	58.9	60.6	53.

READING COMPREHENSION

	Concentrated (51.2)				Saturated (49.3)				
	EDY (44.8)		NON-EDY (58.3)		EDY (43.6)		NON-EDY (56.4)		
	Girl	Boy	Girl	Boy	Girl	Boy	Girl	Boy	
Spanish	44.8	43.2	57.4	53.4	41.7	44.7	58.3	56.0	
Caucasian	-	45.8	60.3	68.0	50.0	48.2	54.3	58.4	
Black	51.3	-	-	53.0	42.0	37.5	49.5	-	
Other	-	31.0	04.0	62.0	-	-	-	-	
Total	46.2	43.5	60.2	56.7	42.4	44.9	55.8	57.2	50.

TOTAL READING

	Concentrated (50.8)				Saturated (49.7)				
	EDY (44.9)		NON-EDY (57.4)		EDY (44.4)		NON-EDY (56.4)		
	Girl	Boy	Girl	Boy	Girl	Boy	Girl	Boy	
Spanish	44.9	43.9	58.8	53.8	42.7	44.6	58.8	55.8	
Caucasian	-	44.0	60.7	68.5	51.0	48.0	52.3	59.0	
Black	51.7	-	-	53.0	43.5	41.5	49.0	-	
Other	-	38.0	74.0	56.0	-	-	-	-	
Total	46.4	43.5	58.9	56.1	43.4	45.4	55.6	57.4	50.

To aid in interpreting these patterns of results, mean scores by design condition are summarized by each outcome measure and are presented in Table 18. Clearly, overall averages by treatment rarely differ by more than one standard score unit, whereas EDY/nonEDY differences are quite large (10 or more standard score points) and relatively consistent across treatment conditions.

In terms of within-district norms, these outcomes can be interpreted as follows:

(a) Concentrated EDY pupils averaged at about the 36th percentile; concentrated nonEDY pupils at the 75th. Saturated EDY pupils averaged at about the 33rd percentile; saturated nonEDY at about the 73rd. At most, concentration has provided about 5 percentile points educational advantage to these second-grade pupils.

(b) A weak differential trend suggests that saturated methods might be more beneficial to boys (59th percentile) than girls (52nd percentile), with the opposite being the case for concentrated methods (boys = 55th percentile; girls = 63rd percentile). However, these patterns failed to reach statistical significance.

B) Grade 2 Difference Score Analyses

In terms of the net educational benefit produced by these "treatments," analysis of the patterns of available pre-to post-score change was conducted using relevant process variables as covariates (as identified through separate regression analyses conducted on pre-post change scores).* The results of these analyses are presented in Appendices G.1 through G.3 with the corresponding difference mean scores summarized in Table 19.

Table 19

Pre-Post Change Scores--Grade 2

WORD KNOWLEDGE	Concentrated (10.8)				Saturated (11.5)				
	EDY (11.7)		NONEDY (9.8)		EDY (14.7)		NONEDY (7.5)		
	Girl	Boy	Girl	Boy	Girl	Boy	Girl	Boy	
Spanish	12.9	10.0	6.0	9.8	15.3	12.0	16.6	6.0	
Caucasian	--	12.2	12.7	19.0	24.0	17.6	-7.3	10.6	
Black	11.3	--	--	14.0	15.0	10.7	-5.0	--	
Other	--	12.0	20.0	-3.5	--	--	--	--	
Total	12.5	10.9	10.2	9.5	15.9	13.6	7.0	8.1	11.

WORD ANALYSIS	Concentrated (9.5)				Saturated (9.2)				
	EDY (8.8)		NONEDY (10.2)		EDY (9.4)		NONEDY (9.0)		
	Girl	Boy	Girl	Boy	Girl	Boy	Girl	Boy	
Spanish	8.9	4.5	6.7	12.0	10.4	6.8	11.0	6.0	
Caucasian	--	14.0	10.8	14.5	5.0	12.0	7.7	10.2	
Black	10.6	00	--	10.0	13.0	8.7	11.5	--	
Other	--	8.0	13.0	6.0	--	--	--	--	
Total	9.3	8.5	8.9	11.4	10.2	8.7	10.2	7.7	9.

TOTAL READING	Concentrated (11.6)				Saturated (10.9)				
	EDY (12.8)		NONEDY (10.5)		EDY (11.2)		NONEDY (10.4)		
	Girl	Boy	Girl	Boy	Girl	Boy	Girl	Boy	
Spanish	13.4	11.0	9.2	7.7	10.3	9.7	14.3	10.8	
Caucasian	--	13.2	12.7	22.5	11.0	16.4	0.7	12.4	
Black	16.0	--	--	10.0	10.5	9.5	5.5	--	
Other	--	8.0	31.0	-2.5	--	--	--	--	
Total	14.0	11.7	12.8	8.5	10.4	12.1	9.4	11.6	11.

*Because of changes in subtest content across years, not all outcome measures had corresponding prescores.

These results show that strong differential gains occurred only for the Word Analysis subtest ($p<.01$). These gains were most marked for EDY pupils in saturated class and least marked for nonEDY pupils in saturated classes (see Table 19). Based on local norms, the EDY pupils in saturated class apparently moved from the mean percentile rank of 30 in theSpring of 1977 to the mean percentile rank of 37 in the Spring of 1978 in terms of Word Knowledge skills. NonEDY pupils in saturated classes lowered their score from the 86th percentile in Spring 1977 to the 77th percentile in Spring 1978. The results for both EDY and nonEDY pupils in the concentrated classes on the same subtests are as follows:

	Mean Percentile Rank (Word Knowledge)		
	Spring 1977	Spring 1978	Net Change
Concentrated EDY	33	35	+ 2
Concentrated nonEDY	80	77	- 3

A table of net percentile rank change (again based on within-district norms) on Total Reading scores for the second grade sample is as follows:

	Mean Percentile Rank (Total Reading)		
	Spring 1977	Spring 1978	Net Change
Concentrated EDY	27	36	+ 9
Concentrated nonEDY	82	79	- 3
Saturated EDY	27	34	+ 7
Saturated nonEDY	85	75	-10

Therefore, using relative within-school district status as the effectiveness criterion concentration is apparently a superior treatment to saturation. This interpretation cannot be advanced unequivocably, however, since these score patterns are at least partly influenced by the regression-toward-the-mean phenomenon inherent in pre-post analyses.

C) Results of the Grade 4 Analyses

Analyses formally identical to those reported above for the second grade sample were conducted on the fourth grade sample (102 pupils); however, the Word Analysis Subscore was not available for the reading test used at grade 4 (the MAT elementary level), and the reading comprehension difference scores were unavailable for this sample. The results of analyses of Spring 1978 outcome measures are presented in Appendices H.1 through H.3. The corresponding averages are summarized in Table 20.

Table 20

Spring 1978 Test Scores--Grade 4

WORD KNOWLEDGE

	Concentrated (66.6)				Saturated (64.3)				
	EDY (60.2)		NONEDY (76.4)		EDY (56.6)		NONEDY (72.7)		
	Girl	Boy	Girl	Boy	Girl	Boy	Girl	Boy	
Spanish	61.7	60.2	76.0	73.0	55.9	54.1	71.7	69.5	
Caucasian	60.7	66.0	74.7	72.0	60.0	50.5	78.8	74.5	
Black	55.5	56.5	73.0	101.5	55.5	59.0	--	73.0	
Other	59.0	—	64.0	70.0	--	59.0	--	--	
Total	60.3	60.1	74.2	80.6	56.2	55.1	74.3	71.4	65.5

READING COMPREHENSION

	Concentrated (64.6)				Saturated (63.3)				
	EDY (58.3)		NONEDY (73.8)		EDY (58.5)		NONEDY 72.4)		
	Girl	Boy	Girl	Boy	Girl	Boy	Girl	Boy	
Spanish	61.2	53.4	75.8	73.7	48.7	56.5	73.0	70.4	
Caucasian	60.7	77.0	71.2	64.0	62.0	49.5	74.2	72.5	
Black	52.0	60.5	74.0	89.5	53.0	55.0	--	74.0	
Other	71.0	--	60.0	72.0	--	49.0	--	--	
Total	60.4	56.1	72.3	76.6	50.9	53.8	73.4	71.5	63.8

TOTAL READING

	Concentrated (65.0)				Saturated (63.1)				
	EDY (58.2)		NONEDY (74.9)		EDY (53.1)		NONEDY (71.9)		
	Girl	Boy	Girl	Boy	Girl	Boy	Girl	Boy	
Spanish	60.3	56.5	76.0	73.0	51.6	53.8	71.9	69.1	
Caucasian	58.8	69.0	72.2	67.0	59.0	49.0	76.0	72.8	
Black	53.0	56.5	73.0	97.0	53.0	56.5	--	73.0	
Other	62.0	--	61.0	71.0	—	54.5	—	—	
Total	58.9	57.4	72.8	78.7	52.6	53.5	73.4	70.7	64.0

As distinct from the second-grade results, clear differences associated with treatment are found for these grade 4 pupils on both the Word Knowledge and Total Reading scales. Moreover, when the preceding scores for these pupils are used in analysis, as is done in the analyses of difference scores reported in Appendices I.1 and I.2 and summarized in Table 21, the effects become even more marked.

Table 21

Pre-Post (Change) Scores--Grade 4

WORD KNOWLEDGE	Concentrated (6.2)				Saturated (4.1)			
	EDY (6.0)		NONEDY (6.4)		EDY (5.6)		NONEDY (2.6)	
	Girl	Boy	Girl	Boy	Girl	Boy	Girl	Boy
Spanish	9.2	4.6	5.2	2.7	4.4	6.6	1.3	-2.0
Caucasian	7.8	9.0	4.8	5.0	8.0	2.5	8.0	6.5
Black	0.5	5.0	-4.0	34.5	4.0	8.5	--	7.0
Other	2.0	--	-6.0	6.0	--	7.5	--	--
Total	7.0	5.0	3.1	12.6	4.6	6.4	3.-	1.7

TOTAL READING	Concentrated (5.8)				Saturated (4.1)			
	EDY (6.6)		NONEDY (4.7)		EDY (5.0)		NONEDY (3.2)	
	Girl	Boy	Girl	Boy	Girl	Boy	Girl	Boy
Spanish	10.3	3.7	4.8	0.0	3.0	8.0	1.7	0.9
Caucasian	9.5	12.0	2.3	1.0	6.0	3.5	5.2	6.0
Black	-1.0	8.5	-8.0	27.5	2.0	6.0	--	8.0
Other	6.0	--	-1.0	8.0	--	6.5	--	--
Total	8.2	5.0	2.2	9.1	3.1	6.7	3.0	3.4

The concentrated treatment provided more desirable effects than the saturated treatment. These patterns of outcomes can be displayed most clearly as relative effect shifts in within-district percentile rankings. Specifically, for Total Reading measure the pattern is as follows:

	Mean Percentile Rank (Total Reading)		
	Spring 1977	Spring 1978	Net Change
Concentrated EDY	18	30	+ 12
Concentrated nonEDY	91	88	- 3
Saturated EDY	18	19	+ 1
Saturated nonEDY	90	81	- 9

Essentially, the relative within-district rank of EDY fourth-grade pupils receiving concentrated services increased by an averageof 12 percentile rank units, whereas their nonEDY counterparts stayed relatively stable (declined 3 percentile rank units). In comparison, the EDY fourth-grade pupils receiving saturated services increased their ranking only 1 percentile rank unit over their relative within-district ranking the preceding year, while their nonEDY counterparts declined an average of 9 percentile rank units.

A similar analysis of relative shifts on the Word Knowledge scale reveals the following patterns:

	Mean Percentile Rank (Word Knowledge)		
	Spring 1977	Spring 1978	Net Change
Concentrated EDY	30	34	+ 4
Concentrated nonEDY	88	88	0
Saturated EDY	20	17	- 3
Saturated nonEDY	88	78	- 10

Again there is an upward shift for concentrated EDY, a downward shift for saturated EDY, virtually no shift for concentrated nonEDY, and a marked decline for saturated nonEDY.

One possible explanation is that the teachers in the saturated classes frequently interpreted their assignment as providing resources equally and uniformly to all pupils, rather than making resources available to all pupils on the basis of diagnosed need. Therefore, teachers in the saturated fourth grade classes mechanically implemented the compensatory services (the data indicates the teachers in the saturated classes did this significantly more frequently than teachers in the concentrated classes). Consequently, neither EDY or nonEDY pupils benefited.

Alternatively, the data indicates that the teachers in the concentrated classes provided differential services according to pupil need; therefore, both EDY and nonEDY pupils benefited.

An alternative interpretation of these results, also indicated by the observation findings, is that concentrated teachers were more likely to segment their class, and make use of aides and resource centers to intensify services directed at the poor-performing pupils. Therefore, these findings might indicate that not only did the EDY pupils receive appropriate individualized assistance but also the teacher appropriately differentiated methods and materials to the nonEDY pupils. Since many teachers in the fourth grade saturated classes apparently felt they were expected to treat all pupils equally (even though they clearly could not), it is reasonable to conclude that they were less inclined to individualize, by using either pullout/resource center facilities, differential instructional methods or materials matched to pupil ability. If this second interpretation is correct, then the effect of asking teachers to "saturate" services may, in their perception, be equivalent to asking them to homogenize instruction.

IV. Multiple Regression Analyses Results

Even though the analyses of covariance indicate a substantial benefit may be associated with concentrating compensatory services, particularly in the upper elementary grades (grade 4), such analyses do not identify the instructional components associated with these benefits. In addition, these analyses do not evaluate other features of instructional programs (e.g., use of human and material resources, engaged time patterns, teacher style, etc.) which may account for additional differences in reading achievement. To facilitate additional analyses and evaluation of these features, a series of stepwise multiple linear regressions were performed on outcome measures within each grade-level sample. Basically, this analysis attempts to discover: What are the process and context characteristics at the classroom level which best account for differences in mean achievement on criterion tests? The results of these analyses, confirm and extend the results of the covariance analyses.

Grade 4 Class-level Regressions

Outcome measures (Spring 1978 Total Reading and subtest average standard scores) for the 28 fourth-grade classes having complete data (interview, observation, and test data) were separately regressed on process and context indicators. A forward stepwise procedure was used which restricts inclusion to significant predictor variables. However, once a variable was included, it remained in the equation regardless of subsequent changes in its predictive significance.

Three criterion tests available for the grade 4 sample (Total Reading, Word Knowledge, and Reading Comprehension) are reported.

Total Reading Achievement

Average standard scores on the Total Reading scale for the 28 fourth grade classes yielded an unusually high degree of statistical explanation when regressed on context and process measures. Altogether, 13 measures entered into the explanation of Reading score outcomes, although two eventually dropped below the criterion significance level (.05). The resultant multiple correlation is .989, indicating that nearly all (i.e., 97.7%) of the variability in outcome measures has been "explained" by these relevant context and process measures. Even adjusting the solution for the number of predictors, the explanation still accounts for better than 95% (adjusted R^2=.956) of test score variance.

Although the regression solution has identified a linear combination of both context and process determinants, for interpretive convenience they are presented separately. Two statistics are reported for each determinant: a standardized Beta value, indicating the relative potency of the determinant (i.e., the expected unit change in the criterion for a unit change in the determinant, all other determinants held constant), and a step (or univariate) F value, indexing the reliability of the determinant ($F>4.5$, $p<.05$).

Context Determinants

Fourth grade classes generally achieved higher overall reading scores to the extent they consisted of:

		Beta	Stepwise F
(a)	proportionately fewer Spanish surname pupils	-.269	11.20
(b)	proportionately more Anglo/caucasian pupils	.242	9.14
(c)	proportionately fewer girls	-.179	12.69

Conditions which approached significance in relating to above-average Total Reading achievement were:

	Beta	Stepwise G
the use of whole class (as opposed to staggered) reading instruction	-.116	3.94
a higher average age of the class	.021	1.03

Process Determinants

In addition to these context determinants, the following instructional characteristics added significant explanation of Total Reading achievement (i.e., represent the significant process determinants):

		Beta	Stepwise F
(a)	the classroom received concentrated services	.303	33.44
(b)	individual pupils were observed to make a wider use of materials	.685	175.10
(c)	teachers were observed to make proportionately greater use of EDY materials	.527	76.16
(d)	more observed variablity (viz individualization in the amount of time pupils were being managed or receiving directions	.313	54.47
(e)	pupils were less often observed making use of EDY materials	-.303	28.79
(f)	teachers reflected a more thorough understanding and correct implementation of their respective resource strategy (concentrated or saturated)	.348	20.29
(g)	teachers were observed to be more variable in the amount of time spent in directive roles	.233	13.45
(h)	teachers were less extensive in their affective responsiveness to pupils	-.153	6.07

This analysis indicates that the class achieving the highest performance level has relatively more older caucasian males, relatively few young Spanish surname females, and is led by a teacher who concentrates resources on EDY pupils, individualizes instrucion and the assignment of materials, more clearly understands resource management and the concentration/saturation experiment, balances activities between giving direct instruction to small groups vs. providing directions to pupils for self-instruction, and uses positive/negative feedback more conservatively (or selectively).

Word Knowledge

Analysis of mean fourth grade classroom standard scores on the Word Knowledge subscale yielded a high explanation which was strikingly similar to that reported for the Total Reading scores. Specifically, the overall multiple R on eight regressor variables was computed as .956, showing better than 91% of criterion variance had been "explained" by these eight predictors (R^2=.914). The adjusted R^2 for this solution is .877, and the F value for this equation is 25.10 (df=i,19). Again, the interpretation of this result is presented in terms of context and process variables separately.

Context Determinants

In terms of context variables, mean performance on Word Knowledge subtests was higher to the extent:

	Beta	Stepwise F
(a) the classroom was made up of older pupils	.158	4.83
(b) the classroom consisted of an above-average proportion of caucasian/anglo pupils	.331	7.70

In addition, context variables which, originally significant, generally related to score patterns (but which are dominated by process variables) are:

	Beta	Stepwise F
• lower proportion of Spanish surname pupils	-.190	2.75
• whole class (as opposed to staggered) reading instruction	-.151	3.90

Process Determinants

The cumulative explanation available through these context determinants is, at maximum, 42%. Nearly 50% additional explanation is found with the four significant process determinants, which are interpreted as indicating that classroom score above average to the extent:

	Beta	Stepwise F
(a) the teacher concentrated resources	.314	18.47
(b) pupils were observed to use a larger number of materials over the course of instruction	.586	56.78
(c) teachers were observed to make use of a higher proportion of EDY materials	.296	15.48
(d) more variability was observed in the amount of time teachers spent providing pupils with directions	.331	22.49

Reading Comprehension

Average standard scores on the MAT Reading comprehension subscale were also regressed on context and process variables. As with the Word Knowledge scores, results for this analysis are quite similar to the total score results at a general level, with only minor variations in specific determinants. An overall solution involved nine variables, with a multiple correlation of .956, accounting for 91.5% of the total variance on Reading comprehension scores. The adjusted R^2 is .872, with an F on regression of 21.46 (df=9,18).

Context Determinants

The interpretation of this result in terms of context determinants is that high Reading comprehension scores were obtained for classrooms consisting of:

	Beta	Stepwise F
(a) more pupils of above-average age	.240	10.25
(b) larger percents of anglo/caucasian pupils	.340	7.66
(c) fewer pupils of Spanish surname*	-.119	0.94

Collectively, these context determinants account for a maximum of 39% of all criterion variance.

Process Determinants

The remaining 52% of criterion variance is explained by the six process determinants, which indicate that mean scores on Reading comprehension increase to the extent:

	Beta	Stepwise F
(a) teachers concentrate services	.372	17.70
(b) pupils were observed to make use of a larger number (variety) of materials	.793	74.51
(c) greater variation in group leadership was observed for individual pupils (e.g., use of aides, peers, etc.)	.196	5.50
(d) teachers were observed to make greater overall use of EDY materials	.229	9.02
(e) more variation existed in time spent giving individual pupils directions	.216	8.22
(f) less variation over time was found in the relative amount of pupil time spent in seatwork and self-instruction	-.204	3.79

*Originally significant, but subsequently aliased by percent caucasian.

Grade 2 Classroom-level Regressions

Findings from regressions of criterion scores on context and process measures for second grade classes demonstrate neither the regularity nor the strength of association that was indicated by the findings from fourth grade classes. Again using classroom aggregated statistics on each category of measures (context, process, outcomes), separate stepwise regressions were performed on the Word Knowledge, Reading Comprehensio and Total Reading means for the 28 second grade classrooms. The results of these analyse are described and interpreted as follows:

Word Knowledge

The analysis of context and process determinants of Word Knowledge produced a surprising result. Approximately 74% of the criterion variance (R^2=.745) is explained by four variables (multiple R=.863, F=16.77, df=4,23) and can be interpreted as showing second grade classrooms averages on Word Knowledge subtests increase to the extent:

		Beta	Stepwise F
(a)	the classroom was composed of a smaller porportion of black pupils	-.430	13.91
(b)	the teacher was observed to make below-average use of EDY materials relative to all materials	-.561	23.64
(c)	the teacher was observed to be more variable in the amount of time spent giving directions	.219	4.24
(d)	the teacher's previous class was above average on Word Knowledge	.333	9.81

One reasonable interpretation of this pattern of findings is that, for these second grade classrooms, Word Knowledge achievement is more strongly determined by characteristics of the pupils than by instructional methods per se, and furthermore, that teachers are adapting their methods and materials to these contextual differences (i.e., classroom composition). Since prior-year class score also reliably accounts for current outcomes, this possibly is evidence of a teacher effect (i.e., certain teachers are consistently associated with high-achieving classes, others with low-achieving classes). However, a more feasible explanation is that this effect reflects stable population differences associated with school attendance areas within the

district. These attendance area population differences would be manifest as differences in relative EDY composition at the classroom level, and would necessarily show up as constant differences in classroom achievement. Furthermore, this interpretation is consistent with EDY-use findings: namely, classes consisting of low percentages of EDY pupils would be expected to make less frequent use of EDY materials, and vice versa.

This regression result indicates, that, in the second grade, the use of instructional procedures (methods and materials) apparently do not overcome learning differences associated with socio-cultural group membership (perhaps as aliased by school attendance areas), at least with respect to Word Knowledge achievement measures. It does suggest that teachers are targeting resources (EDY materials) to perceived pupil needs; however, this targeting is highly correlated to ethnic group membership (again a correlate of school attendance areas).

Reading Comprehension

Results for regression of second grade Reading Comprehension means on context and process variables essentially replicate those found with Word Knowledge, except that far less criterion variance is explained. Only two reliable "predictors" of second grade reading comprehension were found, accounting for less than 30% of the outcome variance ($R=.546$, $R^2=.298$, $F=5.31$, $df=2,25$). They are:

		Beta	Stepwise F
(a)	the relative use of EDY materials by the teacher	-.479	7.96
(b)	the mean reading comprehension scores obtained by the previous year's class	.109	4.22

Again, high average scores occurred for classes in which teachers make less use of EDY mateials and for whom the teacher's prior year's class also scored above average. This is consistent with the interpretation that context (or school) effects dominate the outcomes, event though the teachers properly target resources.*

*Note: We also considered the alternative interpretation that the use of EDY materials and resources serves to depress scores. But in the absence of a difference due to concentration vs. saturation of EDY materials, this interpretation is considered less tenable. Rather, as is suggested in findings for Word Analysis outcomes, it appears that a large proportion of second grade teachers simply refused to implement their prescribed treatment.

Word Analysis

The MAT second grade battery (Primary II) provides for an additional skill area described as Word Analysis. Regression analysis of this measure on process and context variables produced some surprising results.

Virtually all of the criterion variance on this measure has been "explained" by a combination of ten context/process descriptors (eight of which remain highly reliable). The multiple correlation is .981, accounting for over 96% (R^2=.962) of the variation in Word Analysis mean scores (F=38.36, df=10,15). Even adjusting for the number of predictors, the explanation is still extraordinarily high (adjusted R^2=.937). This result indicates mean scores on the Word Analysis subtest increase to the extent:

	Beta	Stepwise F
(a) the class consists of a lower percentage of black pupils	-.487	61.45
(b) the teacher uses staggered (as opposed to whole class) reading instruction	.040	0.31
(c) the teacher was observed to use proportionately fewer EDY materials	-.970	118.62
(d) the teacher was more variable in the assignment of pupil seatwork/self-instruction	.433	59.73
(e) the teacher was less in compliance with her/his respective treatment condition	-.082	2.00
(f) the teacher's prior class scored above average on the Word Analysis subtest	.908	106.60
(g) the teacher perceived her/his resource targeting guidelines (i.e., treatment) to be at variance with the district policy	.402	44.54
(h) the proportion of girls in the class was above the overall sample average	.545	44.55
(i) the teacher saw him/herself as primarily responsible for learning outcomes	.403	25.26
(j) the teacher tended to be more demonstrative in the use of positive and negative affective responses	.258	15.41

Basically, this result both reinforces and elucidates previous findings regarding determinants of Word Knowledge and Reading Comprehension scores in these second grade classes. Specifically, the context determinants account for better than 46% of outcome variance, with about 50% attributable to process characteristics (including teacher attitudes about the validity of the experiment). This corresponds closely with findings

for the fourth grade sample, where process measures generally account for about 50% of the criterion variance. This result is consistent with the interpretation that school/community characteristics significantly influences teacher strategies and subsequent outcomes in this second grade sample.

Even more startling, however, are the findings relating teacher attitudes and behaviors (regarding the targeting of resources) to subsequent outcome patterns. The teachers with higher attaining classes apparently thought that the "treatment" definitions were vague and arbitrary; therefore, their behavior was influenced by this opinion. Moreover, these teachers attribute the achievement of their pupils to their own teaching methods (rather than to resources and administrative support).

These second grade teachers apparently assert that they know how to optimally allocate resources, and to a considerable extent the findings corroborate this assertion The strong negative influence of ethnic composition of the classroom to outcomes is still troubling; clearly, the relationship between ethnicity and learning has not been overcome by these teachers, and needs further investigation.

Total Reading Score

The overall relationship between Total Reading score and context/process characteristics is shallow for these second grade classrooms, and is far more difficult to interpret than the subscore findings. Only two variables were found to reliably account for Total Reading scores at the second grade:

	Beta	Stepwise F
(a) observed use of EDY materials	-.473	8.20
(b) mean age of pupils	-.314	4.62

Approximately 32% of outcome variance is accounted for by these measures ($R=.564$, $R^2=.318$ $F=5.83$, $df=2,25$), and as the beta coefficients show, in both cases the predictor relationships are inverse (lower mean age and use of EDY materials account for higher outcome scores).

One plausible interpretation is that this finding reflects, in part, the confounding of second grade retention policies. In other words, it is conceivable that classes of above-average pupil mean age contain disproportionate numbers of slow learners who are repeating the second grade. This, in turn, would account for the negative relationship between mean pupil age and mean achievement. Unfortunately, at the time of this writing, data are not available to corroborate this interpretation.

SUMMARY CONCLUSIONS

Alum Rock Union Elementary School District participated as one of 11 national demonstration sites to assess the relative educational effects of variations in school-wide targeting of compensatory services. The effects of the concentration and saturation methods provide the general focus of this report.

The data used in assessing the relative effects of these two resource provision conditions were provided by establishing a matched sample of 18 schools which were randomly assigned to "saturation" or "concentration" of EDY resources. Two basic questions guided the analysis of the data:

1. Does saturation or concentration of compensatory resources and services--to the extent such occurred in this study--related to reliable and meaningful differences in basic reading skill attainment?

2. What are the contextual and procedural (instructional) conditions which account for differences in reading skill attainment?

An additional objective was to determine the central and peripheral effects of the allocations of these treatments on classroom practices and pupil learning (reading, as measured by MAT). The objective was to determine the characteristics of pupils, resources, and instructional procedures which combined to account for learning outcomes (i.e., reading skills, as measured by the MAT).

Some of the major findings of the observational component were:

1. Teacher Roles

   More than three roles were observed in only 10% of the teacher-focused observations. The maximum number observed was five. Diversity of teacher roles did not differ reliably across treatment group or grade levels. The most common teacher activities observed were oral or silent reading and reviewing (24%), drill (23%), classroom management (15%), and assigning tasks (9%). Together these four activities represented 71% of all teacher roles observed. These roles were predominant across treatment groups and grade levels.

2. Pupil Roles

Many of the pupil roles were the counterpart to teacher roles. The most common activities involving pupils working with the teacher were oral/silent reading and review (22%) and drill (20%). Receiving assignments and participation in classroom management activities represented 8% and 9% of all pupil roles, respectively. Two additional roles were fairly common among pupils: seatwork (completing assignments--11%); and transition (waiting for a new task or the teacher's attention--6%). Together these activities accounted for three-fourths of all the pupil roles observed.

3. Engaged Time

A measure of engaged time was generated for each of the 219 pupils by calculating the total number of minutes each spent in all roles classified as instructional. Second and fourth-grade pupils spent an average of 87% and 90% of their time, respectively, engaged in activities directly related to instruction. Reliable differences between treatment groups were not found at either grade level. EDY and non-EDY students in both saturated and concentrated classes generally had a high proportion of engaged time. In the fourth-grade concentrated classes, EDY pupils spent an average of 95% of their time in instructional roles, while the non-EDY pupils spent an average of 85%.

4. Teacher-Pupil Interaction

The teacher-initiated interactive mode clearly dominates, accounting for an average of 70% of teacher time. The directive and facilitative modes together represent an average of 25% of teacher time. Discussion and social interaction are comparatively rare. Pupils working with the teacher during reading instruction spent an average of 65% of their time in the responding mode. Most of their remaining time was spent completing seatwork assignments or working on self-instructional activities. A comparison of the teacher and pupil profiles showed strong similarities in the relative proportion of time spent in corresponding teacher-pupil modes. Teachers in the saturated classes spent 70% of their time in

the interactive mode. Correspondingly, the pupils in those classes spent 72% of their time in the interactive mode.

Teachers in concentrated classes spent more time monitoring or assisting their pupils than teachers in the saturated classes. Pupils in concentrated classes spent an average of 28% of their time in seatwork and self-instruction. This represents almost twice the percentage spent by pupils in the saturated classes. Teachers in concentrated classes spent a significantly greater amount of time facilitating activities than teachers in saturated classes.

One possible explanation is that teachers in concentrated classes used various modes of instruction as a technique for concentrating services on EDY pupils. Unfortunately, data from the individual observation instrument did not show systematic differences in use of time by EDY and non-EDY pupils in the concentrated classes.

5. Materials

The average number of different materials used during a ten-minute epdisode was 2.00. An average of 2.20 materials per episode were used in concentrated classes, which is significantly higher than the average of 1.86 materials used in saturated classes. Teachers in concentrated classes were more likely to use materials purchased with EDY funds.

Diverse use of materials apparently did not differ as a function of grade level, treatment condition or EDY classification. However, fourth grade pupils in concentrated classes used EDY materials more often than fourth grade pupils in saturated classes.

6. Teachers' Interpersonal Style

Teachers' interpersonal style was also observed during the teacher-focused observations. Behavioral data for each of the 56 teachers were combined across observations to form several indices of the teachers' interpersonal style or responsiveness.

Even though virtually all teachers displayed some supportive affect, the display was relatively infrequent and at a low level of intensity. Most teachers took care to praise the students only when appropriate. The vast majority of teachers rarely commented or acted in a manner which indicated disapproval of pupils' work or behavior.

Correlative analysis of the affect variables revealed general findings regarding teachers' interpersonal style: Teacher praise and approval are not related to criticism and disapproval. Essentially, teachers who scored relatively high on the positive measures were neither more nor less likely than other teachers in the sample to score high on the negative (nonsupportive) measures. Supportive and nonsupportive responsiveness apparently functions as relatively independent components of these teachers' interpersonal styles. With the sample of second and fourth grade teachers, the interpersonal style was found to be related more to grade than to treatment group, with teachers responding more frequently to second grade pupils.

7. Instructional Modes

Second grade teachers in concentrated classes apparently made some distinctions between EDY and non-EDY pupils. EDY pupils spent somewhat more time than non-EDY pupils in the responding mode. Non-EDY pupils spent more time receiving directions and completing seatwork and self-instruction tasks. Within saturated classes, the majority of time was fairly evenly divided between the responding mode and the seatwork/self-instruction mode for both EDY and non-EDY pupils.

The results from the fourth grade differed. Fourth grade teachers in both treatment groups did not make systematically different use of the three instructional modes for EDY and non-EDY. Within the fourth grade, patterns were very similar within treatment type but very different between treatment type. Pupils in concentrated classes spent an average of half their time in seatwork and self-instruction. In saturated classes, teachers generally used the interactive mode for both EDY and non-EDY children.

8. Group Size

Average group size was about 10 in both the second and fourth-grade classes. Group size did not differ reliably between treatment groups in either grade. In the concentrated classes, groupings do not appear to differ between EDY and non-EDY pupils. In saturated second-grade classes, however, non-EDY pupils generally worked in smaller groups than EDY pupils. This distinction was not found in the fourth grade saturated classes.

Results from the analysis of the outcome measures differ somewhat for the grades analyzed (2 and 4). More specifically, the results indicate the following:

1. Fourth Grade Results

A. Results of the analysis of covariance on the 28 fourth-grade classes point to the following conclusions:

For both the Total Reading and the Word Knowledge measures, concentrated services produced reliably greater mean scores than saturated services. These effects were evident before and after ajustment for process-context covariates (which include pre-scores). As distinct from second grade results, clear differences associated with treatment are found for these fourth-grade pupils on both Work Knowledge and Total Reading scales.

Mean differences on Reading scores (a comprehension sub test) favored the concentrated condition.

B. Fourth-grade multiple regression results point to the following conclusions:

The significant process predictors are apparently in accord with findings reported in related research. Specifically, there is consistently an inverse relationship between the amount of time these pupils were engaged in noninstructional activities and outcome scores ($p < .05$). In other words, the more observed noninstructional time, the lower the subsequent scores.

Essentially, the relative within-district rank of EDY fourth-grade pupils receiving concentrated services increased by an average of 12 percentile rank units, wehreas their non-EDY counterparts stayed relatively stable (declined 3 percentile rank units). In comparison, the EDY fourth-grade pupils receiving saturated services increased their ranking only one percentile rank unit over their relative within-district ranking the preceding year, while their non-EDY counterparts declined an average of nine percentile rank units.

2. Second Grade Results

A. The covariate analysis for the second grade indicates the following:

Evidence for overall superiority for concentration or saturation did not approach statistical significance. Even after adjusting for pre-test scores as covariables, differences and outcomes in terms of initial EDY status, remain highly significant.

Evidence of differential effectiveness of treatment by EDY condition did not approach significance.

B. Results of the regression analysis for second grade outcomes point to the following:

For those process measures which apparently account for significant proportions of criterion score variance (e.g., typical role-group leader and total number of minutes the pupil was observed to be idle), the anticipated relationships materialized differently than expected. For example, time-idle positively relates to outcome score, indicating that pupils with higher observed idle time score higher on the post-tests. This probably indicates that teachers spent more time with EDY pupils thereby neglecting non-EDY pupils at least during the one-time pupil observation session.

Results of the analysis indicate a substantial benefit may be associated with concentrating compensatory services, particularly in the upper elementary

grades (grade 4) . Such analyses, however, do not identify the instructional components associated with these benefits. In addition, these analyses do not evaluate other features of the instructional programs which may account for additional differences in Reading achievement.

Using relative-within-school-district status as the effectiveness criterion, the concentration treatment is apparently superior to saturation. However, this interpretation cannot be advanced unequivocally since these patterns are at least partially influenced by regression toward the mean phenomenon inherent in pre-post analyses.

APPENDIX A: DEFINITION OF ROLE TYPES

A.1 TEACHERS

A.2 PUPILS

A.3 FREQUENCY/TEACHERS

A.4 FREQUENCY/PUPILS

APPENDICES

Appendix A.1

DEFINITION OF ROLE TYPES--TEACHERS

Instructional

01 Assigning task
03 Discussing
04 Drilling
05 Facilitating AV
06 Facilitating manipulatives, games
07 Facilitating oral/silent reading
08 Facilitating oral/silent reading, review
09 Facilitating student work
10 Instructing
12 Facilitating creative work
13 Reviewing
15 Testing assessing
16 Tutoring
23 Facilitating reading, writing
26 Praising student work
27 Facilitating other than reading

Noninstructional

02 Disciplining
11 Interacting socially
14 Story telling, reading aloud
19 Managing
22 Doing Nothing
24 Reciting poetry
25 Interrupted by office
28 Talking with parent

Unable to classify

17 Can't tell, no English
18 Can't tell
21 Other, unclassified

20 No adult
00 Not applicable

Directive

01 Assigning task
02 Disciplining
10 Instructing
14 Story telling, reading aloud
19 Managing
24 Reciting poetry
25 Interrupted by office
26 Praising student work
28 Talking with parent

Teacher-initiated interactive

04 Drilling
07 Facilitating oral/silent reading
08 Facilitating oral/silent reading, review
13 Reviewing
15 Testing, assessing
16 Tutoring

Discussion and social interaction

03 Discussing
11 Social interaction

Assisting and monitoring

05 Facilitating AV
06 Facilitating manipulatives, games
09 Facilitating student work
12 Facilitating creative work
23 Facilitating reading, writing
27 Facilitating other than reading

Teacher idle

22 Doing nothing

Unable to classify

17 Can't tell, not English
18 Can't tell
21 Other, unclassified

20 No adult
00 Not applicable

Appendix A.2

DEFINITION OF ROLE TYPES--PUPILS

Instructional

01 Being assigned task
03 Participating in discussion
04 Responding to drill
05 Using AV
06 Using manipulatives, games
07 Oral/silent reading
08 Oral/silent reading, review
09 Quiet task
10 Being instructed
12 Creative work
13 Responding to review
15 Being tested, assessed
16 Being tutored
21 Tutoring, work with peers
24 Reading, writing
26 Other than reading
28 Reciting poems
29 Play rehearsal
31 Being praised, rewarded
32 Leave room, to resource center

Noninstructional

02 Being disciplined
11 Interacting socially
14 Listening to story
19 Being managed
20 In transition
22 Not attending to task
25 Leave room, personal reasons
27 Clean up

Unable to classify

17 Can't tell, not English
18 Can't tell
23 Other, unclassified
00 Not applicable

Seatwork and self-instruction

03 Participating in discussion
05 Using AV
06 Using manipulatives, games
09 Quiet task
11 Interacting socially
12 Creative work
21 Tutoring, working with peers
24 Reading, writing
26 Other than reading
27 Clean-up
28 Reciting poems
29 Play rehearsal
32 Leave room, to resource center

Responding to teacher/group leader

04 Responding to drill
07 Oral/silent reading
08 Oral/silent reading, review
13 Responding to review
15 Being tested, assessed
16 Being tutored

Receiving directions

01 Being assigned task
02 Being disciplined
10 Being instructed
14 Listening to story
19 Being managed
31 Being praised, rewarded

Idle

20 In transition
22 Not attending to task

Unable to classify

17 Can't tell, not English
18 Can't tell
23 Other, unclassified
25 Leave room, personal reasons
00 Not applicable

APPENDIX B: ANALYSIS VARIABLES

B.1 CLASSROOM-LEVEL VARIABLES

B.2 LEGEND FOR CLASSROOM-LEVEL VARIABLES

B.3 PUPIL-LEVEL VARIABLES

B.4 LEGEND FOR PUPIL-LEVEL VARIABLES

B.1 Classroom-Level Analysis Variables

VARIABLE	Grade 2 MEAN	Grade 2 STANDARD DEV	Grade 2 CASES	Grade 4 MEAN	Grade 4 STANDARD DEV	Grade 4 CASES	Total MEAN	Total STANDARD DEV	Total CASES
VAR007	1.4643	0.5079	28	1.5000	0.5092	28	1.4821	0.5042	56
PSPAN	0.5671	0.1568	28	0.6010	0.1486	28	0.5840	0.1523	56
PNEGR	0.1120	0.0353	28	0.1004	0.0747	28	0.1172	0.0934	56
PCAUC	0.2526	0.1555	28	0.2122	0.1422	28	0.2324	0.1490	56
GEN2	1.5105	0.1050	28	1.4988	0.0666	28	1.5017	0.0375	56
AGE2	106.3563	19.7186	28	124.2619	15.8059	28	115.5541	19.7622	56
STAG	1.7143	0.4600	28	1.6071	0.4973	28	1.6607	0.4778	56
WX77	50.4054	7.1364	28	64.0131	7.1532	28	57.2092	9.6617	56
WA77	46.5732	7.3024	27	55.6370	7.1439	10	49.0265	8.2532	37
PD77	47.7182	7.2611	28	63.5854	7.8491	28	55.6518	10.9638	56
TOTR77	47.6124	6.9717	28	62.8441	7.4902	28	55.2283	10.5106	56
TCSV01	1.7500	1.0758	28	2.0714	1.1524	28	1.9107	1.1164	56
CTISV07	7.8929	1.6852	28	8.3929	1.1001	28	8.1429	1.4325	56
TISV03	2.0357	1.6212	28	1.8571	0.9315	28	1.9464	1.3131	56
TISV15	11.0357	5.1459	28	9.6014	5.0410	28	10.4286	5.0842	56
PISV01	1.7500	1.0758	28	2.0714	1.1524	28	1.9107	1.1164	56
CPISV07	7.8929	1.6852	28	8.3929	1.1001	28	8.1429	1.4325	56
PISV03	2.0357	1.6212	28	1.8571	0.9315	28	1.9464	1.3131	56
PISV12	0.4286	0.5040	28	0.3214	0.4756	28	0.3750	0.4885	56
PISV15	11.0357	5.1459	28	9.6014	5.0410	28	10.4286	5.0842	56
XTIMINS	5.3959	2.3493	28	5.8494	2.2049	28	5.6227	2.2639	56
STIMINS	5.5321	1.6970	28	5.8809	2.2924	28	5.7065	2.0051	56
STIMPASS	0.9307	1.6301	28	0.7502	0.5486	28	0.8655	1.2437	56
STIMIDLE	1.3419	0.9392	28	1.0026	0.9930	28	1.1823	0.9736	56
XDIFMATL	0.9293	0.2204	28	0.9457	0.2000	28	0.9370	0.2093	56
XEDYRELB	20.8402	21.0151	28	31.2049	29.2207	28	26.0225	25.7545	56
SLEADER	1.7016	0.5394	28	1.3500	0.6091	28	1.5258	0.7229	56
XPEDYMAT	24.8596	24.7791	28	44.0743	29.8110	28	34.4654	28.8339	56
SPEDYMAT	21.7633	13.5111	28	28.7328	16.9469	28	25.2505	17.9318	56
SPSTIM3	17.5576	13.0915	28	27.0502	11.6461	28	22.3039	13.1766	56
XPSTIM3	9.4118	7.1492	28	8.6037	7.3540	28	9.0177	7.2021	56
SPSTIM3	10.9014	7.3021	28	12.2341	8.3131	28	11.5678	7.7915	56
XTTIM1	8.4651	1.0300	28	7.8160	1.3746	28	8.1406	1.2151	56
STTIM1	1.6652	0.8484	28	2.2612	0.8529	28	1.9647	0.8945	56
STTIM5	1.4713	1.4769	28	1.5224	1.5435	28	1.5469	1.4939	56
XTTIM7	0.0069	0.1417	28	0.2411	0.4235	28	0.1339	0.3310	56
XPOSNEG	119.0329	92.4253	28	63.1900	44.3368	28	91.1114	77.1659	56
XOCCPER	0.1935	0.3125	28	0.1071	0.1305	28	0.1503	0.2412	56
CWX73	52.5765	3.5999	28	65.4471	6.0391	28	59.0218	8.1308	56
CWA73	48.4379	3.2991	27	59.6979	4.3550	10	51.4812	6.1699	37
CPD73	49.9436	4.6537	28	62.9579	6.4336	28	56.4657	8.6159	56
CTOTR73	49.6632	4.1332	28	63.4714	6.2031	28	56.5673	8.7098	56

B.2 Legend for Classroom-level Analysis Variables

VAR001 ID

VAR002 RESPONDENT TYPE

VAR003 OBSERVER NUMBER

VAR004 SCHOOL CODE

VAR005 RESPONDENT CODE

VAR006 GRADE

GRADE

VAR007 TREATMENT CODE

1. SAT
2. CONC

PSPAN PROPORTION SPANISH SURNAME PUPILS

PNEGR PROPORTION BLACK PUPILS

PCAUC PROPORTION CAUCASIAN PUPILS

GEN2 MEAN PUPIL GENDER OF TCHRS 78 CLASS

AGE2 MEAN PUPIL AGE IN MONTHS OF TCHRS 78 CLASS

STAG UNIT OF INSTRUCTION

1. TOTAL CLASS
2. STAGGERED READING

WK77 MEAN WORD KNOWLEDGE SCORE SPRING 77

WA77 MEAN WORD ANALYSIS SCORE SPRING 77

RD77 MEAN READING SCORE SPRING 77

TOTR77 MEAN TOTAL READING SCORE SPRING 77

TISV01 TEACHER EXPERIENCE SCALE

CTISV07 TEACHER TREATMENT IMPLEMENTATION SCALE

TISV08 TCHR PERCEIVED SALIENCE OF TREATMENT

TISV15 TCHR PROCESS DETERMINANTS SCALE

PISV01 PRINCIPAL EXPERIENCE SCALE

CPISV07 PRINCIPAL TREATMENT IMPLEMENTATION SCALE

PISV08 PRIN PERCEIVED SALIENCE OF TREATMENT

PISVI2 PRIN OPINION OF FUNDS ALLOCATION

PISVI5 PRIN PROCESS DETERMINANTS SCALE

XTIMINS IND OBS TIME IN INSTRUCTIONAL ROLES-ME

STIMINS IND OBS TIME IN INSTRUCTIONAL ROLES-SD

STIMPAS2 IND OBS TIME IN RECEPTIVE ROLES-SD

STIMIDLE IND OBS TIME IDLE-SD

XDIFMATL IND OBS NO OF MATERIALS USED-MEAN

XEDYRELB IND OBS PERCENT OF EDY MATLS-MEAN

SLEADER IND OBS SCALED GROUP LEADERSHIP-SD

XPEDYMAT TCH OBS PERCENT OF EDY MATLS-MEAN

SPEDYMAT TCH OBS PERCENT OF EDY MATLS-SD

SPSTIM3 TCHR OBS PCT PUPIL TIME ACTIVE-SD

XPSTIM5 TCH OBS PCT PUPIL TIME RECEPTIVE-MEAN

SPSTIM5 TCH OBS PCT PUPIL TIME RECEPTIVE-SD

XTTIMI TCH OBS TCHR TIME INSTRUCTIONAL ROLES-MEAN

STTIMI TCH OBS TCHR TIME INSTRUCTIONAL ROLES-SD

STTIM6 TCH OBS TCHR TIME HELP PUPIL ACT-SD

XTTIM7 TCH OBSTCHR TIME IDLE-MEAN

XPOSNEG SUPPORTIVE X NONSUPPORTIVE AFFECT-MEAN

XCOOPER COOPERATIVE BEHAVIOR-MEAN

CWK78 MEAN WORD KNOWLEDGE SCORE SPRING 78

CWA78 MEAN WORD ANALYSIS SCORE SPRING 78

CRD78 MEAN READING SCORE SPRING 78

CTOTR78 MEAN TOTAL READING SCORE SPRING 78

B.3 Pupil-Level Analysis Variables

VARIABLE	Grade 2 MEAN	Grade 2 STANDARD DEV	Grade 2 CASES	Grade 4 MEAN	Grade 4 STANDARD DEV	Grade 4 CASES
VAR004	1.4541	0.5010	113	1.5000	0.5025	102
VAR005	2.0000	0.0	113	[illegible]	0.0	102
VAR006	1.4831	0.5018	113	1.5000	0.5025	102
VAR007	1.5578	0.9312	113	[illegible]	[illegible]	102
VAR008	41.7573	11.1637	117	[illegible]	10.9375	101
VAR010	39.2165	9.2352	107	56.7077	10.0444	[illegible]
VAR011	50.2857	10.4336	105	[illegible]	10.2702	[illegible]
VAR012	37.9229	9.2354	117	[illegible]	12.0050	101
VAR013	53.2018	9.3599	109	[illegible]	11.7351	[illegible]
VAR014	43.1551	7.9309	109	0.0	0.0	0
VAR015	50.2752	9.6879	105	[illegible]	12.0028	[illegible]
FALL	1.0000	0.0	9	1.0700	0.0	7
XSTAG	1.5610	0.4754	113	[illegible]	0.4977	102
XEDY	1.4575	0.5003	113	[illegible]	0.5013	101
XNROLES	1.5867	0.7771	113	[illegible]	0.5079	101
XGRPSIZ	10.3347	5.3225	113	10.1275	0.2217	102
VGRPSIZ	1.3743	4.4557	113	1.3735	2.5504	102
STIMINS	25.7924	7.9023	113	27.5573	5.2099	102
STIMNIN	3.7001	5.0296	113	3.0195	3.9044	102
STIMACT	10.8370	9.8396	113	12.2255	7.3573	102
STIMRSP	13.3305	6.5202	113	[illegible]	11.1205	102
STIMPAS2	1.9758	3.6548	113	1.5731	1.9495	102
STIMIDL	3.0424	4.7383	113	2.1?51	3.5404	102
XUSEDY	0.2401	0.2663	113	[illegible]	0.3249	102
VUSEDY	0.2555	0.2574	113	0.2517	0.2011	99
XDIFMATL	0.7211	0.3087	113	0.5551	0.3835	102
VDIFMATL	0.4533	0.3137	113	0.5033	0.3540	99
XLEADER	3.5307	1.2597	117	3.5410	1.4162	101
VLEADER	1.4007	0.9430	117	1.0293	0.9384	93
DWK	11.1296	9.5302	103	5.1224	3.5326	93
DWA	7.3700	7.2068	100	0.0	0.0	0
DTOTR	11.2492	7.9592	104	4.3444	5.0547	95

B.4 Legend for Pupil-Level Analysis Variables

VAR001	SCHOOL CODE
VAR002	PUPIL ID
VAR003	TEACHER CODE
VAR004	TREATMENT 1=CONS. 2=SAT.
VAR005	GRADE
VAR006	GENDER 1=MALE, 2=FEMALE
VAR007	ETHNICITY 1=SPN 2=NGR 3=CAU 4=OTH
VAR008	INDIV OBS FLAG
VAR009	WORD KNOWLDGE 77
VAR010	WORD ANALYSIS 77
VAR011	READING COMP 78
VAR012	TOTAL READING 77
VAR013	WORD KNOWLDGE 78
VAR014	WORD ANALYSIS 78
VAR015	TOTAL READING 78
FALL	FALL 77 AS PRESCORE FLAG 1=YES
XSTAG	AVERAGE STAGGERED RDG., STA =2
VSTAG	SD STAGGERED VS TOTAL CLASS RDG
XEDY	EDY STATUS..1=YES 2=NO
XNROLES	MEAN NO OF ROLES CODED
VNROLES	SD NO OF ROLES CODED
XGRPSIZ	AVERAGE INSTR GROUP SIZE
VGRPSIZ	VARIABILITY OF INSTRU GROUP SIZE
STIMINS	TOTAL MINUTES INSTR TIME
STIMNIN	TOTAL MINUTES NONINSTR TIME
STIMACT	TOTAL MINUTES PUPIL ACTIVE ROLES
STIMRSR	TOTAL MINS PUPIL RESPONDING ROLES
STIMPAS2	TOTAL MINS PUPIL PASSIVE ROLES
STIMIDL	TOTAL MINUTES PUPIL IDLE
XUSEDY	AVERAGE USE OF EDY MATERIALS
VUSEDY	VARIABILITY IN USE OF EDY MATLS
XDIFMATL	AVERAGE USE OF DIFFERENT MATLS
VDIFMATL	VARIABILITY IN USE OF DIFF MATLS
XLEADER	TYPICAL ROLE-GROUP LEADER
VLEADER	VARIABILITY IN ROLE-GROUP LEADER
DWK	DIFFERENTIAL WORD KNOWLEDGE
DWA	DIFFERENTIAL WORD ANALYSIS
DTOTR	DIFFERENTIAL TOTAL READING

APPENDIX C: INTERCORRELATION MATRIX FOR CLASSROOM-LEVEL ANALYSIS VARIABLES

Appendix C: Intercorrelation Matrix for Classroom-level Analysis Variables

	VAR007	PSPAN	FMISR	PCAUC	GEN2	AGE2	STAG	MX77	WA77	RD77	TOTR77	TISV01	CTISV07	TISV08	TISV15	PISV01	CPISV07	PISV08
VAR007	55.	55.	55.	56.	56.	56.	55.	56.	37.	56.	55.	56.	56.	56.	56.	56.	55.	55.
PSPAN	0.04315	55.	55.	56.	55.	56.	56.	56.	37.	55.	56.	55.	56.	56.	55.	56.	55.	56.
FMISR	-0.06732	-0.29462	55.	56.	55.	55.	55.	56.	37.	55.	56.	55.	55.	55.	55.	55.	55.	55.
PCAUC	0.09237	-0.79226	-0.31714	55.	55.	55.	55.	56.	37.	55.	56.	55.	56.	56.	55.	55.	56.	55.
GEN2	-0.03310	0.15559	0.02263	-0.15353	55.	55.	55.	55.	37.	55.	55.	55.	55.	56.	55.	56.	55.	55.
AGE2	0.15729	0.03333	0.00419	-0.11930	0.01755	55.	55.	56.	37.	56.	56.	55.	55.	55.	55.	55.	56.	55.
STAG	0.01213	-0.02229	-0.03129	0.15296	-0.33355	-0.11356	55.	56.	37.	55.	56.	55.	55.	55.	56.	56.	56.	55.
MX77	0.19324	-0.11242	0.12495	0.09332	-0.25399	0.27157	0.03571	56.	37.	55.	55.	55.	55.	55.	55.	56.	56.	55.
WA77	0.19992	-0.11985	0.06627	0.06191	-0.45716	0.06922	0.13399	0.93557	37.	37.	37.	37.	37.	37.	37.	37.	37.	37.
RD77	0.22357	-0.09953	0.11355	0.05393	-0.27193	0.33673	0.00358	0.96145	0.91171	55.	56.	55.	55.	55.	55.	56.	56.	55.
TOTR77	0.21675	-0.11431	0.12330	0.05312	-0.26150	0.32162	0.01335	0.95511	0.94250	0.99174	55.	55.	55.	56.	55.	55.	55.	55.
TISV01	-0.14323	-0.34439	-0.04335	0.21120	0.07122	0.13497	-0.02374	0.07252	0.05913	0.10551	0.05439	55.	56.	55.	55.	55.	55.	55.
CTISV07	0.07912	-0.03523	-0.04025	0.09747	0.10170	0.14670	0.04554	0.00486	-0.21414	-0.05624	-0.01325	-0.12931	55.	56.	55.	55.	55.	55.
TISV08	0.09464	-0.05333	-0.17543	0.03591	0.07361	0.13585	-0.23237	-0.22493	-0.21075	-0.13183	-0.18770	0.02148	-0.05335	55.	55.	55.	55.	55.
TISV15	0.10943	0.12323	-0.10565	-0.03015	0.10554	-0.05347	0.10536	-0.30652	-0.07182	-0.27782	-0.28554	0.05132	-0.05350	0.08520	56.	55.	55.	55.
PISV01	-0.14323	-0.34409	-0.04835	0.21120	0.07122	0.13497	-0.02374	-0.07252	0.05913	0.10551	0.05439	1.00000	-0.12831	0.02148	0.06132	55.	55.	55.
CPISV07	0.07912	-0.03523	-0.04025	0.09747	0.10170	0.14670	0.04554	0.00486	-0.21414	-0.05624	-0.01325	-0.12331	1.00000	-0.05355	-0.05350	-0.12831	55.	55.
PISV08	0.07464	-0.05333	-0.17543	0.03591	0.07351	0.13585	-0.23237	-0.22493	-0.21095	-0.13133	-0.18770	0.02149	-0.05355	1.00000	0.05520	0.02148	-0.05335	55.
PISV12	-0.08305	0.02943	0.03247	-0.03337	0.11335	0.04517	0.05764	-0.13436	-0.03347	-0.16141	-0.15330	0.12918	-0.10393	-0.19426	0.13177	0.12918	-0.10393	-0.19496
PISV15	0.10943	0.12525	-0.10565	-0.03015	0.10554	-0.05347	0.10526	-0.30652	-0.07132	-0.27732	-0.23554	0.05132	-0.05350	0.05520	1.00000	0.06132	-0.05350	0.05520
XTIMINS	0.21035	0.09492	0.04525	-0.05950	-0.16291	-0.19517	-0.16723	0.14509	0.13026	0.14240	0.14157	-0.13470	-0.01695	-0.05525	0.09309	-0.13470	-0.01695	-0.05525
STIMINS	0.26725	0.05057	0.10541	-0.03599	0.02339	-0.05505	-0.31836	0.18253	0.18133	0.16240	0.17331	-0.07125	-0.01910	-0.07555	0.05139	-0.09125	-0.01910	-0.07555
STIMPAS2	0.17971	0.02443	0.15512	-0.10529	-0.04719	0.06843	-0.15141	-0.03502	0.01589	0.00177	-0.01569	-0.01650	-0.14325	0.10918	0.10337	-0.01650	-0.14325	[illegible]
STIMIDLE	-0.13502	0.05220	0.21253	-0.22240	0.07833	0.05735	-0.19245	-0.20402	-0.14700	-0.13771	-0.19702	-0.02035	-0.04940	0.13153	-0.05195	-0.02098	-0.04940	0.13153
XDIFMATL	-0.01559	0.11343	-0.00753	-0.11493	-0.21809	-0.24103	-0.07393	0.07118	0.15342	0.11932	0.09182	-0.04344	-0.11190	-0.18935	0.07953	-0.04344	-0.11190	-0.18935
XEDIFELD	0.22262	-0.05214	0.21036	-0.00453	0.00855	0.16469	0.01930	0.21068	0.16725	0.16230	0.18523	-0.04344	0.13857	-0.12553	0.05039	-0.04344	0.13857	-0.12553
SLEADER	-0.23534	-0.12111	0.06646	0.13792	-0.00843	-0.34572	0.05745	0.04833	-0.03348	0.00200	0.02375	-0.07505	-0.00355	-0.17437	-0.03929	-0.07505	-0.00355	-0.17437
XFEDYMAT	0.28247	-0.13476	0.29392	0.06951	0.09115	0.23715	0.03125	0.40755	0.19939	0.42529	0.42743	0.03991	0.00732	-0.10525	0.13539	0.03991	0.00732	-0.10525
SFEDIMAT	-0.00593	0.02422	-0.03329	-0.04321	0.01137	0.17250	0.14004	0.25933	0.17201	0.26747	0.25541	0.30452	-0.06297	0.07110	-0.03261	0.30452	-0.06297	0.07110
SFSTIM3	0.24015	0.17731	0.04403	-0.14124	-0.07054	0.26935	0.21914	0.15550	0.15539	0.17737	0.17275	-0.05452	0.11392	-0.04078	0.15344	-0.05452	0.11392	-0.04078
XFSTIMS	0.23245	-0.14532	0.13394	-0.01671	-0.10126	0.29352	-0.17539	-0.05574	0.03735	0.02478	-0.01075	0.05795	0.17654	0.09542	0.07350	0.05795	0.17654	0.09542
SFSTIMS	0.09923	-0.11649	0.14754	-0.04432	-0.06559	0.22350	-0.21720	0.07812	0.07775	0.14430	0.12161	0.09273	0.09804	0.12224	0.10337	0.09273	0.09824	0.12224
XTTIMI	-0.03297	0.18575	-0.23182	-0.03429	0.13553	-0.45526	0.14191	-0.19671	-0.20164	-0.24251	-0.22920	-0.17579	-0.21697	0.08725	0.17007	-0.17579	-0.21697	0.05725
STTIMI	-0.01215	-0.14654	0.24131	-0.03293	-0.12031	0.35901	-0.06494	0.26031	0.24114	0.26379	0.27354	0.03723	0.23591	0.04521	-0.01955	0.03723	0.23591	0.04521
STTIMS	0.31920	0.11576	0.29230	-0.04975	-0.12934	0.16342	0.25305	-0.00745	-0.03471	0.00755	0.00332	-0.17245	-0.01585	-0.00229	0.14342	-0.17245	-0.01535	-0.00229
XTTIM	0.15976	-0.10326	0.23726	-0.05153	-0.12614	0.31345	-0.21043	0.32739	0.32175	0.32641	0.32636	0.15594	0.00205	-0.13432	-0.25079	0.15594	0.00205	-0.13432
XPOS	0.12980	-0.26152	0.24168	0.13567	-0.00915	-0.24988	0.09152	-0.21971	-0.22424	-0.24974	-0.22876	-0.13597	0.17304	0.10374	0.01933	-0.13597	0.17324	0.10374
XOCC R	0.29654	0.05977	-0.16574	0.09350	-0.13140	0.10335	0.10370	-0.06708	0.07293	-0.05013	-0.05128	-0.27277	-0.05450	0.18612	0.16334	-0.27277	-0.05450	0.13512
CMX73	0.16718	-0.07354	-0.02943	0.10435	-0.13258	0.46594	-0.19318	0.70407	0.49613	0.74575	0.73697	0.13242	0.12952	-0.07591	-0.23225	0.13242	0.12952	-0.07591
CWA73	0.04795	0.14159	-0.31935	0.04733	-0.13896	0.26855	0.20729	0.58938	0.45881	0.60948	0.61560	0.25345	0.11274	0.03782	-0.03474	0.25345	0.11274	0.03732
CRD73	0.13265	-0.09337	0.02180	0.10115	-0.07641	0.38114	-0.17325	0.69743	0.45039	0.75356	0.73654	0.19596	0.05421	-0.12233	-0.17637	0.19375	0.05421	-0.12233
CTOTR78	0.12331	-0.07370	0.04429	0.05997	-0.08304	0.39220	-0.17705	0.70663	0.46036	0.74991	0.73504	0.19242	0.13116	-0.14573	-0.12654	0.19242	0.13116	-0.14573

Appendix C (continued)

	PISV12	PISV15	XTIMINS	STIMINS	STIMPAS2	STIMIDLE	XDIFMATL	XEDTRELS	SLEADER	XFEDTMAT	SPEDTMAT	SPSTIM3	XPSTIMS	SPSTIMS	XTTIM1	STTIM1	STTIM5	XTTIM7
VAR337	56.	56.	56.	56.	55.	56.	56.	56.	56.	55.	55.	56.	55.	55.	55.	55.	55.	55.
FSPAN	55.	56.	55.	55.	56.	55.	55.	55.	55.	55.	55.	56.	55.	56.	55.	55.	56.	55.
PHEGR	55.	55.	55.	56.	55.	56.	56.	56.	55.	55.	55.	56.	55.	55.	55.	55.	55.	55.
FCAUC	55.	55.	55.	55.	55.	56.	55.	56.	55.	55.	55.	55.	56.	55.	56.	55.	55.	55.
GEN2	56.	56.	56.	56.	55.	56.	55.	55.	56.	55.	55.	55.	55.	55.	55.	55.	55.	55.
AGE2	55.	56.	55.	55.	56.	55.	55.	56.	55.	55.	55.	56.	55.	55.	55.	55.	56.	55.
STAG	56.	56.	55.	56.	55.	55.	55.	56.	55.	55.	55.	55.	55.	56.	55.	55.	55.	55.
MK77	55.	56.	55.	55.	56.	55.	55.	56.	55.	55.	55.	55.	55.	56.	55.	55.	55.	55.
WA77	37.	37.	37.	37.	37.	37.	37.	37.	37.	37.	37.	37.	37.	37.	37.	37.	37.	37.
RD77	56.	56.	55.	55.	55.	55.	56.	55.	56.	55.	55.	56.	55.	55.	55.	55.	55.	55.
TOTR77	55.	55.	55.	56.	55.	55.	56.	56.	56.	55.	55.	55.	56.	55.	55.	55.	55.	55.
TISV31	55.	55.	55.	55.	55.	55.	55.	55.	56.	55.	55.	56.	55.	55.	56.	55.	55.	55.
CTISV37	55.	56.	55.	55.	55.	55.	55.	56.	56.	56.	56.	56.	56.	55.	56.	55.	55.	55.
TISV25	55.	55.	55.	55.	56.	56.	56.	55.	55.	56.	55.	55.	55.	55.	56.	55.	55.	55.
TISV15	56.	55.	55.	56.	56.	56.	55.	56.	56.	55.	55.	55.	55.	55.	56.	55.	55.	55.
PISV31	55.	56.	55.	55.	56.	56.	55.	55.	55.	55.	55.	56.	55.	55.	55.	55.	55.	55.
CPISV37	55.	55.	55.	56.	56.	56.	55.	56.	56.	55.	55.	55.	55.	55.	55.	55.	55.	55.
PISV25	55.	55.	56.	55.	56.	55.	56.	55.	55.	55.	56.	56.	56.	55.	56.	55.	56.	55.
PISV12	56.	55.	55.	55.	56.	55.	55.	55.	55.	55.	55.	55.	55.	55.	55.	55.	55.	55.
PISV15	0.13177	56.	55.	55.	56.	55.	55.	55.	55.	55.	55.	56.	55.	55.	55.	55.	55.	55.
XTIMINS	-0.25475	0.09337	55.	55.	56.	55.	55.	56.	56.	55.	55.	55.	55.	55.	55.	55.	55.	55.
STIMINS	-0.24540	0.05130	0.02043	55.	55.	55.	55.	55.	55.	55.	56.	55.	55.	55.	55.	55.	55.	55.
STIMPAS2	-0.16889	0.10337	0.31329	0.24573	55.	56.	56.	56.	55.	55.	55.	56.	55.	56.	55.	55.	55.	55.
STIMIDLE	0.09485	-0.05195	-0.21231	0.12865	-0.19653	55.	55.	55.	56.	55.	55.	55.	55.	55.	55.	55.	55.	55.
XDIFMATL	-0.14192	0.07933	0.39349	0.25462	0.11547	-0.16693	55.	55.	55.	55.	55.	55.	55.	55.	55.	55.	55.	55.
XEDTRELS	0.05085	0.05339	0.19365	0.09755	-0.12551	-0.17954	-0.00771	56.	55.	56.	55.	55.	55.	55.	55.	55.	55.	55.
SLEADER	0.05166	-0.03929	0.19505	0.21249	-0.05265	0.07656	0.06109	-0.18095	55.	55.	55.	55.	55.	55.	55.	55.	55.	55.
XFEDTMAT	0.07653	0.13539	0.14827	0.12124	0.08322	-0.22025	-0.17544	0.53919	-0.09327	55.	55.	55.	55.	55.	55.	55.	55.	55.
SPEDTMAT	0.01620	-0.03251	-0.15051	-0.19530	0.05403	-0.03494	-0.07229	0.12439	-0.18713	0.45523	55.	55.	55.	55.	55.	56.	55.	55.
SPSTIM3	0.09026	0.15344	0.10196	0.05576	0.20697	-0.24533	0.27271	0.22372	-0.32924	0.09775	0.09319	55.	55.	55.	55.	55.	55.	55.
XPSTIMS	-0.41536	0.07335	0.12535	0.13540	0.26641	0.01851	0.07704	0.01075	-0.16377	-0.00855	-0.03747	-0.05135	55.	55.	55.	55.	55.	55.
SPSTIMS	-0.32702	0.10337	0.19120	0.13933	0.14636	-0.02926	0.10975	0.05634	-0.11437	0.07237	0.02566	-0.07373	0.82572	55.	56.	55.	55.	55.
XTTIM1	-0.12224	0.17207	0.05856	-0.14048	0.02177	-0.18187	-0.19280	-0.23905	0.08726	-0.04234	-0.01054	-0.29192	-0.35511	-0.19747	55.	56.	55.	55.
STTIM1	0.23553	-0.01965	-0.11056	-0.02635	-0.01054	0.05401	0.17554	[illegible]	-0.14578	0.10333	0.15695	0.39757	0.22951	0.19739	-0.79557	55.	55.	55.
STTIM5	0.07143	0.14542	0.02759	-0.03734	0.15397	-0.16535	0.07459	0.11099	-0.32933	0.05533	0.04519	0.73921	-0.09357	-0.10061	-0.01414	0.09181	55.	55.
XTTIM7	0.17559	-0.25077	-0.01177	0.21343	-0.14407	0.19377	0.18119	0.11652	-0.26002	0.03332	-0.02753	0.23789	-0.00452	-0.07655	-0.60139	0.47045	0.14590	55.
XPTIMES	-0.02335	0.01933	0.05123	-0.03753	0.23359	0.03575	0.00104	0.15529	0.16505	0.06545	0.14705	-0.07143	0.15409	0.04615	0.05740	0.03327	0.00153	-0.08933
XCOOPER	0.19448	0.16334	0.02319	0.04442	0.27797	0.05777	-0.09557	-0.13313	0.11625	-0.05123	0.09117	0.28355	-0.07941	-0.11671	-0.00071	0.07745	0.36495	-0.07373
CARTS	-0.18911	-0.23225	0.27118	0.27450	-0.07115	-0.26533	0.22575	0.24352	-0.14529	0.27239	0.03350	0.35451	0.03237	0.18411	-0.39403	0.31323	0.13327	0.39273
CUAT3	-0.25497	-0.03474	-0.04540	-0.03319	-0.04039	-0.31635	-0.01167	0.13995	-0.22105	0.03350	0.03594	0.42343	-0.16757	-0.04053	-0.11059	0.11367	0.20257	0.23312
CTD73	-0.16255	-0.17537	0.16749	0.20709	-0.03335	-0.20535	0.26422	0.18235	-0.07770	0.23783	0.05078	0.34575	0.05228	0.15218	-0.38233	0.32041	0.11535	0.34412
CIDRR7S	-0.16032	-0.12554	0.19463	-0.23472	-0.09720	-0.20939	0.24101	0.21542	-0.11894	0.30764	0.05492	0.35501	0.06923	0.15579	-0.40869	0.34227	0.12235	0.37253

	XPOSNEG	XCOOPER	CWK78	CWA78	CRD78	CTOTR78
VARC07	56.	56.	56.	37.	56.	56.
PSPAN	56.	56.	56.	37.	56.	56.
PNEGR	56.	56.	56.	37.	56.	56.
PCAUS	56.	56.	56.	37.	56.	56.
GEN2	56.	56.	56.	37.	56.	56.
AGE2	56.	56.	56.	37.	56.	56.
STAG	56.	56.	56.	37.	56.	56.
WK77	56.	56.	56.	37.	56.	56.
WA77	37.	37.	37.	37.	37.	37.
RD77	56.	56.	56.	37.	56.	56.
TOTR77	56.	56.	56.	37.	56.	56.
TISV01	56.	56.	56.	37.	56.	56.
CTISV07	56.	56.	56.	37.	56.	56.
TISVC9	56.	56.	56.	37.	56.	56.
TISV15	56.	56.	56.	37.	56.	56.
PISV01	56.	56.	56.	37.	56.	56.
CPISV07	56.	56.	56.	37.	56.	56.
PISVC9	56.	56.	56.	37.	56.	56.
PISV12	56.	56.	56.	37.	56.	56.
PISV15	56.	56.	56.	37.	56.	56.
XTIMINS	56.	56.	56.	37.	56.	56.
STIMINS	56.	56.	56.	37.	56.	56.
STIMPAS2	56.	56.	56.	37.	56.	56.
STIMIDLE	56.	56.	56.	37.	56.	56.
XDIFMATL	56.	56.	56.	37.	56.	56.
XEDIRELB	56.	56.	56.	37.	56.	56.
SCREACER	56.	56.	56.	37.	56.	56.
XPEDIMAT	56.	56.	56.	37.	56.	56.
SPEDIMAT	56.	56.	56.	37.	56.	56.
SPSTIM3	56.	56.	56.	37.	56.	56.
XPSTIM5	56.	56.	56.	37.	56.	56.
SPSTIM5	56.	56.	56.	37.	56.	56.
XTTIM1	56.	56.	56.	37.	56.	56.
STTIM1	56.	56.	56.	37.	56.	56.
STTIM5	56.	56.	56.	37.	56.	56.
XTTIM7	56.	56.	56.	37.	56.	56.
XPOSNEG	56.	56.	56.	37.	56.	56.
XCOOPER	0.05309	56.	56.	37.	56.	56.
CWK78	-0.43681	-0.14094	56.	37.	56.	37.
CWA78	-0.31173	0.01180	0.89722	37.	37.	56.
CRD78	-0.40214	-0.12837	0.92335	0.77136	56.	56.
CTOTR78	-0.40412	-0.15742	0.94141	0.81280	0.93920	56.

APPENDIX D: SUMMARY OF REGRESSION ANALYSIS

D.1 ON SECOND GRADE PUPIL

D.2 ON FOURTH GRADE PUPIL

APPENDIX D

D.1 SUMMARY OF REGRESSION ANALYSIS

* * * * * * * * * * * * * * M U L T I P L E   R E G R E S S I O N * * * * * * * * * * * * * *

DEPENDENT VARIABLE.. VAR013 WORD KNOWLDGE 78

SUMMARY TABLE

	MULTIPLE R	R SQUARE	RSQ CHANGE	SIMPLE R	B	BETA
EDY STATUS .. 1=YES 2=NO	0.58837	0.34577	0.34577	0.5[illegible]	6.858755	0.31[illegible]
WORD KNOWLDGE 77	0.63166	0.39[illegible]	0.05223	0.59447	0.2932324	0.33201
					30.90110	

DEPENDENT VARIABLE.. VAR014 WORD ANALYSIS 78

	MULTIPLE R	R SQUARE	RSQ CHANGE	SIMPLE R	B	BETA
EDY STATUS .. 1=YES 2=NO	0.62747	0.39372	0.39372	0.62747	6.857242	0.42[illegible]
WORD ANLYSIS 77	0.63893	0.47[illegible]	0.080[illegible]0	0.59[illegible]	0.3353344	0.3[illegible]
					25.[illegible]	

DEPENDENT VARIABLE.. VAR011 READING COMP 78

	MULTIPLE R	R SQUARE	RSQ CHANGE	SIMPLE R	B	BETA
EDY STATUS .. 1=YES 2=NO	0.63572	0.40414	0.40414	0.63572	7.893664	0.37853
TYPICAL ROLE-GROUP LEADER	0.66455	0.44162	0.03749	-0.17046	-1.050081	-0.12779
FALL 77 AS PRESCORE FLAG 1-YES	0.67960	0.46186	0.02023	0.12[illegible]	5.522399	0.14109
TOTAL MINUTES PUPIL IDLE	0.69224	0.47919	0.01733	0.14838	0.2255274	0.10242
TOTAL READING 77	0.73114	0.53457	0.05538	0.56329	0.4071502	0.36039
					25.50799	

DEPENDENT VARIABLE.. VAR015 TOTAL READING 78

	MULTIPLE R	R SQUARE	RSQ CHANGE	SIMPLE R	B	BETA
EDY STATUS .. 1=YES 2=NO	0.63598	0.40449	0.40449	0.63598	7.641990	0.3[illegible]
TYPICAL ROLE-GROUP LEADER	0.65807	0.44632	0.04184	-0.1[illegible]139	-1.051707	-0.13[illegible]3
FALL 77 AS PRESCORE FLAG 1-YES	0.68558	0.47016	0.02384	0.14[illegible]0	5.62836[illegible]	0.1[illegible]
TOTAL MINUTES PUPIL IDLE	0.69826	0.48756	0.01741	0.14[illegible]	0.2135537	0.10[illegible]
TOTAL READING 77	0.73257	0.53710	0.04953	0.65676	0.3575424	0.3[illegible]
					27.83341	

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APPENDIX D

D.2 SUMMARY OF REGRESSION ANALYSIS

* * * * * * * * * * * * * M U L T I P L E R E G R E S S I O N * * * * * * * * * * * * * * *

DEPENDENT VARIABLE.. VAR013 WORD KNOWLDGE 78

SUMMARY TABLE

	MULTIPLE R	R SQUARE	RSQ CHANGE	SIMPLE R	B	BETA
EDY STATUS .. 1=YES 2=NO	0.67214	0.45178	0.45178	0.67214	10.39638	0.32[illegible]
TOTAL MINUTES NONINSTR TIME	0.68619	0.47036	0.01309	0.00663	-0.5822759	-0.19[illegible]
TOTAL MINS PUPIL RESPONDING ROLES	0.70203	0.49295	0.02139	-0.08937	-0.1107975	-0.[illegible]
WORD KNOWLDGE 77	0.72712	0.52871	0.03535	0.67793	0.3772592	0.34730
					30.24544	

DEPENDENT VARIABLE.. VAR011 READING COMP 78

	MULTIPLE R	R SQUARE	RSQ CHANGE	SIMPLE R	B	BETA
EDY STATUS .. 1=YES 2=NO	0.58263	0.33945	0.33945	0.58263	6.952222	0.24450
AVERAGE STAGGERED RUG .. STAG#2	0.60195	0.36234	0.02289	-0.16[illegible]	-3.579818	-0.12747
TOTAL READING 77	0.65030	0.42299	0.06055	0.52614	0.5295987	0.34582
TOTAL MINUTES NONINSTR TIME	0.66635	0.44669	0.02390	-0.01516	-0.5647621	-0.15[illegible]
					29.11190	

DEPENDENT VARIABLE.. VAR015 TOTAL READING 78

	MULTIPLE R	R SQUARE	RSQ CHANGE	SIMPLE R	B	BETA
EDY STATUS .. 1=YES 2=NO	0.56951	0.43824	0.43824	0.66961	5.538544	0.22312
TOTAL MINUTES NONINSTR TIME	0.68578	0.47029	0.03205	-0.00401	-0.5745[illegible]	-0.1[illegible]
TOTAL READING 77	0.76093	0.57901	0.10872	0.73213	0.6231995	0.[illegible]
					19.60414	

APPENDIX E: REGRESSION RESULTS WITHOUT EDY STATUS

E.1 SECOND GRADE

E.2 FOURTH GRADE

APPENDIX E: Second-Grade Regession Results without EDY Status

E.1

* * * * * * * * * * * * M U L T I P L E R E G R E S S I O N * * * * * * * * * * * * *

ABLE.. VAR013 WORD KNOWLDGE 78

SUMMARY TABLE

	MULTIPLE R	R SQUARE	RSQ CHANGE	SIMPLE R	B
AL MINS PUPIL RESPONDING RCLES	0.17407	0.03030	0.03030	-0.17407	-0.1220642
D KNOWLDGE 77	0.59400	0.35283	0.32253	0.59847	0.5051107
					33.63578

ABLE.. VAR014 WORD ANALYSIS 78

IABILITY IN USE OF DIFF MATLS	0.17874	0.03195	0.03195	-0.17874	-4.051579
RAGE USE OF EDY MATERIALS	0.25531	0.06518	0.03323	0.15669	3.841425
AL MINS PUPIL PASSIVE ROLES	0.30613	0.09371	0.02853	-0.10412	0.1739478
D ANLYSIS 77	0.61872	0.38281	0.28910	0.59150	0.5365000
AL MINS PUPIL RESPONDING RCLES	0.63419	0.40220	0.01939	-0.12070	-0.1333463
					30.19373

ABLE.. VAR011 READING COMP 78

RAGE USE OF EDY MATERIALS	0.17377	0.03019	0.03019	0.17377	1.130287
AL READING 77	0.66429	0.44129	0.41109	0.66329	0.7338767
ICAL ROLE-GROUP LEADER	0.67692	0.45821	0.01693	-0.13044	-1.073364
					25.19071

ABLE.. VAR015 TOTAL READING 78

RAGE USE OF EDY MATERIALS	0.20350	0.04158	0.04158	0.20350	2.224332
ICAL ROLE-GROUP LEADER	0.26324	0.06929	0.02772	-0.19139	-1.067447
AL READING 77	0.67491	0.45550	0.38620	0.65476	0.6670916
					27.50572

APPENDIX E: Fourth-Grade Regression Results without EDY Status

E.2

* * * * * * * * * * * * * * * * M U L T I P L E R E G R E S S I O N * * * * * * * * * * * * * * * *

IABLE.. VAR015 GRD KNOWLDGE 78

SUMMARY TABLE

	MULTIPLE R	R SQUARE	RSQ CHANGE	SIMPLE R	B
AVERAGE USE OF DIFFERENT MATLS	0.19099	0.03648	0.03648	0.19099	4.339102
GRD KNOWLDGE 77	0.72121	0.52014	0.48366	0.70844	0.7485045
					15.92105

IABLE.. VAR011 READING COMP 78

AVERAGE USE OF DIFFERENT MATLS	0.19325	0.03735	0.03735	0.19325	2.709632
VARIABILITY IN USE OF DIFF MATLS	0.26968	0.07273	0.03538	0.17518	5.276313
TOTAL READING 77	0.71264	0.50784	0.43513	0.69884	0.7793376
TOTAL MINUTES NONINSTR TIME	0.72997	0.53270	0.02486	-0.00803	-0.0545369
					14.24545

IABLE.. VAR015 TOTAL READING 78

AVERAGE USE OF DIFFERENT MATLS	0.21716	0.04716	0.04716	0.21716	4.005088
VARIABILITY IN USE OF DIFF MATLS	0.28048	0.07868	0.03152	0.17752	5.716964
TOTAL READING 77	0.74878	0.56217	0.48349	0.69710	0.8004936
TOTAL MINUTES NONINSTR TIME	0.80390	0.64626	0.02410	-0.00868	-0.5228432
MEAN NO OF RULES CODED	0.81128	0.65918	0.01291	-0.00886	3.071774
AVERAGE USE OF EDY MATERIALS	0.82204	0.67575	0.01657	0.02875	5.424060
					5.392810

APPENDIX F: FOUR-WAY ANALYSIS OF COVARIANCE FOR SECOND GRADE PUPILS

F.1 WORD KNOWLEDGE - 1978

F.2 WORD ANALYSIS - 1978

F.3 READING COMPREHENSION - 1978

F.4 TOTAL READING - 1978

94.

N-WAY ANCOVAS REL DATA NEW COVARIABLES MODEL 2
GRADE 2 ANOVAS . , POSTSCORES
FILE BOVA (CREATION DATE = 01/25/79)

* * * * * * * * * * A N A L Y S I S   O F   V A R I A N C E * * * * * * * * * *

	VAR013	WORD KNOWLEDGE 78
BY	VAR004	TREATMENT 1=CONC,2=SAT
	XEDY	EDY STATUS . , 1=YES 2=NO
	VAR005	GENDER 2=BOY, 1=GIRL
	VAR007	ETHNICITY 1=SPN 2=NGR 3=CAU 4=OTH
WITH	STIMRSP	TOTAL MINS PUPIL RESPONDING ROLES
	VAR002	WORD KNOWLEDGE 77

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SOURCE OF VARIATION			SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS			3694.915	6	615.819	11.835	0.000
VAR004			35.925	1	35.926	0.690	0.408
XEDY			3232.263	1	3232.263	62.118	0.000
VAR005			15.053	1	15.053	0.289	0.592
VAR007			116.079	3	38.693	0.744	0.527
COVARIATES			623.267	2	314.634	5.047	0.004
STIMRSP			60.623	1	60.628	1.165	0.284
VAR002			526.838	1	526.838	10.125	0.002
2-WAY INTERACTIONS			666.625	11	60.602	1.165	0.324
VAR004	XEDY		73.349	1	73.949	1.410	0.237
VAR004	VAR005		4.397	1	4.397	0.084	0.772
VAR004	VAR007		102.744	2	51.372	0.987	0.377
XEDY	VAR005		121.323	1	121.323	2.332	0.131
XEDY	VAR007		122.531	3	40.844	0.785	0.505
VAR005	VAR007		312.186	3	104.062	2.000	0.120
3-WAY INTERACTIONS			1013.867	5	202.773	3.897	0.003
VAR004	XEDY	VAR005	205.613	1	205.613	3.952	0.050
VAR004	XEDY	VAR007	95.613	2	47.807	0.919	0.403
VAR004	VAR005	VAR007	255.313	1	255.313	4.906	0.029
XEDY	VAR005	VAR007	425.931	1	425.931	8.186	0.005
EXPLAINED			6004.675	24	250.195	4.808	0.000
RESIDUAL			4318.832	83	52.034		
TOTAL			10323.508	107	96.481		

118 CASES WERE PROCESSED.
10 CASES (8.5 PCT) WERE MISSING.

F.1: FOUR-WAY ANALYSIS OF COVARIANCE FOR SECOND GRADE PUPILS

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4-WAY ANCOVAS PFL DATA  NEW COVARIABLES MODEL 2
 GRADE 2 ANOVAS , , POSTSCORES
FILE  POV4     (CREATION DATE = 01/25/79)

* * * * * * * * * * * A N A L Y S I S   O F   V A R I A N C E * * * * * * * * * * *
              VAR014   WORD ANALYSIS 78
           BY VAR004   TREATMENT 1=CONC,2=SAT
              XEDY     EDY STATUS ,, 1=YES 2=NO
              VAR006   GENDER 2=BOY, 1=GIRL
              VAR007   ETHNICITY 1=SPN 2=NGR 3=CAU 4=OTH
         WITH VAR010   WORD ANALYSIS 77
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
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SOURCE OF VARIATION			SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS			2487,105	6	414,518	10,851	0.000
VAR004			49,164	1	49,164	1,261	0.257
XEDY			2066,427	1	2066,427	54.095	0.000
VAR006			0,046	1	0,046	0.001	0.972
VAR007			162,881	3	54,294	1.421	0.243
COVARIATES			552,323	1	552,323	14,459	0.000
VAR010			552,323	1	552,323	14,459	0.000
2-WAY INTERACTIONS			209,322	11	18,938	0.496	0.900
VAR004	XEDY		0,850	1	0,850	0.023	0.881
VAR004	VAR006		24,353	1	24,353	0.638	0.427
VAR004	VAR007		46,679	2	23,339	0,611	0.545
XEDY	VAR006		65,733	1	65,733	1,721	0,194
XEDY	VAR007		9,296	3	3,099	0,081	0.970
VAR006	VAR007		45,231	3	15,077	0,395	0.757
3-WAY INTERACTIONS			171,553	5	34,312	0,898	0.487
VAR004	XEDY	VAR006	105,647	1	105,647	2.766	0,100
VAR004	XEDY	VAR007	2,665	2	1,332	0,035	0,966
VAR004	VAR006	VAR007	0,205	1	0,205	0.005	0.942
XEDY	VAR006	VAR007	4,792	1	4,792	0.125	0.724
EXPLAINED			3419,310	23	148,666	3,892	0.000
RESIDUAL			2903,194	76	38,200		
TOTAL			6322,504	99	63,864		

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    118 CASES WERE PROCESSED.
     18 CASES ( 15,3 PCT) WERE MISSING.
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F.1: FOUR-WAY ANALYSIS OF COVARIANCE FOR SECOND GRADE PUPILS

4-WAY ANCOVAS PFL DATA NEW COVARIABLES MODEL 2
GRADE 2 ANOVAS . . POSTSCORES
FILE POV4 (CREATION DATE = 01/25/79)

* * * * * * * * * * A N A L Y S I S O F V A R I A N C E * * * * * * * * * *

VAR011 READING COMP 78
BY VAR004 TREATMENT 1=CONC,2=SAT
XEDY EDY STATUS .. 1=YES 2=NO
VAR006 GENDER 1=BOY, 2=GIRL
VAR007 ETHNICITY 1=SPN 2=NGR 3=CAU 4=OTH
WITH XLEADER TYPICAL RULE-GROUP LEADER
STIMIDL TOTAL MINUTES PUPIL IDLE
VAR012 TOTAL READING 77

* *

SOURCE OF VARIATION			SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS			4867.043	6	811.174	15.456	0.000
VAR004			50.299	1	50.299	0.958	0.331
XEDY			3767.859	1	3767.859	71.791	0.000
VAR006			68.001	1	68.001	1.296	0.258
VAR007			336.047	3	112.016	2.134	0.103
COVARIATES			1078.305	3	359.435	6.849	0.000
XLEADER			128.925	1	128.925	2.456	0.121
STIMIDL			57.746	1	57.746	1.100	0.297
VAR012			669.852	1	669.852	12.763	0.001
2-WAY INTERACTIONS			945.527	11	85.957	1.638	0.105
VAR004	XEDY		1.291	1	1.291	0.025	0.876
VAR004	VAR006		81.595	1	81.595	1.555	0.216
VAR004	VAR007		143.057	2	71.528	1.363	0.262
XEDY	VAR006		13.791	1	13.791	0.263	0.610
XEDY	VAR007		104.693	3	34.898	0.665	0.576
VAR006	VAR007		323.875	3	107.958	2.057	0.113
3-WAY INTERACTIONS			199.234	5	39.847	0.759	0.582
VAR004	XEDY	VAR006	14.740	1	14.740	0.281	0.598
VAR004	XEDY	VAR007	110.649	2	55.324	1.054	0.353
VAR004	VAR006	VAR007	1.273	1	1.273	0.024	0.877
XEDY	VAR006	VAR007	7.679	1	7.679	0.146	0.703
EXPLAINED			7090.109	25	283.604	5.404	0.000
RESIDUAL			4041.230	77	52.484		
TOTAL			11131.340	102	109.131		

119 CASES WERE PROCESSED.
15 CASES (12.7 PCT) WERE MISSING.

```
4-WAY ANCOVAS PRE DATA ONLY COVARIABLES MODEL 2
 GRADE 2 ANOVAS , , POSTSCORES
FILE   PDVA      (CREATION DATE = 01/25/79)

* * * * * * * * * * A N A L Y S I S   O F   V A R I A N C E * * * * * * * * * *
                VAR015    TOTAL READING 78
             BY VAR004    TREATMENT 1=CONC,2=SAT
                XEDY      EDY STATUS ,, 1=YES 2=NO
                VAR006    GENDER 1=BOY, 2=GIRL
                VAR007    ETHNICITY 1=SPN 2=NGR 3=CAU 4=OTH
             WITH XUSEDY  AVERAGE USE OF EDY MATERIALS
                XLEADER   TYPICAL SMALL-GROUP LEADER
                VAR012    TOTAL READING 77
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
```

SOURCE OF VARIATION			SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS			4112,836	5	822,567	18,614	0,000
VAR004			13,278	1	13,278	0,301	0,585
XEDY			3312,611	1	3312,611	75,107	0,000
VAR006			49,084	1	49,084	1,113	0,300
VAR007			245,569	3	81,856	1,856	0,144
COVARIATES			836,273	3	278,758	6,318	0,000
XUSEDY			15,400	1	15,400	0,349	0,557
XLEADER			155,095	1	155,095	3,516	0,065
VAR012			559,240	1	559,240	12,678	0,001
2-WAY INTERACTIONS			779,738	11	70,885	1,607	0,114
VAR004	XEDY		0,556	1	0,556	0,013	0,911
VAR004	VAR006		60,403	1	60,403	1,369	0,246
VAR004	VAR007		113,065	2	56,533	1,281	0,284
XEDY	VAR006		1,942	1	1,942	0,044	0,834
XEDY	VAR007		66,944	3	22,282	0,505	0,680
VAR006	VAR007		388,574	3	129,525	2,936	0,037
3-WAY INTERACTIONS			416,960	5	83,392	1,890	0,107
VAR004	XEDY	VAR006	33,407	1	33,407	0,757	0,387
VAR004	XEDY	VAR007	157,733	2	78,867	1,787	0,175
VAR004	VAR006	VAR007	2,272	1	2,272	0,051	0,821
XEDY	VAR006	VAR007	41,023	1	41,023	0,930	0,339
EXPLAINED			6194,836	25	247,793	5,618	0,000
RESIDUAL			3402,254	77	44,185		
TOTAL			9597,090	102	94,089		

```
  118 CASES WERE PROCESSED.
   15 CASES ( 12,7 PCT) WERE MISSING.
```

APPENDIX G: DIFFERENCE SCORE ANALYSIS FOR SECOND GRADE PUPILS

G.1 WORD KNOWLEDGE

G.2 WORD ANALYSIS

G.3 TOTAL READING

G.1 DIFFERNCE SCORE ANALYSIS FOR SECOND GRADE PUPILS

4-WAY ANCOVAS ON PUPIL DIFFERENCE SCORES
GRADE 2 PUPIL DATA
FILE PDV4 (CREATION DATE = 01/25/79)

* * * * * * * * * * A N A L Y S I S O F V A R I A N C E * * * * * * * * * *

DVK
BY VAR004 TREATMENT 1=CONC,2=SAT
XEDY EDY STATUS .. 1=YES 2=NO
VAR005 GENDER 1=BOY, 2=GIRL
VAR007 ETHNICITY 1=SPN 2=NGR 3=CAU 4=OTH
WITH STIMIN TOTAL MINUTES NONINSTR TIME
VAR012 TOTAL READING 77.

* *

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS	731,093	6	125,181	1,954	0,082
VAR004	6,031	1	6,031	0,094	0,760
XEDY	562,563	1	562,563	8,780	0,004
VAR005	38,377	1	38,377	0,599	0,441
VAR007	194,661	3	64,887	1,013	0,391
COVARIATES	1477,275	2	738,988	11,537	0,000
STIMIN	323,205	1	323,205	5,046	0,027
VAR012	1002,816	1	1002,816	15,660	0,000
2-WAY INTERACTIONS	847,615	11	77,056	1,203	0,294
VAR004 XEDY	140,095	1	140,095	2,188	0,143
VAR004 VAR005	13,520	1	13,520	0,211	0,647
VAR004 VAR007	169,805	2	84,903	1,325	0,271
XEDY VAR005	88,465	1	88,465	1,381	0,243
XEDY VAR007	165,245	3	55,082	0,860	0,466
VAR005 VAR007	231,773	3	77,258	1,206	0,313
3-WAY INTERACTIONS	1323,010	5	264,602	4,130	0,002
VAR004 XEDY VAR005	201,857	1	201,857	3,150	0,080
VAR004 XEDY VAR007	212,018	2	106,009	1,655	0,197
VAR004 VAR005 VAR007	222,258	1	222,258	3,469	0,066
XEDY VAR005 VAR007	580,676	1	580,676	9,062	0,003
EXPLAINED	4399,698	24	183,320	2,861	0,000
RESIDUAL	5318,377	83	64,077		
TOTAL	9718,074	107	90,823		

118 CASES WERE PROCESSED.
10 CASES (8,5 PCT) WERE MISSING.

G.2 DIFFERENCE SCORE ANALYSIS FOR SECOND GRADE PUPILS

```
4-WAY ANCOVAS ON PUPIL DIFFERENCE SCORES
 GRADE 2 PUPIL DATA
FILE   PDVA      (CREATION DATE = 01/25/79)

* * * * * * * * * * * A N A L Y S I S   O F   V A R I A N C E * * * * * * * * * * *
                DVA
             BY VAR004   TREATMENT 1=CONC,2=SAT
                XEDY     EDY STATUS ..., 1=YES 2=NO
                VAR006   GENDER 1=BOY, 2=GIRL
                VAR007   ETHNICITY 1=SPN 2=NGR 3=CAU 4=OTH
           WITH VAR010   ACRD ANLYSIS 77
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
```

SOURCE OF VARIATION			SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS			183,329	6	30,555	0.800	0.573
VAR004			6,110	1	6,110	0.160	0.690
XEDY			3,553	1	3,553	0.093	0.758
VAR006			11,045	1	11,045	0.289	0.592
VAR007			154,130	3	[illegible]	1.467	0.230
COVARIATES			1675,313	1	1675,313	43.856	0.000
VAR010			1675,313	1	1675,313	43.856	0.000
2-WAY INTERACTIONS			208,321	11	18,938	0.496	0.900
VAR004	XEDY		0,880	1	0,880	0.023	0.881
VAR004	VAR006		24,359	1	24,359	0.638	0.427
VAR004	VAR007		46,673	2	23,336	0.611	0.547
XEDY	VAR006		65,733	1	65,733	1.721	0.194
XEDY	VAR007		9,295	3	3,098	0.081	0.970
VAR006	VAR007		45,231	3	15,077	0.395	0.757
3-WAY INTERACTIONS			171,561	5	34,312	0.898	0.487
VAR004	XEDY	VAR006	105,614	1	105,614	2.765	0.100
VAR004	XEDY	VAR007	2,666	2	1,333	0.035	0.966
VAR004	VAR006	VAR007	0,206	1	0,206	0.005	0.942
XEDY	VAR006	VAR007	4,793	1	4,793	0.125	0.724
EXPLAINED			2238,524	23	97,327	2.548	0.001
RESIDUAL			2903,231	76	38,200		
TOTAL			5141,758	99	51,937		

```
119 CASES WERE PROCESSED.
 19 CASES ( 16.0 PCT) WERE MISSING.
```

G.3 DIFFERENCE SCORE ANALYSIS FOR SECOND GRADE PUPILS

```
3-WAY ANCOVAS ON PUPIL DIFFERENCE SCORES
GRADE 2 PUPIL DATA
FILE  PDVA      (CREATION DATE = 01/25/7?)

* * * * * * * * * * * A N A L Y S I S   O F   V A R I A N C E * * * * * * * * * * *
               DTOT?
          BY   VAR004   TREATMENT 1=CDNC 2=SAT
               XEDY     ESY STATUS .. 1=YES 2=NO
               VAR006   GENDER 1=BOY, 2=GIRL
               VAR007   ETHNICITY 1=SPN 2=NGR 3=CAU 4=OTH
        WITH   VAR012   TOTAL READING 77
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
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SOURCE OF VARIATION			SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS			237,219	5	39,536	0.8[illegible]	0.503
VAR004			30,599	1	30,599	0,6[illegible]	0,407
XEDY			31,472	1	31,472	1.[illegible]	0.17[illegible]
VAR006			29,026	1	29,026	0.6[illegible]	0,42[illegible]
VAR007			140,409	3	46,936	1.06[illegible]	0.37[illegible]
COVARIATES			1317,747	1	1317,747	29.93[illegible]	0,000
VAR012			1317,747	1	1317,747	29.93[illegible]	0.000
2-WAY INTERACTIONS			809,712	11	73,610	1.66[illegible]	0,09[illegible]
VAR004	XEDY		0,135	1	0,196	0.00[illegible]	0.9[illegible]
VAR004	VAR006		39,974	1	39,974	0.90[illegible]	0,345
VAR004	VAR007		135,342	2	67,671	1.53[illegible]	0,222
XEDY	VAR006		0,015	1	0,015	0.00[illegible]	0.9[illegible]
XEDY	VAR007		54,[illegible]	3	18,170	0.412	0.745
VAR006	VAR007		458,443	3	152,914	3.46[illegible]	0,020
3-WAY INTERACTIONS			462,725	5	92,545	2.0[illegible]	0,07[illegible]
VAR004	XEDY	VAR006	24,401	1	24,401	0.553	0,45[illegible]
VAR004	XEDY	VAR007	175,202	2	87,601	1.98[illegible]	0,14[illegible]
VAR004	VAR006	VAR007	4,373	1	4,373	0,09[illegible]	0,75[illegible]
XEDY	VAR006	VAR007	51,555	1	51,565	1.3[illegible]	0.241
EXPLAINED			2827,404	23	122,931	2.7[illegible]	0.000
RESIDUAL			3532,997	80	44,162		
TOTAL			6360,402	103	61,751		

```
   118 CASES WERE PROCESSED.
    14 CASES ( 11,? PCT) WERE MISSING.
```

APPENDIX H: FOUR-WAY ANALYSIS OF COVARIANCE FOR FOURTH GRADE PUPILS

H.1 WORD KNOWLEDGE - 1978

H.2 READING COMPREHENSION - 1978

H.3 TOTAL READING - 1978

H.1 FOUR-WAY ANALYSIS OF COVARIANCE FOR FOURTH GRADE PUPILS

4-WAY ANCOVAS POL DATA NEW COVARIABLES MODEL 2
GRADE 4 ANOVAS.. POSTSCORES
FILE POV4 (CREATION DATE = 01/25/79)

* * * * * * * * * * A N A L Y S I S O F V A R I A N C E * * * * * * * * * *

VAR013 AGRD KNOWLDGE 78
BY VAR004 TREATMENT 1=CONC,2=SAT
XEDY EDY STATUS .. 1=YES 2=NO
VAR005 GENDER 1=BOY, 2=GIRL
VAR007 ETHNICITY 1=SPN 2=NGR 3=CAU 4=OTH
WITH XDIFMATL AVERAGE USE OF DIFFERENT MATLS
VAR003 AGRD KNOWLDGE 77

* *

SOURCE OF VARIATION			SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS			7059,838	5	1176,650	23,456	0,000
VAR004			395,752	1	395,752	7,890	0,006
XEDY			6408,152	1	6408,152	127,800	0,0
VAR006			1,332	1	1,332	0,027	0,871
VAR007			193,479	3	64,493	1,286	0,286
COVARIATES			852,593	2	426,296	8,500	0,000
XDIFMATL			214,145	1	214,145	4,270	0,042
VAR009			537,099	1	537,099	10,710	0,002
2-WAY INTERACTIONS			1101,395	12	91,783	1,830	0,060
VAR004	XEDY		36,385	1	36,385	0,726	0,397
VAR004	VAR006		66,121	1	66,121	1,320	0,256
VAR004	VAR007		49,811	3	16,604	0,331	0,803
XEDY	VAR006		28,909	1	28,909	0,576	0,451
XEDY	VAR007		293,534	3	97,845	1,951	0,123
VAR006	VAR007		315,604	3	105,201	2,100	0,101
3-WAY INTERACTIONS			840,613	7	120,088	2,397	0,030
VAR004	XEDY	VAR006	4,441	1	4,441	0,089	0,767
VAR004	XEDY	VAR007	476,135	2	238,068	4,751	0,012
VAR004	VAR006	VAR007	12,081	2	6,040	0,121	0,887
XEDY	VAR006	VAR007	250,651	2	125,325	2,501	0,089
4-WAY INTERACTIONS			46,531	1	46,531	0,929	0,339
VAR004	XEDY	VAR006	46,531	1	46,531	0,929	0,339
	VAR007						
EXPLAINED			9901,035	28	353,609	7,058	0,000
RESIDUAL			3456,973	69	50,101		
TOTAL			13358,008	97	137,711		

102 CASES WERE PROCESSED.
4 CASES (3,9 PCT) WERE MISSING.

H.2 FOUR-WAY ANALYSIS OF COVARIANCE FOR FOURTH GRADE PUPILS

4-WAY ANCOVAS PPL DATA NEW COVARIABLES MODEL 2
GRADE 4 ANCOVAS.. POSTSCORES
FILE PDV4 (CREATION DATE = 01/25/79)

* * * * * * * * * * A N A L Y S I S O F V A R I A N C E * * * * * * * * * *

	VAR011	READING COMP 78
BY	VAR004	TREATMENT 1=CONC, 2=SAT
	XEDY	EDY STATUS .. 1=YES 2=NO
	VAR006	GENDER 2=BOY, 2=GIRL
	VAR007	ETHNICITY 1=SPN 2=NGR 3=CAU 4=OTH
WITH	VDIFMATL	VARIABILITY IN USE OF DIFF MATLS
	STIMNIN	TOTAL MINUTES NONINSTR TIME
	VAR012	TOTAL READING 77

* *

SOURCE OF VARIATION			SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS			7386.213	6	1314.469	15.948	0.000
VAR004			222.924	1	222.924	2.705	0.105
XEDY			7351.535	1	7351.535	89.321	0.0
VAR006			5.504	1	5.504	0.067	0.797
VAR007			166.025	3	55.342	0.671	0.573
COVARIATES			1638.410	3	546.137	6.627	0.001
VDIFMATL			129.253	1	129.253	1.568	0.215
STIMNIN			506.339	1	506.339	6.144	0.016
VAR012			1157.120	1	1157.120	14.040	0.000
2-WAY INTERACTIONS			992.672	12	82.723	1.004	0.454
VAR004	XEDY		3.586	1	3.536	0.044	0.835
VAR004	VAR006		29.774	1	29.774	0.361	0.550
VAR004	VAR007		147.460	3	49.153	0.596	0.620
XEDY	VAR006		3.580	1	3.580	0.043	0.836
XEDY	VAR007		590.250	3	196.750	2.387	0.077
VAR006	VAR007		95.132	3	31.711	0.385	0.764
3-WAY INTERACTIONS			533.367	7	76.195	0.925	0.494
VAR004	XEDY	VAR006	0.556	1	0.556	0.009	[illegible]
VAR004	XEDY	VAR007	132.294	2	65.147	0.803	0.453
VAR004	VAR006	VAR007	258.703	2	129.351	1.569	0.216
XEDY	VAR006	VAR007	8.175	2	4.088	0.050	0.952
4-WAY INTERACTIONS			219.012	1	219.012	2.645	0.109
VAR004	XEDY	VAR006	218.011	1	218.011	2.645	0.107
	VAR007						
EXPLAINED			11269.273	29	338.595	4.715	0.000
RESIDUAL			5274.641	64	82.416		
TOTAL			16543.914	93	177.892		

H.3 FOUR-WAY ANALYSIS OF COVARIANCE FOR FOURTH GRADE PUPILS

```
4-WAY ANCOVAS PFL DATA  NEW COVARIABLES MODEL 2
GRADE 4 ANOVAS., POSTSCORES
FILE  PDV4      (CREATION DATE = 01/25/79)

* * * * * * * * * * * A N A L Y S I S   O F   V A R I A N C E * * * * * * * * * * *
              VAR015    TOTAL READING 78
           BY VAR003    TREATMENT 1=CONC,2=SAT
              XEDY      EDY STATUS    1=YES 2=NO
              VAR006    GENDER 1=BOY, 2=GIRL
              VAR007    ETHNICITY 1=SPN 2=NGR 3=CAU 4=OTH
         WITH VDIFMATL  VARIABILITY IN USE OF DIFF MATLS
              VAR012    TOTAL READING 77
              STIMNIN   TOTAL MINUTES NONINSTR TIME
              XNROLES   MEAN NO OF ROLES CODED
              XUSEDY    AVERAGE USE OF EDY MATERIALS
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
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SOURCE OF VARIATION			SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS			7800.683	5	1300.115	30.907	0.000
VAR004			305.942	1	305.942	7.273	0.009
XEDY			7238.063	1	7233.063	172.066	0.0
VAR006			10.875	1	10.875	0.259	0.613
VAR007			190.729	3	63.576	1.511	0.221
COVARIATES			1887.922	5	377.584	8.976	0.000
VDIFMATL			117.201	1	117.201	2.786	0.100
VAR012			1372.694	1	1372.693	32.632	0.000
STIMNIN			454.772	1	454.772	10.811	0.002
XNROLES			200.881	1	200.881	4.775	0.033
XUSEDY			51.988	1	51.988	1.236	0.271
2-WAY INTERACTIONS			816.992	12	68.083	1.619	0.110
VAR004	XEDY		18.381	1	18.381	0.437	0.511
VAR004	VAR006		10.502	1	10.502	0.250	0.619
VAR004	VAR007		34.095	3	11.365	0.270	0.847
XEDY	VAR006		0.320	1	0.320	0.008	0.931
XEDY	VAR007		478.775	3	159.592	3.794	0.015
VAR006	VAR007		77.743	3	25.914	0.616	0.607
3-WAY INTERACTIONS			347.750	7	49.679	1.181	0.327
VAR004	XEDY	VAR006	0.647	1	0.647	0.015	0.902
VAR004	XEDY	VAR007	201.725	2	100.863	2.398	0.099
VAR004	VAR006	VAR007	35.850	2	17.925	0.426	0.655
XEDY	VAR006	VAR007	38.551	2	19.275	0.458	0.635
4-WAY INTERACTIONS			45.932	1	45.932	1.090	0.301
VAR004	XEDY	VAR006	45.929	1	45.929	1.092	0.301
	VAR007						
EXPLAINED			10899.134	31	351.586	8.358	0.000
RESIDUAL			2566.008	61	42.066		
TOTAL			13465.191	92	146.361		

APPENDIX I: DIFFERENCE SCORE ANALYSIS

I.1 WORD KNOWLEDGE

I.2 TOTAL READING

I.1 DIFFERNCE SCORE ANALYSIS

4-WAY ANCOVAS ON PUPIL DIFFERENCE SCORES
GRADE 4 PUPIL DATA
FILE DOVA (CREATION DATE = 01/25/79)

* * * * * * * * * * * A N A L Y S I S O F V A R I A N C E * * * * * * * * * * *

DSX
BY VAR004 TREATMENT 1=CONC,2=SAT
XEDY [illegible] STATUS 1=YES 2=NO
VAR006 GENDER 1=BOY, 2=GIRL
VAR007 ETHNICITY 1=SPN 2=NGR 3=CAU 4=OTH
WITH XUSEDY AVERAGE USE OF EDY MATERIALS

* *

SOURCE OF VARIATION				SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS				510,009	6	85,001	1.361	[illegible]
	VAR004			[illegible]	1	[illegible]	[illegible]	[illegible]
	XEDY			56,249	1	56,249	0.901	0.346
	VAR006			30,303	1	30,303	0.485	0.489
	VAR007			333.240	3	111,080	1.77[illegible]	0.15[illegible]
COVARIATES				98,102	1	98,102	1.573	0.221
	XUSEDY			98,102	1	98,102	1.573	0.221
2-WAY INTERACTIONS				1300,452	12	108,304	1.734	0.07[illegible]
	VAR004	XEDY		123,795	1	123,795	1.982	0.16[illegible]
	VAR004	VAR006		22,125	1	22,125	0.354	0.554
	VAR004	VAR007		7[illegible],673	3	2[illegible],22[illegible]	0.420	[illegible]
	XEDY	VAR006		37,66[illegible]	1	37,66[illegible]	0.603	0.440
	XEDY	VAR007		327,480	3	109,327	1.75[illegible]	0.163
	VAR006	VAR007		380,277	3	126,766	2.030	0.118
3-WAY INTERACTIONS				913,041	7	130,434	2.08[illegible]	0.056
	VAR004	XEDY	VAR006	33,351	1	33,351	0.534	0.467
	VAR004	XEDY	VAR007	275,069	2	137,534	2.202	0.118
	VAR004	VAR006	VAR007	40,613	2	20,307	0.325	0.723
	XEDY	VAR006	VAR007	321,29[illegible]	2	160,647	2.572	0.08[illegible]
4-WAY INTERACTIONS				32,052	1	32,052	0.513	0.47[illegible]
	VAR004	XEDY VAR007	VAR006	32,052	1	32,052	0.513	0.47[illegible]
EXPLAINED				2857,055	27	105,817	1.694	0.041
RESIDUAL				4371,379	70	62,448		
TOTAL				7228,434	97	74,520		

102 CASES WERE PROCESSED.
4 CASES (3.9 PCT) WERE MISSING.

GRADE 4 PUPIL DATA
FILE POVA (CREATION DATE = 01/23/79)

* * * * * * * * * A N A L Y S I S O F V A R I A N C E * * * * * * * * * *

DEPTEP
BY VAR004 TREATMENT 1=CONC,2=SAT
XEDY EDY STATUS 80 1=YES 2=NO
VAR005 GENDER 2=BOY, 1=GIRL
VAR007 ETHNICITY 1=SPN 2=NGR 3=CAU 4=OTH
WITH STIMNIN TOTAL MINUTES NONINSTR TIME
XNROLES MEAN NO OF ROLES CODED
XUSEDY AVERAGE USE OF EDY MATERIALS
VDIFMATL VARIABILITY IN USE OF DIFF MATLS
VAR012 TOTAL READING 77

* *

SOURCE OF VARIATION				SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS				338,339	6	54,723	1,530	0,181
	VAR004			39,753	1	39,763	0.945	0.337
	XEDY			63,755	1	63,756	1,501	0.163
	VAR005			60,433	1	60,438	1.438	0,235
	VAR007			207,650	3	69,217	1,645	0,185
COVARIATES				1400,055	5	280,011	6,312	0,000
	STIMNIN			454.773	1	454,773	10.811	0,002
	XNROLES			200.832	1	200,832	4.774	0,033
	XUSEDY			51.988	1	51,988	1.236	0.271
	VDIFMATL			117,203	1	117,203	2.786	0,102
	VAR012			674,376	1	674,376	16,032	0,000
2-WAY INTERACTIONS				816.938	12	68.083	1.619	0,110
	VAR004	XEDY		18,381	1	18,381	0.437	0.511
	VAR004	VAR005		10.503	1	10,503	0,250	0,619
	VAR004	VAR007		34.096	3	11,365	0,270	0.847
	XEDY	VAR005		0.320	1	0,320	0.008	0.931
	XEDY	VAR007		478,793	3	159,598	3,794	0,015
	VAR005	VAR007		77,741	3	25,914	0.616	0.607
3-WAY INTERACTIONS				347,749	7	49,678	1,181	0.327
	VAR004	XEDY	VAR005	0,647	1	0,647	0.015	0.902
	VAR004	XEDY	VAR007	201.722	2	100,861	2.398	0,098
	VAR004	VAR005	VAR007	35,450	2	17,725	0.421	0.658
	XEDY	VAR005	VAR007	38,545	2	19,273	0.458	0.635
4-WAY INTERACTIONS				45.825	1	45,826	1.089	0.301
	VAR004	XEDY VAR007	VAR005	45.827	1	45.827	1.089	0.301
EXPLAINED				3058,959	31	98,676	2,346	0,002
RESIDUAL				2565.993	61	42,065		
TOTAL				5624,953	92	61,141		