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I am submitting herewith a dissertation written by Doris Scott Crawford entitled "Analyses of Verbal and Nonverbal Behaviors of Teachers Teaching Reading." I recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Education, with a major in Educational Administration and Supervision.

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ANALYSES OF VERBAL AND NONVERBAL BEHAVIORS
OF TEACHERS TEACHING READING

A Dissertation
Presented for the
Doctor of Education
Degree
The University of Tennessee, Knoxville

Doris Scott Crawford
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DEDICATION

This study is dedicated posthumously to my mother, Gladys Berryman Scott, and to my grandmother, Alice Carrington Scott. Their precepts and examples provided inspiration and cultivated in me the will to achieve. This study is also dedicated to all who hold the memories of Gladys and Alice dear and strive to make real the dreams they had for their children and grandchildren.

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ABSTRACT

The purpose of this study was to determine and describe what, if any, teacher behavior changes occurred during the course of a Special Emphasis Reading Project involving grades 1-6. Secondary concerns of the study were race and sex as variables influencing teacher behaviors and the comparability of results of this study with similar studies conducted at The University of Tennessee, Knoxville.

Approximately fifteen minutes of videotapes were made of the same five female teachers teaching reading (grades 2-5) in Spring 1977 and Spring 1979. Teachers taught the same grade level at each taping. Data were classified using two observational systems: PIT (for Personal, Institutional, and Task events) and IDER (Indirect, Direct, Encouraging, Restricting). IDER simultaneously collects verbal and nonverbal behaviors. The primary data sources were the 3,017 IDER and the 370 PIT behaviors classified from the pre and post videotaping of the teachers. Ratios to describe interactions and Chi-square to test for significance of changes in frequencies of behaviors were primary analyses. Inter- and intra-rater reliabilities were established above .80 using two computational approaches, the Scott pi coefficient and the percentage method.

This study of teacher behavior identified some patterns of teacher behaviors and behavior change. Significant findings (.05) between pre and post data were: (1) decrease in Restricting nonverbal behaviors, (2) decrease in Direct verbal behaviors, and (3) increase in student talk. There were fewer communication events in the post

analyses and teachers spent more time on each event. Less than 10 percent of IDER behaviors were "silence or confusion" (much was silent reading), and 93 percent of PIT behaviors were "Task." Thus, in the reading project there was a high degree of time on task behavior.

Teacher behaviors to pupils were generally in proportion to the ratio of male/female/black/white pupils in the classes. However, black pupils received a greater frequency of behaviors from all teachers than expected. Teacher communication cues were distributed almost exactly in relation to pupil sex.

In the post-analyses there was more acceptance of student ideas and student response to the teachers, and less teacher direction giving than in the pre-analyses. There was measurable change in classroom climate toward more facilitative and positive interaction as shown by the PIT and IDER observation systems.

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CHAPTER I

INTRODUCTION

For three years (1976-1979) a school system in West Tennessee was involved in a federally funded project with primary emphasis on reading improvement. In late 1975, the (then) United States Office of Education solicited competitive proposals and made awards as a result of a congressional mandate for "Special Emphasis Reading Projects" utilizing reading specialists to provide intensive reading instruction.

Eight school systems were selected nationally for project implementation, operation, and evaluation. Each project included both a treatment and a control school within the same system. Over 50 percent of the students in both schools in grades 3-6 were reading one or more years below grade level at the time of the awards.

Although the primary goal of the project was to evaluate pupil reading gain resulting from intensive reading instruction, the project design also included teacher training. A determination was made that in addition to a program design that would address concerns and questions, strategies should be developed to maximize and continue positive project benefits at the local level. Each teacher in the project was given some training necessary to develop the skills to carry out the program objectives.

I. STATEMENT OF THE PROBLEM

The development of basic literacy skills on the part of elementary pupils in grades 1-6 became a congressionally mandated

national goal in 1976. Reading ability, already a national concern, became a legislative consideration when specific U.S. Office of Education estimates of pupil reading abilities were reported. It was estimated that 50 percent of pupils in urban schools has reading problems; that 10 million elementary and secondary students have severe reading deficiencies and that at least half of the unemployed youth in our cities cannot read. Congress passed and funded the National Reading Improvement Program under Title VII of the Educational Amendments of 1974.

The question of what constitutes an effective in-school reading program was primary to the implementation strategies for the congressionally mandated reading initiatives. Committees made up of school administrators, classroom teachers, reading specialists, and consultants were regularly in meetings to draw up standards to guide the development of new reading programs. Studies were conducted to identify factors that contributed most strongly to achievement growth in reading. An important finding was that schools which demonstrated a high level of reading achievement had a staff with high expectations for their students. Teachers in these schools were found to tend to believe that all of their students could master basic reading skills and if the students did not, the teacher, not the students or parents, should assume the responsibility (Weber, 1971; Brookover and Lezotte, 1977). Another study found adaptability of instruction to student need to be a key factor in pupil reading achievement (Venezky and Winfield, 1979). Congressional testimony prior to the passage of Title VII stipulated that the use of reading specialists in elementary schools would bring about a preventive aspect to reading problems.

Studies and questions about pupil achievement, regardless of skill or content area, direct attention to the centrality of the teacher in the classroom and teacher/pupil interaction. Classroom interaction research has focused on the impact of teacher expectations and on the extent to which teacher communication cues are supportive of individual pupil needs. Increased attention has been given to the analysis of interaction between teacher and student in recent years. Based upon the widely held assumption that teacher behaviors set the climate for learning, the need for increased teacher awareness of the nature and result of his/her behavior cues is being repeatedly emphasized. It would therefore follow that analyzing behaviors of teachers engaged in a federally funded Right to Read Project, over a twenty-six month period, would provide additional insights into teacher-learning systems in general and teacher behavior/pupil reading achievement in particular.

II. CONTEXT OF STUDY

The Shelby County, Tennessee, school system was one of eight throughout the United States funded to participate in a congressionally mandated reading instruction experiment. The project was funded under Part D (Special Emphasis Projects) of the National Reading Improvement Act, and was commonly referred to as a Right to Read "Special Emphasis Project." A national evaluator was selected by the U.S. Office of Education. The major purpose of the national evaluation was to make comparisons of reading growth among the eight projects. Data for the national evaluation were obtained, using pretest and posttest reading growth as measured by the Stanford

Diagnostic Test. The diagnostic instrument used was not among those previously administered by Shelby County School System. Project administrators readily recognized the potential value of such an evaluation to national policymakers, but were also concerned that evaluations be performed from a local standpoint to determine the project impact for students, teachers, and local policymakers. The local system built their evaluation around the regular testing program and data routinely gathered, rather than from "special" testing.

Several evaluations have been done, using normally collected school data, which document substantial improvement in pupil reading scores over the three-year period. At the time that the Shelby County "Special Emphasis Project" began, the treatment school was participating in an ESEA, Title I Reading Program. For ten years the school had participated in programs that required students to attend special reading instruction classes outside of their regular classrooms. In 1976, the school still had more than 70 percent of the students reading one or more years below grade level. Data normally collected by the school system indicated a gain of about twenty percentage points after a year and a half of "Special Emphasis Project" operation which utilized an intensive in-classroom reading instruction approach. Specifically, in 1975 for grades 3-8, 75 percent of the students were reading one or more years below grade level. By 1978 and 1979 the percentages of readers below grade level were 56 and 58, respectively. Also in 1975, grades 3-6 had 72 percent of students reading below grade level. For 1978 and 1979 the percentages were 46 and 53 percent, respectively. In 1975 the mean IQ for third graders in the treatment school was 85, which was approximately two standard deviations below

the mean IQ of the total school system. In 1978 the mean IQ score increased to 87 and in 1979 to 98, suggesting a significant gain. The data which support these evaluative statements also reinforce the generally held assumption of the positive correlation of IQ and reading scores (Smedley, 1979; Achilles, et al., 1980).

Along with the evaluations of student progress (based on test-score gain), it seemed appropriate to conduct a structured study of regular classroom teachers' behaviors to determine what, if any, changes there were in teacher behavior. This dissertation presents the result of the teacher behavior study.

The Barret's Chapel School in Shelby County was designated the treatment school for the project. In March, 1977 when the project began formal operation, videotapes were made of twelve teachers showing fifteen minutes of teacher behavior for each teacher during reading instruction. In May, 1979, videotapes were made of six of the twelve teachers who were teaching the same grades as in 1977. The 1979 tapes also show approximately fifteen minutes of teaching behavior for each teacher during reading instruction. In the time between 1977 and 1979, each teacher had formal in-service training in reading, or worked intensively with reading specialists in the teaching of reading--a type of in-service.

III. PURPOSE AND QUESTIONS

The purpose of this study is to determine whether, during the course of the "Special Emphasis Project," the teachers changed their behaviors in the teaching of reading as measured by analyses of their verbal and nonverbal behavior patterns. Pupil gain in reading scores

during the project exceeded chance. These results appear in reports of the analysis of pupil gains (Achilles, et al., 1980; Smedley, 1979).

Questions addressed by this study are:

1. Did change in teacher behavior occur during an experimental reading project which produced pupil reading score gains?

2. If teacher behaviors did change, how can these changes be described?

3. How do teacher/pupil race and sex impact on classroom interaction in this study?

4. How do results of this study compare to previous studies using the two observational techniques that were also employed in this study?

5. Are there any patterns of teacher/pupil interactions that can be identified, classified, and described?

IV. IMPORTANCE OF THE STUDY

Many educators are now aware of recent research in classroom interaction. During the early sixties, interest in nonverbal communication in the educational process emerged to parallel the already existing studies of teacher/student verbal interactions.

During the decade of the sixties it became "apparent that the separation of verbal and nonverbal communication for purposes of theory building and research was unrealistic as these facets of human communication are interrelated in educational and personal interactions" (Achilles and French, 1977, p. 2). Subsequent studies have been done addressing the multidimensionality of teacher-student communication. Previous studies at The University of Tennessee,

Knoxville, have explored teacher-pupil nonverbal and verbal communication using the IDER System of observation and analysis. Some studies, in order of their occurrence, addressed the following issues or questions:

1. Are sex differences in teacher-student interaction as manifest in verbal and nonverbal behavior based on teacher-student sex sameness or opposites (Cosper, 1970)?

2. Do differences in teacher communication cues, nonverbal behavior in particular, seem to follow socio-economic level lines? Are there patterns of discrimination toward students in three social classes (upper, middle, and lower) (Shepard, 1971)?

3. Do teachers who teach elementary or secondary students during the day and Adult Basic Education students at night communicate with adults and children in the same way, or do they change teaching styles with different groups (Fowler, 1972)?

4. Are there differences in verbal and nonverbal behaviors of teachers toward adjudicated delinquents with major variables being teacher and pupil race and sex (Crump, 1974)?

5. How similar are the perceptions of a black and a white female observer with respect to verbal and nonverbal communications of black and white male and female teachers (London, 1975)?

6. When verbal and nonverbal behaviors of teachers toward educable mentally-retarded (EMR) children were analyzed, was there any systematic positive or negative discrimination toward the EMR student (Fullerton, 1978)?

These studies have, according to the areas of particular interest, added to the body of information regarding communication

behaviors in education. However, each of these studies focused on behaviors which spanned a short period of time. None of the studies used pre-post data sources or sought to determine if changes in teaching behaviors occurred concomitantly with measured changes in student progress.

V. PROCEDURES

This inquiry was conducted as a field study using an ex post facto design. The population for the study consisted of five teachers in the Shelby County, Tennessee, School System for whom complete and usable data were available. Two videotapes of approximately fifteen minutes in length were made of each teacher while that teacher was teaching reading. The two videotapes of each were made twenty-six months apart.

Each teacher had remained a participant in the "Special Emphasis Project" during the three years. The teachers were not teaching the same students, but were teaching the same grades and the same subject (reading) when both tapes were made.

The instruments used to gather the data for this study were the videotapes of the teacher, the French and Galloway IDER System of simultaneously categorizing verbal and nonverbal behavior, an IDER Matrix, the PIT (Personal, Institutional, and Task) Model for observing classroom behavior and an instrument designed to record the type and duration of communication events observed.

The French and Galloway (1968) IDER System of behavioral analysis is based upon the Flanders System of Interaction Analysis. The Flanders concept of Indirect and Direct teacher influence was

incorporated into a larger framework ranging from Encouraging to Restricting interaction to describe nonverbal behaviors.

The system matches the ten Flanders verbal categories with appropriate nonverbal dimensions. In using the IDER System, the observer codes the verbal interaction following the ground rules of the Flanders System and adds codes for the nonverbal interaction. The system enables the observer to categorize and record nonverbal behaviors simultaneously with verbal ones (see Figure 1).

PIT is an acronym derived from the first letter of Personal, Institutional, and Task, each a major category of communication events in the model. The model was developed by French (1968) for use in observing classroom behavior.

The PIT Model is based on the concept that four communication events-categories, i.e., personal, institutional, task, and mixed events, comprise the whole of classroom communications. PIT is also sensitive to both verbal and nonverbal communication behaviors. Using the PIT Model, the observer is required to indicate the category and duration of each event. The coding scheme utilizes the symbol "P" to signify personal events, "I" for institutional events, "T" for task events, and "M" for events which cannot be clearly identified. The coding scheme also includes symbols for recording whether the communication event involves the teacher with a single student or with a group of students, and the duration of the event.

In this study the PIT Model was used in combination with the French and Galloway IDER System in an effort to determine the inter-relatedness, if any, of the communication goals, the communication events, and the communication behaviors of the participating teachers.

	VERBAL	NONVERBAL	
TEACHER TALK		ENCOURAGING	RESTRICTING
	1. ACCEPTS FEELINGS	1.	1.
	2. PRAISES OR ENCOURAGES	2. CONGRUENT: nonverbal cues reinforce and further clarify the credibility of a verbal message.	2. INCONGRUENT: contradiction occurs between verbal and nonverbal cues.
	3. ACCEPTS OR USES IDEAS OF STUDENTS	3. IMPLEMENTATION: occurs when the teacher actually uses student's idea either by discussing it, reflecting on it or turning it to the class for consideration.	3. PERFUNCTORY USE: occurs when the teacher merely recognizes student's idea by automatically repeating or restating it.
	4. ASKS QUESTIONS	4. PERSONAL: face-to-face confrontation.	4. IMPERSONAL: avoidance of verbal interchange in which mutual glances are exchanged.
	5. LECTURES	5. RESPONSIVE: change in teacher's pace or direction of talk in response to student behavior, i.e., bored, disinterested, inattentive.	5. UNRESPONSIVE: inability or unwillingness to alter the pace or direction of lecture disregarding pupil cues.
	6. GIVES DIRECTIONS	6. INVOLVE: students are involved in clarification or maintenance of learning tasks.	6. DISMISS: teacher dismisses or controls student behavior.
	7. CRITICIZES OR JUSTIFIES AUTHORITY	7. FIRM: criticisms which evaluate a situation cleanly and crisply and clarify expectations for the situation.	7. HARSH: criticisms which are hostile, severe and often denote aggressive or defensive behavior.
	8. STUDENT TALK (RESPONSES)	8. & 9. RECEPTIVE: involves attitude of listening and interest, facial involvement and eye contact.	8. & 9. INATTENTIVE: involves a lack of attending eye contact and teacher travel or movement.
	9. STUDENT TALK (INITIATION)		
STUDENT TALK	10. SILENCE OR CONFUSION	10. COMFORT: silences characterized by times of reflection, thought or work.	10. DISTRESS: instances of embarrassment or tension-filled moments, usually reflecting disorganization and disorientation.

Figure 1. Summary of Categories for Interaction Analysis Using Nonverbal Categories: The ICER System of Verbal/Nonverbal Categorization.

Reprinted from Inside Classrooms: Studies in Verbal and Nonverbal Communication by Charles M. Achilles and Russell L. French, 1977.

Individualization of instruction and time-on-task are important in the assessment of instruction, and PIT is helpful in looking closely at these two phenomena.

The principal investigator and two other observers coded data from the videotapes according to the IDER System and the PIT Model. Two of the raters, including the principal investigator, are black and one is white. London's (1975) study concluded that interpretations of teacher nonverbal behaviors differ according to the race of the observer.

The raters were trained in the use of the IDER Classification System and in using the PIT Model for observing classroom behavior. Dr. Russell L. French, one of the developers of each system, served as the trainer for the raters. Following the training, inter- and intra-rater consistency (reliability) was established by computing two kinds of reliability coefficients, in accordance with the IDER System of behavior analysis. One computation consists of a Scott (1955) reliability coefficient using the formula:

$$\pi = \frac{P_o - P_e}{1 - P_e}$$

P_o represents the observed percent of agreement between raters coding the same data; P_e represents the acceptable percent agreement. The second computation utilized the percentage method. This formula is:

$$P = \frac{N\text{-Neophyte}}{N\text{-Expert}} \text{ or } \frac{N\text{-Expert}}{N\text{-Neophyte}}$$

This formula was used to measure the percentage of rater agreement in independent ratings between a designated expert rater and each

designated neophyte rater. Intra-rater reliability for the principal investigator, who coded and later recoded the same data for comparison, was computed using both the Scott coefficient and the percentage method. Raters were determined to have been adequately trained in the use of the IDER System when an inter- and intra-rater reliability coefficient of .80 or more was achieved.

The quantification of communication behaviors produces data of at least ordinal level. The Chi-square non-parametric statistic was used in some analyses. Arithmetic computations--means, percents, ratios--were employed to assist in analysis. Collected and coded data were also arranged in charts and tables for ease in interpretation.

VI. ASSUMPTIONS

The following assumptions are basic to this study.

1. Nonverbal teacher behaviors can be identified from video-taped teaching situations.
2. The use of videotaping equipment to collect and store data for coding is appropriate for the study.
3. Raters can be trained to use the IDER System and will be capable of appropriately coding data, and when reliability is established at or above .80, the raters are providing an accurate description of classroom events.
4. Classroom communication events can be analyzed using the PIT Model.
5. The IDER System is appropriate and valid for categorizing teacher behaviors to answer the questions of this study.

6. The number of teaching behaviors identified will be adequate for the purpose of this study.

VII. LIMITATIONS AND DELIMITATIONS

This study is limited and delimited by the following factors:

1. The population for the study is confined to one school located in Shelby County, Tennessee.

2. Reading is the only educational program to be observed for purpose of this study.

3. The use of pre and post videotapes limits the size of the population for the study. All twelve teachers at the school (grades 1-6) were taped in 1977 (pre); only six of twelve remained at the same grade levels in 1979.

4. The data were collected in two approximate fifteen minute periods of time for each teacher.

5. The actual teacher/student organization and structure observed for purposes of this study were determined largely by the school's participation in a national reading improvement research project. There was no random selection of teachers.

6. There was no control group for teacher behaviors observed in the study.

7. Results should not be generalized for several reasons, including lack of control, lack of randomness, and sample/population size.

VIII. DEFINITIONS

For the purposes of this study, the following definitions are provided for consistency and clarity:

1. Behaviors refers to observable and identifiable overt actions, expressions, and statements of teachers.

2. Communication is the sending and receiving of verbal and nonverbal messages. The communication process has four minimum requirements: a sender, a channel (verbal or nonverbal behavior), a message (content), and a receiver.

3. Communication event is a sequence of teacher-pupil communication separated from events (sequences of behavior) before and after by naturally occurring boundaries. According to Galloway (1962) the boundaries are: (1) a variation or change in the direction of a teacher's communicative behavior; (2) a change in the teacher's behavior toward a new interaction; (3) the occurrence of a significant or potent act which appears influential; and (4) social intervention in which an interruption is instigated by either a pupil or the teacher. Communication events are composed of both verbal and non-verbal behaviors by both teachers and pupils.

4. Direct verbal statements are teacher statements that reduce or restrict the freedom of students to respond.

5. Encouraging behaviors are behaviors that set a teacher/student climate which produces further interaction.

6. Indirect verbal statements are teacher statements that increase or enhance the freedom of the students to respond.

7. Institutional events are those sequences of behavior which relate to managing the classroom and meeting the expectations of the institution.

8. Nonverbal behaviors are overt actions, i.e., gestures, postures, positions, and facial expressions by teachers that can be observed.

9. Personal events are events in which personal needs, goals, and emotions of a pupil, a group of pupils, and/or the teacher provide the central focus.

10. PIT Model is a conceptual model for interaction analysis that categorizes classroom interactions as Personal, Institutional, Task, and Mixed Events.

11. Restricting behaviors are those behaviors exhibited by the teacher which limit further interaction.

12. Task events are events focused on the teaching and learning of subject matter content whether cognitive, affective, or skill-oriented.

13. Verbal behaviors are the overt statements of teachers that can be categorized as Direct or Indirect.

IX. ORGANIZATION OF THE STUDY

Chapter I provides a statement of the problem, the context of the study and discusses the purpose of the study, the importance of the study, methods and procedures, assumptions, limitations and delimitations, and definitions of terms essential to the study.

Chapter II presents a review of selected literature pertinent to the

study. Chapter III discusses methodology and procedures. Chapter IV presents the data collected and an analysis of the data. Chapter V includes a summary, findings, conclusions, implications, and discussion of the study.

CHAPTER II

REVIEW OF SELECTED LITERATURE

During the last two decades an increasing amount of research has examined the communicative behavior of teachers and the reciprocal behavior of students they teach. Nevertheless, questions still abound relative to the educational impact of both interpersonal and extra-personal communications in the classroom. Whether the concern is for teacher effectiveness or student achievement, one can hardly argue the synonymical relationship of education to communication.

The primary purpose of this study was to determine if changes in teacher behavior occurred over a twenty-six month period concomitant with documented change in student progress. That is, when an intervention designed to increase pupil reading ability was successful, was there a corresponding change in teacher behavior as measured by the instruments used in this study? In this chapter literature and research approaches and findings are discussed under the headings (1) Communication in the Classroom, (2) Verbal and Nonverbal Teacher Behavior, and (3) Observation and Analysis of Teacher Behavior.

I. COMMUNICATION IN THE CLASSROOM

Postulates that have given rise to current educational research are that "education is communication" (French and Achilles, 1973, p. 5) and "culture is communication" (Hall, 1957, p. 93). These lead to the assumption that the quality of one's life is at least partially dependent upon one's interpretation of what is being communicated to

him/her. To answer the question of what classroom teaching has to do with communication, Smith (1979) proposes consideration of Montagu's statement that "the main purpose of education is to teach the art of communication since the child learns to become human through communication." Smith further expresses the sentiments of Victoria and French that the education process essentially is communication, particularly as it relates to interpersonal communication behaviors. Data supportive of this concept clearly indicate that what teachers do is as important as what they say and that interpersonal relationships are "critical aspects of all learning situations." Smith concludes that the teaching process is an interpersonal flow of communication or information which, when processed, results in decision-making and learning. Because of the centrality of communication in educational practice, many researchers and practitioners advocate the inclusion of interpersonal communication skills in teacher training curricula--pre-service as well as in-service training. While many classroom communication patterns may conform to the "rule of two-thirds, i.e., someone is talking for two-thirds of the total class time, and two-thirds of that talking is done by the teacher," teachers are communicating whether or not they are talking. Messages are transmitted by the teacher's movements, tone of voice, style of dress, use of time and space. The need for teachers to become explicitly aware of all facets of communication in the classroom has been substantiated by research studies that report inadequate teacher awareness of his/her communication behavior in the classroom (Smith, 1979, pp. 632-634).

Communication is always made up of at least four parts: the sender or source, the message, some channel or medium for carrying the

message, and the receiver or destination. The sender may be an individual, an organization, or an object. The message may take any form, i.e., soundwave, gesture, written word, that has meaning to another. The receiver or destination may be an individual alone, an individual as part of a group, or members of a particular large audience, such as newspaper readers.

In order for a communication event to happen, a sequential interplay among three communication parts must take place. First, the sender puts information or feeling into a form that can be transmitted. This is called encoding. From this a message is formed and a signal or channel is employed for transmitting the message. The message reaches its intended destination and is interpreted or decoded by a receiver. The process described does not insure successful communication. The sender may select transmittal signs that are inappropriate to the experience and capacity of the intended receiver. The message may not be decoded in a manner that corresponds to the encoding (DeVito, 1976; Crable, 1979; Anderson, 1972; Huseman, 1976).

Of particular interest to persons concerned with classroom communication is recognition of the need for shared, common, or similar experiences. Schramm (1976) discusses the human communication system from that perspective. He advises that the receiver and the sender must be in tune. When one considers that each person in the communication process is both encoder and decoder, an obvious conclusion is that where there has been no common experience, communication is impossible.

Along with the understanding of feedback in the communication process, the element of capacity is equally important. Schramm states

that a communication system as the one previously described can have maximum capacity for handling information. However, this depends on the separate capacities of each unit. For example, the capacity of the channel (how fast one talks) is directly related to the capacity of the encoder (can students understand directions given quickly). If the coding is appropriate (no unnecessary signals), "the capacity of the channel may be approached, but it can never be exceeded. One can readily see that one of the great skills of communication will lie in knowing how near capacity to operate a channel" (Schramm, 1976, p. 13).

A final element in the communication process described by Schramm is the multi-channeling of messages. In any kind of communication, messages are rarely sent in a single channel. When one speaks, the sound waves from the voice are the primary message. There are also other messages transmitted by facial expressions, gestures, and the relationship of the spoken message to past messages. The primary message conveys information on several levels. There are words to decode, certain words are emphasized above others, and words are presented in a pattern of interaction and timing that further promote decoding and meaning. Further, the quality of the voice (deep, high, thin, loud, soft) carries information about the speaker and about what is being said.

Note that Schramm is discussing both the verbal message and a whole series of attendant cues that, together, constitute the non-verbal message. Thus, messages transmitted in the classroom must be viewed holistically, involving several channels through which many signals flow in parallel from source to destination.

Recent studies and publications on classroom communication have been aimed primarily at determining specific teacher-student interactions that support the goals of education. Studies and resultant books, articles, and presentations have also centered on the outcome of communication style and events where the teacher is the encoder and sender. Some educators view the outcome of teacher-student interaction to be evaluative of teacher input and effectiveness.

Henry (1976) conducted a study to increase "understanding of the direct relationship and the factors which influence reciprocal communication styles of teacher and pupils in the classroom." Utilizing the participant/observer method, attention was given to "how perception and expectation influenced the teacher-pupil communicative processes in the classroom . . . and to the effect on students' academic performance and non-academic related behavior" (Henry, 1976, p. 18). Conclusions drawn from the observations of classroom communications presented in this study are:

1. Teachers made initial subjective assessments of students based on pupil behavior and appearance the first day of school.
2. Teachers communicated their expectations to the students.
3. Teachers have their own preferences of the kind of student they wish to teach.
4. There was inter-class stratification based on teacher expectation and academic performance.
5. Teachers were observed working out a teaching-learning situation that was comfortable for them and gave them optimum satisfaction.

6. The verbally expressive teacher had an advantage in classroom control over the teacher who was not explicit in expectations, and

7. A classroom communication system that allows students the opportunity to articulate their interpretation of what is being transmitted is consistent with the concept of meaningful communication (Henry, 1976, pp. 168-202).

Henry concluded that his study on the modes of communication in the classroom between teachers and students was significant in several ways. It highlighted the differential ways in which teachers communicate with students and the need for educators to "vigorously" examine their classroom communicative systems. It supported current emphasis on identifying, modifying, and developing "viable ways in which teachers can become sensitively tuned into students educational needs" and engage in communication behavior more appropriate to meeting those needs (Henry, 1976, p. 202).

The use of words to transmit messages from teacher to student and from student to teacher has been regarded as the primary mode of classroom communication. Amidon and Hough (1967) recognized that teaching is more than talking. They contended, however, that visits to randomly selected classrooms would confirm the extensive use of verbal talk in the instructional behavior of the teacher. It has been estimated that almost 70 percent of classroom instructional time is spent in verbal behavior by teacher and students.

In a discussion of the teacher as the source-encoder, Hennings (1975) views transmitting verbal messages as an integral part of teaching whether in a traditional teacher-led discussion or in an

individual teacher-student experience. She further explains that the "teacher uses words under a variety of conditions to achieve a variety of pedagogical purposes--to direct, question, answer, explain, encourage--even to tease a bit" (Hennings, 1975, p. 113). Teacher verbal messages often set the limits within which learning takes place.

Summarizing Bellack's concept of classroom language, Hennings describes verbal classroom interaction as having four pedagogical moves: structuring, soliciting, responding, and reacting. Structuring and soliciting are initiatory and involve launching, halting, directing, asking, and telling. Structuring is expressed by statements in which the teacher indicates a topic to be discussed, gives a reason for study, announces regulations and changes to a new topic, procedure, or activity. Soliciting is expressed by teacher statements which ask for an active verbal response from students, a cognitive response indicating attending to something or a physical response.

Responding and reacting are reflective and involve answering, rating, modifying, concurring, and disagreeing. Responding is elicited by and follows solicitations and is seen primarily as a student move. Reacting is expressed by statements made to elaborate on a previous statement and add more information and by statements that indicate an explicit rating of an action (Hennings, 1975, pp. 118-128).

The words used in the preceding discussion of classroom language refer specifically to verbal phenomena or speech and indirectly to the processes and skills of the cognitive domain of learning. Even the casual classroom observer can discern the influence of verbal cues on the cognitive domain and the concerted efforts of teachers to ensure

that "learning" takes place and is measurable using established techniques and tools. The affective learning domain has not received equal attention on behalf of those who teach. Intangibles such as attitudes, beliefs, feelings, and values are influenced by nonverbal cues and research has established the importance of nonverbal elements in classroom communication (French and Achilles, 1973).

A listener to an audiotape recording of classroom communication would miss much of what was "said" by the teacher and the students. Theories have been advanced that social communication among people is anywhere from 65 percent to 93 percent nonverbal. The need for recognition of the nonverbal element in classroom communication has been stressed recently by a number of scholars (Galloway, 1968, 1971, 1972, 1977; French, 1970, 1971, 1973, 1977; Achilles, 1974, 1975, 1977; Grant, 1971, 1977; Hennings, 1977; Koch, 1971; Wilson, 1978; Duke, 1973; and others). It has been determined by Keith (1974) and associates that the nonverbal component of a classroom communication was more important than the verbal component. Galloway (1968), a most outspoken exponent of understanding the realities of nonverbal influence in the classroom, stated that nonverbal cues always influence perceptions. Nonverbal information facilitates understanding of what is being communicated. Students and teachers consider the expressive state of the other as indicative of inner feelings and attitudes. It is important to realize that although expressive cues are not taken at face value, inferences in terms of what is meant and what to believe are taken from them. Nonverbal reactions are inherent in the formation of attitudes because they result from unwitting responses. Teachers

unknowingly reveal feelings to students that are thought to be carefully concealed. The interchange of messages that are nonverbal in character between teacher and student plays a significant role in student learning. According to Galloway, nonverbal phenomena in the classroom not only "minimize verbal messages, but they become the real focus of attention--the idea that lingers long after the event has passed" (Galloway, 1968, p. 173).

Galloway further stated:

Nonverbal signs, signals, and events can provide information regarding the realities of classroom life. They can occur as intentional efforts to communicate expectations and instructions; and they can appear as moves to influence perceptions and behaviors (Galloway, 1972, p. 13).

The need to be open to the meaning of attitudinal displays and emotional reactions, i.e., more participatory in the affective learning domain is indeed great.

In a paper presented to teachers of English in 1973, Duke, in apparent agreement with Galloway concluded:

The vastness of nonverbal influence on communication is apparent, but educators are left with the question of how an awareness of nonverbal behavior can fit into the classroom. In reality, the classroom offers a vast supply of information about nonverbal communication. . . . The simple process of acceptance and understanding of ideas and actions on the part of both students and teachers involves extensive nonverbal elements (Duke, 1973, pp. 18-19).

As recently as 1978 a case was being made for the inclusion in school curricula ordered experiences that would lead to a greater understanding of nonverbal communication. Wilson stated:

Nonverbal talk is indeed a legitimate language for study which may be characterized as being nondiscursive, symbolic, imaginative, and metaphysical. It communicates

distinctive and essential patterns of meanings that are culturally mediated. A body of knowledge, a distinctive subject matter, exists (Wilson, 1978, p. 4).

The literature related to the subject of nonverbal communication in the classroom is replete with two points that should be addressed in this discussion. First, although there is evidence to substantiate the conclusion that nonverbal language reinforces verbal language, nonverbal language may be, and often is, nonsupportive of the verbal signals being utilized. "Nonverbal and verbal communication may be contradictory" and when the messages are not congruent, the nonverbal message is usually accepted as the valid one (Achilles, 1974, p. 30). Of primary concern is the determination that teachers often send "mixed messages." These cause processing problems for some students and set up barriers to effective classroom communication. Mixed messages contain incongruent verbal and nonverbal cues and take the form of a positive verbal cue and a negative nonverbal cue (+v/-nv) or a negative verbal cue and a positive nonverbal cue (-v/+nv) (Achilles and French, 1977; Woolfolk and Woolfolk, 1974). One of the six dimensions in Galloway's (1968) model of teacher nonverbal communication is congruity between verbal intent and nonverbal referents. This dimension refers to the extent of reinforcement between voice, gesture, and other actions of the teacher and the words used by the teacher to convey meaning. Galloway explains that congruency occurs when a verbal message is supported and reinforced by nonverbal behaviors such that there is harmony between "verbal intent and nonverbal referents" (Galloway, 1968, p. 174). Using the symbols employed above to demonstrate mixed messages, a "pure" or congruent message can be illustrated as (+v/+nv or -v/-nv). Secondly, even though much of nonverbal

communication is transmitted and received unconsciously, nonverbal signals can be deliberately and intentionally employed, especially by teachers to control pupil participation and to obtain attending behaviors (Hennings, 1978).

According to Abbey, "words and things, time and space and body language" are all parts of the message system used in the classroom (Abbey, 1973, p. 10). Recognizing the powerful effect that communication has on student achievement, authors of recent publications on classroom communication have included discussions on the use of audio-visual aids; use of time; size and arrangement of classroom furniture; the use of objects and materials for classroom environmental conditioning, i.e., color, light, plants, bulletin boards, and other decorations; body language, i.e., gestures, body positioning, eye movements, facial expressions, in addition to discourses on verbal communication. There is a need for more teacher attention to the "what and how" of messages transmitted. A widely endorsed conclusion is that with increased understanding and intentional use of the communication modalities operating in the classroom, the teacher is better equipped to facilitate student learning (Hurt, 1977, p. 3; Hennings, 1975; Abbey, 1973; Thompson, 1973; Stanford, 1974; Galloway, 1968, 1972).

II. VERBAL AND NONVERBAL TEACHER BEHAVIOR

It is now widely recognized that verbal and nonverbal behaviors equate to the totality of classroom interaction. Both are viewed as integral to the process of classroom interaction and must be included in any analysis of the teacher's role as source-encoder of classroom

messages. (Appendix A contains a general summary of teacher nonverbal behavior measurement.)

Research and related reports support the conclusion that the behavior of the teacher determines the climate of the classroom. The teacher behavior also sets the pattern of behavior of the students. Classroom activities are primarily the responsibility of the teacher and it is the expectation of educational administrators, teachers, and students that the teacher is to "take charge, to initiate, and to control the learning activities" (Flanders, 1967, p. 108).

Rosenthal and Jacobsen's research (1968) detailing of the self-fulfilling prophecy as it relates to activities in the classroom heightened inquiry and educational research regarding teacher behavior and the expectancy effect. Resultant studies have focused on the effects of teacher behavior on teacher-pupil interaction, on the relationship of teacher behavior to pupil achievement, and the relationship between teacher expectancy and teacher behavior.

Keith, et al. (1974) conducted a study which "examined the variety of verbal and nonverbal behaviors by teachers and learners as they spontaneously manifest and interact in the classroom" (p. 31). A specific goal of the study was to determine the relationship among verbal and nonverbal teacher-learner behaviors. Videotaped observations were made of forty-six teacher interns enrolled for in-service training in the College of Education, Michigan State University. Pupil responses were taken as a subcategory to the teacher interns. Data were collected for those pupils who were within the viewing range of the video camera focused on the teachers. Fifty-seven categories of classroom behaviors were selected for observation. Teacher behaviors

included thirteen groupings, i.e., gesticulation, body acts, body orientation, facial expression, head orientation, physical orientation, visual orientation, physical contact, punishment procedures, verbal behavior, use of instructional aids, teacher-pupil interaction, and facial attraction. Pupil behaviors were ordered in seven groupings, i.e., verbal behavior, visual orientation, motor activity, noisemaking activity, mouthing, object disturbance, and physical contact. Recording of variables on the rating schedule accounted for frequency, duration, and measures of latency corresponding to the event. Results of the study indicate that verbal expressions of approval by the teacher are relatively unrelated to pupil responsiveness, but that nonverbal cues such as smiling are associated with pupil task-relevant behavior. Summary statements include the following:

Affectively pleasant, presumably supportive nonverbal responses by teacher-interns (smiling) were strongly related to enthusiastic, task-related participant verbal activity by pupils. The nonverbal component was found to be more important than the verbal We might attempt to encapsulate the findings salient to task-oriented teacher-pupil interaction as follows: Smiling, verbally probing teacher-interns are associated with thoughtful and responsive pupils over a variety of performance measures (Keith, et al., 1974, p. 36).

In a study to investigate the link between teacher behavior and pupil performance, Alpert (1975) concentrated on "good" teacher behaviors.

The specific purpose of the study was to determine whether an increase in certain teacher behaviors would affect the performance of low ability pupils. . . . Good behaviors are those reading group teacher behaviors experts judged likely to increase the academic performance of pupils (Alpert, 1975, p. 53).

The teacher behaviors selected have been considered in other related investigations. A key consideration in selecting the low

ability group was a prior determination that "pupils of low ability are more affected by pedagogical strategy than pupils of high and average ability" (Alpert, 1975, p. 53).

Drawing on research that investigated the relationship between socio-economic status and pupil verbal ability, Achilles and French (1973) generated assumptions related to pedagogical strategy for pupils of low verbal ability. Two of the assumptions, which were intended to guide research and promote instructional change, are:

1. By analysis of background and communication experience, children can be classified into two general groupings: those from verbally enriched backgrounds and those from verbally deprived backgrounds.

2. Education is a cumulative communication process. Students are products of past experiences. Those who have experienced verbally enriched backgrounds deal more easily with verbal symbols and concepts than do youngsters from verbally deprived backgrounds.

- a. Children from verbally enriched environments trust and rely heavily on verbal communication cues.

- b. Children from verbally deprived environments rely more on nonverbal communication cues (Achilles and French, 1973, pp. 5-6).

These assumptions and attendant conclusions, i.e., that nonverbal cues are extremely influential in the classroom interaction process and that the degree of dependence on nonverbal cues (affective learning) varies according to the extent of emphasis on cognitive learning in the child's verbal environment, are germane to the selection of pupils and the concentration on specific teacher behaviors in Alpert's study.

Alpert's subjects were second grade teachers and their "bottom" reading group pupils. The "good" behaviors list was developed by experts, including reading teachers, remedial reading teachers, and first grade teachers. The "good" behaviors were: more reading group time, "best" reading group time (those times during the day when the teacher felt most motivated to teach), more materials in reading group, fewer pupils in reading group, and more "good" verbal behaviors. Good verbal behaviors included praise reading, specific question, praise behavior, teacher answer and encourage question. The results of the study did not show that an increase in "good" teacher behaviors caused an increase in pupil performance. The investigation did not "indicate a relationship between the frequently investigated teacher behaviors and pupil performance" (Alpert, 1975, p. 56).

According to Bell and Davidson (1975), the measurement of teacher competency in terms of pupil achievement is problematic due to a large number of intervening variables. They thought that a partial solution to the problem of measuring teacher performance by pupil achievement might lie in the determination of a correlate of pupil achievement. Their research attempted to answer the question "what is the relationship between the percentage of time which pupils spend in on-task performance and pupil achievement?" (p. 173). "Pupil on-task performance was defined as the exhibiting of behaviors by the student which indicated that the student was performing tasks conducive to learning" (p. 172). The subjects were twenty-three elementary grade teachers who were observed for four teaching days.

An initial analysis of the data revealed significant partial correlations between pupil on-task performance and pupil achievement

existing in only three of the twenty-three classes observed. A comparison of teacher behaviors in the significant correlations classes to teacher behaviors in the non-significant correlations classes revealed a difference in teacher behaviors at the .05 level. The investigators concluded that the significant correlation between pupil on-task performance and pupil achievement coupled with the existence of specific teacher behaviors in three of the twenty-three classes indicated that teacher behavior may be an important variable. The specific teacher behaviors exhibited in the three classes which were significantly different from the other twenty classes were behaviors that led to attending student behaviors. They stated, "specifically, the most important variable related to student achievement in the presence of pupil-on-task performance may be teacher behaviors" (Bell and Davidson, 1975, p. 176).

Closely associated with investigations of the relationship of teacher behavior to pupil performance are studies designed to investigate the relationship between teacher behavior and pupil perceptions of teachers. In a discussion concerning student perceptions of teachers as communication sources, Hurt (1978) advanced the opinion that a student's perception of the teacher is the best predictor of student performance in a given class. He concludes that "communication in the classroom depends not on how the teacher really is, but on how the students perceive the teacher to be. The perceptions are the reality" (p. 114).

An analysis of students' response to a questionnaire on their perceptions of teacher classroom behavior led Whitfield (1976) to draw the following conclusions:

1. Students form very clear perceptions of their teachers and can report these perceptions by identifying observable behaviors.
2. Students hold individual as well as common (shared by other students) perceptions of their teachers.
3. Students form distinct perceptions and can identify specific teacher behaviors accounting for those perceptions.

Results of recent studies which examined the effects of verbal and nonverbal teacher behaviors upon students and perceptions of that teacher's feelings and attitudes towards them (Woolfolk and Woolfolk, 1974; Melang, 1976; Boser and Poppen, 1978; Karr and Beatty, 1979) support the conclusions reached by Whitfield. The studies also revealed that student perceptions are based on what the teacher does or says verbally and nonverbally and not on the student's level of self-esteem.

Utilizing the immediacy construct developed by Mehrabian (1971), Anderson (1979) and Anderson, et al. (1979) have investigated the relationship between teacher immediacy and student perception. Teacher immediacy refers to nonverbal behaviors of teachers which communicate physical and psychological closeness.

Immediacy behaviors operate to reduce distance between people and Mehrabian emphasizes that the distance reduction can occur by decreasing actual physical distance or by decreasing psychological distance (Anderson, et al., p. 1).

In a discussion of the basic results of the immediacy studies, the investigators stated:

There seems to be a consistent relationship appearing in these studies and in previous ones which suggests that teacher communication behaviors do make a difference in student perceptions of effective teaching and in student affect toward the instructor and the course. Teachers who are perceived as more immediate, as having

more positive communication style, and as having more interpersonal solidarity with students are also perceived more positively. Students see these teachers as being more effective, and they report greater positive affect toward the instructor and the course itself. . . . These are exciting findings for those interested in further exploring the effect of communication variables on instructional processes and outcomes (Anderson, et al., 1979, p. 13).

Several studies have been conducted at The University of Tennessee, Knoxville, which investigated teacher behaviors toward specific groups of students. In some instances comparison of teacher behavior between groups was made. All of the studies used the IDER system of observation and analysis.

Achilles has provided the following summary of the major concerns of each study:

Cosper (1970) sought to find out if boys and girls in the fifth and sixth grades received quantitatively and qualitatively different teacher communication cues. Shepard (1971) analyzed teacher communication cues to "typical" elementary and secondary pupils to see if differences seemed to follow socio-economic states (SES) lines. Fowler (1972) observed teachers both in their regular elementary and secondary classrooms and in Adult Basic Education (ABE) classes to see if communication cues of the same teacher differed with different groups. Crump (1974) analyzed teacher/pupil interactions using race and sex as major variables. Since Crump and her co-raters were white, London (1975) and a team of black co-raters re-analyzed the data for 20 of Crump's 25 teachers to determine if black and white observers would hear and see the same things from the same samples of videotaped communications (Achilles and French, 1977, p. 6).

Not included in Achilles' summary is a similar study completed in 1978. Fullerton (1978) analyzed the verbal and nonverbal behavior of teachers toward Educable Mentally Retarded (EMR) pupils to determine if there was systematic positive or negative verbal or non-verbal discrimination.

Results from the early IDER studies revealed that:

an individual teacher's verbal and nonverbal communication patterns may be different when the teacher communicates with different groups of students. . . . In other words, different groups of students receive different communication patterns of communication cues from teachers (Crump and Achilles, 1975, p. 8).

Without exception, each of the studies referenced in this section concerning verbal and nonverbal teacher behaviors has emphasized the need for continuing research in teacher communication patterns. The analyses of teacher behaviors and the relationship of those behaviors to pupil behaviors and concerns are still evolving; new methods and instruments are being developed.

III. OBSERVATION AND ANALYSIS OF TEACHER BEHAVIOR

During the past several decades, educational researchers have been creating various types of instruments for observation of classroom behavior. Until recently, the lion's share of systems for describing classroom behavior had been developed for verbal coding only. As the literature reveals, most notably for their contributions to classroom interaction analysis were Flanders (1960) and Amidon (1966). Flanders reduced classroom interaction to two basic categories and developed a system for observing and coding behaviors known as the Flanders Interaction Analysis System (FIAS) (see Appendix A). Amidon, building on the work of Flanders, determined that classroom verbal behavior could be more adequately described using twelve categories grouped according to whether the talk is initiatory or responsive. The instrument developed by Amidon is known as the Verbal Interaction Category System (VICS).

The Flanders Interaction Analysis System has been perhaps the most widely tested and utilized. Test data indicate that it is easy to learn and its reliability has been established. Because of this success, researchers have developed instruments for observing and coding verbal and nonverbal classroom behavior using the Flanders System as a base.

An instrument developed by Heger (1969), called the Mini-TIA, reflects the work of Flanders but emphasizes neither verbal nor non-verbal behavior as being more significant. Heger's observation system was based on three key concepts: (1) Teachers and students both have classroom roles which can be classified; (2) Interaction in the classroom is the sum total of verbal and nonverbal events; and (3) The concept of direct/indirect teaching should be maintained. The instrument consists of seven categories ordered according to teacher and students' classroom roles. The roles and categories identified are:

The teacher's role in personality development of student

Category 1. Reinforcement by the teacher

Category 2. Use of student idea by the teacher

The teacher's teaching role

Category 3. Content presentation by teacher

The teacher's institutional role

Category 4. Control of students by teacher

The student's role as a learner

Category 5. Student talk about content

The student's role as a developing personality

Category 6. Student talk about personal needs

Category 7. Silence or multiple talking is not directly associated with either a teacher or student role.

In order to code nonverbal events and verbal events simultaneously, each of the verbal categories is subdivided into two categories according to the nature of the nonverbal events that parallel the verbal events. Category 4 may be illustrated thusly:

<u>Role</u>	<u>Category Number</u>	<u>Verbal Events</u>	<u>Nonverbal Events</u>		
The Institutional Role	4	Control of Student by Teacher - teacher directs, commands, orders, corrects, criticizes, or justifies authority	+	vs	-
			Facilitating	vs	Punitive
			Adjusting	vs	Corrective
			Concerned	vs	Disdainful

According to Heger's field testing of the instrument, the system is functional, can be taught, and can achieve reliability.

Amidon (1971) developed an instrument and system for observing and coding teachers' nonverbal behavior which included four dimensions of teacher behavior. The content in the system is arranged to parallel the interaction analysis of verbal behavior. The four dimensions include:

- Dimension I - Physical arrangements--desk, chair, tables, bulletin board or chalkboard
- Dimension II - Teaching aids--textbooks, pictures, machinery
- Dimension III - Nonverbal behaviors--gestures, facial expressions, body positions
- Dimension IV - Teacher and student activities--read, write, demonstrate

Symbols were developed for items found in each of the four dimensions and were categorized to the ten categories of Interaction Analysis. The instrument uses fifteen symbols, one for each item found in each dimension. Unique features of the Amidon system include a mechanism for describing classroom and contents prior to actually observing teacher behavior; the coding of content and function of items by combining a Dimension I and II symbol with the addition of an interaction analysis category number; and the coding of the function of an isolated nonverbal behavior by combining the symbol for a specific nonverbal behavior, i.e., a gesture, with an interaction analysis category number. This writer could not find evidence to support wide use or adequate testing of the system.

The Love-Rodenick (1971) Nonverbal Categories and Sample Teacher Behaviors instrument and observation system includes teacher behaviors selected using two criteria. Identified behaviors had to be exhibited by a majority of teachers regardless of grade level and subject area, and each behavior had to have a singular meaning in our culture. After behaviors were identified, those nonverbal behaviors that paralleled the Flanders verbal categories were so classified. Flanders' categories that had no parallel nonverbal behaviors as identified according to the above criteria were eliminated. Other categories were created for those behaviors that were not paralleled in the Flanders system. The resulting categories are:

1. Accepts Student Behavior
2. Praises Student Behavior
3. Displays Student Ideas
4. Shows Interest in Student Behavior

5. Moves to Facilitate Student-to-Student Interaction
6. Gives Direction to the Student
7. Shows Authority Toward Students
8. Focuses Students' Attention on Important Points
9. Demonstrates and/or Illustrates
10. Ignores Students' Behavior

The researchers specify that the system is an event system as opposed to an event/frequency system. Each nonverbal behavior is tallied once regardless of its duration. The record made using this system depicts the pattern of teacher nonverbal behavior but not necessarily the sequence (Love and Roderick, 1971, pp. 295-296).

Cheffers (1974), relying heavily on the universality of the Flanders System, developed an observer system with the primary purpose of describing teacher-pupil behavior in physical activity classes. The system is known as Cheffers Adaptation of the Flanders Interaction Analysis System (CAFIAS). CAFIAS incorporates the concept that whoever or whatever causes learning to occur is the teacher. The system includes code symbols representing the teaching agent as either the classroom teacher, a student, or the environment. Both verbal and nonverbal behaviors can be recorded as they occur sequentially or simultaneously.

French (1968) conducted a study to determine whether a combination of verbal and nonverbal data might significantly increase the instructional value of behavior observation systems. His findings indicated that teacher behavior is, to a large degree, nonverbal and should be included in classroom interaction studies. Based on his earlier research, Galloway (1968) concluded "the teacher's nonverbal

behavior constitutes a model that represents six dimensions of nonverbal activity on a continuum ranging from encouraging to restricting communication" (Galloway, 1968, p. 174). These provided the basis for the formulation of the Indirect/Direct - Encouraging/Restricting (IDER) system of observation. (Appendix A describes in detail the IDER system for categorizing teachers' verbal and nonverbal communication cues.)

The IDER, developed by French and Galloway (1969) and used in this study, matched the ten verbal categories of Flanders' interaction analysis with corresponding nonverbal dimensions. A larger framework ranging from Encouraging to Restricting interaction was designed to incorporate Flanders' Direct to Indirect teacher influence. Using the time intervals and ground rules of the original Flanders system, the IDER permits the observer to record simultaneous verbal and nonverbal behaviors.

French (1968) developed another classroom observation system designed to look at classroom interactions in terms of their functions. The system is called the PIT Model and was also used in this study. (See Appendix B for a detailed description of the PIT Model.) PIT is an acronym derived from the first letter of Personal, Institutional, and Task, each a major category of communication events in the model. The model is based on findings that suggest that classroom activities may be observed as communication events which are institutional, task-oriented, personal, or mixed in nature (French and Galloway, 1970).

Each classroom interaction analysis system discussed in this section has been based upon the theoretical assumption that classroom behavior can be observed and analyzed. Each assumes that behavior observed at a particular point in time for a given period of time is

meaningful behavior from which insights can be gained. Each assumes that the behavior observed in one situation shares certain fundamental relationships with behaviors studied in other situations. Each assumes that the behavior interaction process can be subdivided into patterns. The systems also have categorical definitions of the behaviors to be studied. Each stipulates that the classification of specific behaviors to be observed determines the utility of the system and the nature of the data collected through use of the system. These and other theoretical and procedural commonalities of classroom interactional analysis systems have indeed accelerated and advanced inquiry into the educational implications of teacher verbal and nonverbal behavior.

There are still myriad questions to be answered. In view of recent efforts to observe all classroom interaction cues--verbal and nonverbal--and in anticipation of much more research to come, Smith (1979) discussed certain technological considerations. He emphatically cautions that the usual data collection methods of the 1960's, i.e., in-class observation arrangements, are not adequate for exacting analysis of classroom verbal and nonverbal communication. Videotape and its accompanying equipment have now become basic requirements in data collection. Tapes may be viewed repeatedly and by various persons from many points of view. There is also available specialized equipment such as the time-lapse videographer and the special effects generator which can be used to aid the recording of classroom interaction data. Attempts have been made to computerize further the analysis of videotaped protocols. These and future technological advances will facilitate classroom communication research endeavors and make more comprehensive and sophisticated studies possible.

IV. SUMMARY

The review of selected literature has revealed that attention is being devoted to the importance of interaction analysis in teaching and learning. Heightened interest and inquiry were especially noted relative to the influence of teacher behaviors on students' academic achievement. The literature has also reflected the development of systems for classifying behaviors and teacher training programs designed to promote increased teacher awareness of their classroom behaviors. Research evidence confirmed that nonverbal behaviors in the classroom are often exclusive and significant in number and impact.

A considerable amount of study has been devoted to the relationship between teacher expectations and teacher behavior. Efforts have been made to explain the relationship between teacher nonverbal behavior and the expectancy effect.

Research findings substantiate that teacher behavior, in particular nonverbal behavior, can be identified, observed, classified, coded, and analyzed.

Classroom interaction is still a fertile area of study for educational researchers and practitioners. However, the information available and knowledge gained to date dictate that teachers become more conscious of the messages students receive in their classrooms.

CHAPTER III

METHODS AND PROCEDURES

The primary purposes of this study were: (1) to determine if change in teacher behavior occurred simultaneously with change in student progress, and (2) to identify and describe the direction of teacher behavioral change in the process of teaching reading over a twenty-six month period. Secondary purposes were: (1) to analyze race and sex variables in teacher-student interaction and (2) to determine how the results of this study compare to previous studies using the observational techniques employed in this study.

This chapter provides a description of the methods and procedures used to conduct this research.

I. CONTEXT OF THE STUDY

The study was conducted in a rural elementary school located in Shelby County, Tennessee. This elementary school contained grades K-8, and was the treatment school for a Special Emphasis Reading Project that was operated from January, 1976, through the summer of 1979. The last testing of pupil gain was September, 1979. The Special Emphasis Reading Project was an educational experiment mandated by Congress which required that treatment schools conduct special reading programs for grades 1-6. A control school was matched as well as possible on key variables. Eight Special Emphasis projects were originally funded nationally. Some projects were

terminated and a new project was added. By the end of the project period there were six sites that had participated all three years and one site that had participated two years. Data collection points for assessing student progress were Fall, 1976; Spring, 1977; Fall, 1977; Spring, 1978; Fall, 1978; Spring, 1979, and Fall, 1979. A national evaluation of Special Emphasis Projects was done by an external contractor.

According to Smedley (1979) at the beginning of Shelby County's Special Emphasis Project, the experimental (project) school's student population was characterized mostly by rural (100 percent), black (75 percent), economically disadvantaged (85 percent) pupils. The school had a history of a stable enrollment and low pupil absenteeism. This condition continued throughout the project. In 1975, when the school was selected to be the treatment school in the project, 72 percent of the students in grades 3-6 were reading one or more years below grade level. Also in 1975, the mean IQ's for third and fifth graders in the treatment school (group tests) were 85 and 83, respectively, and represented approximately two standard deviations below the mean for the total school system.

A comparison of the relative positions of project and control schools, as required by the Federal Regulations governing awards in the Special Emphasis Program at the time of the award (1976), is presented in Table I. The data presented reflect 1976, the project's first year. The schools were well matched on the requisite variables even though the project school was larger. There were "hard core" reading problems in both the project and control schools. The schools were two of three in Shelby County where 50 percent or more of the

TABLE I^a
COMPARISON OF PROJECT AND CONTROL SCHOOLS ON
MAJOR DEMOGRAPHIC (1976) VARIABLES^b

Variables	Project School		Control School	
	N	%	N	%
<u>Teachers</u>	29	100	18	100
White	18	62	13	72
Other	11	38	5	28
M.S.	11	38	5	28
B.S.	18	62	13	72
12 or more hrs. of Reading	3	10	0	0
<u>Pupils</u>	610	100	351	100
White	153	25	144	40
Other	457	75	207	60
Below Grade Level (1 or more yrs.) 1975-76 (Grades 3-6)	204	72	117	70
Grade 3	37	57	14	42
4	54	89	33	92
5	59	72	34	72
6	54	76	36	70
<u>Receiving Free Lunches</u>	518	85	295	84
(Based on school lunchroom reports submitted to State Department of Education, September, 1975)				
<u>Title I Eligibles</u>	494	81	259	74
(Based on Shelby County ESEA-I Project 76-01 approved by State Department of Education for 1975-76 school year)				

^aReprinted with permission from Achilles, et al., "Final Evaluation Report: Shelby County (TN) Special Emphasis Right-to-Read Project," 1980.

^bMean IQ (Otis Lennon) for Years 1975-1979:

Grades	<u>75</u>	<u>76</u>	<u>77</u>	<u>78</u>	<u>79</u>	<u>75</u>	<u>76</u>	<u>77</u>	<u>78</u>	<u>79</u>	<u>75</u>	<u>76</u>	<u>77</u>	<u>78</u>	<u>79</u>
3	100	109	102	105	106	85	84	85	87	98	85	94	92	96	95
5	98	101	103	104	105	83	83	89	86	92	80	85	97	90	97
7	--	--	99	102	104	--	--	94	88	92	--	--	87	86	90

pupils were reading one or more grades below level in 1975. Both schools had relatively stable pupil and teacher populations and over 95 percent Average Daily Attendance.* Both were Title I schools receiving extra support for pull out reading programs and both had grades K-8.

Evaluations have been done (Smedley, 1979; Achilles, et al., 1980) using normally collected school data, which document substantial improvement in pupil reading scores over the three-year period. The evaluations used an experimental control, pre/post design based on the school's regular testing program--the Metropolitan Achievement Tests. The evaluation was longitudinal; it followed target and control pupils throughout the project and also used historical pupil data. Regression equations based on IQ and test records provided expected scores for comparison with actual scores (see Tables II and III and Appendix C).

Several of the evaluation objectives were to: (1) evaluate the project using available school district data and the system's regular testing program; (2) identify effects of major project components, and (3) determine the grade level of maximum impact. Evaluation results indicate that grades 2 and 4 appear to receive the most impact for the treatment. Pupils in the project school gained nearly one grade level for one year's instruction by the second year in the project. There was marked advancement in reading achievement and in IQ scores

*Average Daily Attendance (ADA) in both control and project schools is about 95 percent of Average Daily Membership (ADM). The ADM is computed on the basis of all students eligible to attend a particular school by virtue of residence, age, and grade. There is little pupil mobility between the two schools even though they are near each other and serve basically the same population.

TABLE II^{a,b}

PERCENT OF YOUNGSTERS, GRADES 3-6, READING ONE OR
MORE YEARS BELOW LEVEL (1972-79)

School	1972	1973	1974	Project Start		1977	1978	1979
				1975	1976			
Project	82	68	73	72	68	63	46	53
Control	67	76	71	70	71	50	46	43

^aTable II presents the percent of youngsters in grades 3-6 reading one or more years below grade level for the years 1972-79. (Note: The project ran 1976-77, 1977-78, and 1978-79. Final testing was Fall 1979, for the external evaluation. The internal evaluation may follow students for two more years.) The low achievement pattern is reflected in these data, and probably could be expected from median IQ scores (see Table I, page 45). Note the decline in percent reading below grade level in both project and control schools.

^bData for these tables have been taken, with minor adaptations, from Achilles, et al., "Final Evaluation Report: Shelby County (TN) Special Emphasis Right-to-Read Project," 1980.

TABLE IIIa,b

PERCENT OF YOUNGSTERS, GRADES 3-8, READING ONE OR MORE
YEARS BELOW (B) AND ABOVE (A) LEVEL (1974-79)

School	1974		Project Start				1977		1978		1979	
	B	A	1975		1976		B	A	B	A	B	A
Project	74	4	75	4	71	6	63	9	56	12	58	12
Control	70	8	71	5	65	4	59	6	53	10	53	10

^aIn 1974 the County began reporting its school achievement data in more detail and used a grade 3-8 reporting pattern where feasible. This pattern was appropriate for project and control schools; Table III presents data in the 3-8 format, including students above and below grade level. From Fall 1976 to Fall 1979 both schools improved. The project school reduced the percent below grade level by 13 and increased the percent above grade level by 6. Control figures were 12 and 6 percent.

^bData for these tables have been taken, with minor adaptations, from Achilles, et al., "Final Evaluation Report: Shelby County (TN) Special Emphasis Right-to-Read Project," 1980.

(10 points) at each grade tested (3, 5, and 7). The amount of time in the project has been determined a significant factor. Pupils in grades 2-5 showed significant gain (beyond .05) in total reading scores for the period 1976-1978. Using fifth grade total reading scores as a baseline, significant (beyond .05) results were achieved in three out of four comparisons made. In summary, key indicators suggest that the Shelby County Special Emphasis Project was highly successful. There was a substantial increase in the measured group's IQ scores at grades 3, 5, and 7 of the project students. The percent of project school students scoring at or above grade level increased from 6 to 12, and the percent reading one or more grades below grade level decreased as much as 19 percent. "Data clearly indicate that pupils in the experimental school gained more than those in the control school. The project must be considered successful" (Achilles, et al., p. iv).

This study to determine what, if any, changes there were in teacher behavior during the project period is appropriate to the documentation of student progress.

II. SUBJECTS

This study investigated the behavior of reading specialists and regular classroom teachers who worked with the Special Emphasis Reading Project throughout the three-year period. Shortly after the project began formal operation, videotapes were made of twelve teachers showing approximately fifteen minutes of teaching behaviors each in the teaching of reading. In May, 1979, videotapes were made of six of the original twelve teachers. These six had remained with the project and were teaching the same subject and grades as in 1976. During the

three-year treatment period these teachers were given some teacher training for reading improvement. All of the teachers in this study were certified in elementary education and had three quarter hours of additional work in reading beyond certification. All teachers were female, two were black, and four white. One pretape was found to have no audio and the study ended with five teachers as subjects. They taught grades 2-5.

III. INSTRUMENTS

The French and Galloway (1968) IDER System of simultaneously categorizing verbal and nonverbal behaviors and the PIT (Personal, Institutional, and Task) Model were used to collect and classify the data in this study. Galloway established content validity of nonverbal coding using the IDER system through a panel of experts. Construct validity was established based on the theoretical claims of the Flanders system. His work was expanded and further documented by French (1968). It is now also documented that the IDER System meets the validity criteria--content validity, construct validity, and criterion-related validity and face-validity--outlined by Herbert and Attridge (1975) in their publication on observation systems.

The IDER System identifies teacher verbal behavior as Indirect and Direct as does its primary antecedent, the Flanders Interaction Analysis System. Direct teacher influence restricts or minimizes the student's freedom to respond; Indirect teacher influence maximizes the student's freedom to respond. The Indirect teacher influence, categories 1 through 4, are: 1 (accepts feelings), 2 (praises or encourages), 3 (accepts or uses ideas of students), and 4 (asks

questions). Direct teacher influence, categories 5 through 7, are: 5 (lectures), 6 (gives directions), and 7 (criticizes or justifies authority). The remaining categories, 8, 9, and 10 relate to student talk and silence or confusion in the classroom.

French and Galloway (1968) further determined that teacher non-verbal statements can be classified as Encouraging or Restricting. The number of Encouraging behaviors divided by the number of Restricting behaviors provide the E/R ratio. The addition of these dimensions to each of Flanders ten verbal categories makes possible the characterization of nonverbal behaviors; hence, the Indirect/Direct, Encouraging/Restricting System of Categorizing Teacher Behaviors. Encouraging behaviors are behaviors that set a teacher/student climate which produces further interaction. Restricting behaviors are those behaviors exhibited by the teacher which limit further interactions. An E/R ratio is the ratio of Encouraging to Restricting behaviors. A more detailed description of the IDER System is included in Appendix A.

Data analysis included the development of I/D, i/d and E/R ratios. An I/D ratio is the ratio of indirect teacher behaviors to direct teacher behaviors and is computed by dividing the total number of tallies in categories 1 through 4 by the total number of tallies in categories 5 through 7. The i/d ratio, a revised I/D ratio, is used to determine extremes in teacher indirect/direct behaviors. The i/d ratio is computed by dividing the total number of tallies in categories 1 through 3 by the total number of tallies in categories 6 and 7.

The PIT Model also developed by French (1968) provides a functional approach in observing classroom interactions. The system assumes classroom interaction to be communication events, separated

from one another and easily identified. PIT is an acronym derived from the first letter of Personal, Institutional, and Task, each a major category of communication events in the model. PIT is sensitive to both verbal and nonverbal behaviors. In coding communication events using the PIT Model, the observer uses the symbols P for personal events, I for institutional events, and T for task events. The symbol M is used to indicate events that are mixed and cannot be clearly defined. Communication events can be classified and coded as individual or group events. The duration of each event is indicated by tallying the continuance of the event with marks in three-second intervals. A more detailed description of the PIT Model is included in Appendix B.

IV. DATA CODING

Teacher verbal and nonverbal behaviors were recorded from the videotapes at three-second intervals using a modified IDER Matrix (Figure 2). Categories 1-10 are taken directly from the Flanders System for recording verbal behaviors (see Appendix A). In order to describe and code the nonverbal behaviors exhibited by a teacher, the following symbols denoting the intended recipient of the behavior were placed under the appropriate column--E for encouraging or R for restricting: b--black male; g--black female; ~~h~~--white male; and ~~g~~--white female. A check (✓) was used if the behavior was directed toward the total class or group or if the race and sex of the student could not be determined from the videotape. A symbol encircled (b) indicated that the teacher behavior was entirely nonverbal.

RECORDING SHEET (IDER)

VERBAL	NONVERBAL	
	ENCOURAGING	RESTRICTING
1. ACCEPTS FEELINGS		
2. PRAISES OR ENCOURAGES		
3. ACCEPTS OR USES IDEAS OF STUDENTS		
4. ASKS QUESTIONS		
5. LECTURES		
6. GIVES DIRECTIONS		
7. CRITICIZES OR JUSTIFIES AUTHORITY		
8. STUDENT TALK (RESPONSE)		
9. STUDENT TALK (INITIATION)		
10. SILENCE OR CONFUSION		

Figure 2. Interaction Observation Recording Sheet.

Code: b = black male; g = black female;

b̄ = white male; ḡ = white female;

✓ = race/sex not identifiable or entire class;

o = nonverbal behavior only.

A pattern of behaviors (Figure 3) which was recorded on the matrix can be described as follows: the teacher begins with directions to the entire class (category 6E-V) and follows with a question to a black female (category 4E-g). The student answers (category 8E-g); the teacher accepts her answer (category 2E-g) and begins a lecture to the entire class (category E5-V).

In recording communication events using the PIT System, the appropriate letter indicating the event being observed is placed on a recording sheet at the initiation of the event. Dots (. . .) are placed below the letter in three-second intervals, for as long as the event continues. An event involving the teacher with a single student (individual event) is indicated by placing the symbol (i) after the symbol designating the type of event being observed, e.g., Ti, Pi, Ii. Any change in the designation marks the beginning of a new event (see Figure 4).

V. PROCEDURES FOR COLLECTING THE DATA

In February, 1976, a meeting of reading teachers and reading specialists was held to explain the study and data collection procedures. The teachers were first advised concerning the requirement and necessity for informed consent. After informed consent forms were signed by the teachers, the videotaping procedures were explained in detail. The purposes and advantages of videotaping during reading lessons were explained and the teachers were assured that neither they nor the students would be identified by name in the report of the study.

On initial visits to each classroom for videotaping, a short segment of the reading session was taped and played back for the

VERBAL	NONVERBAL	
	ENCOURAGING	RESTRICTING
1. ACCEPTS FEELINGS		
2. PRAISES OR ENCOURAGES	4 g	
3. ACCEPTS OR USES IDEAS OF STUDENTS		
4. ASKS QUESTIONS	2 g	
5. LECTURES		5 ✓
6. GIVES DIRECTIONS Start →	1 ✓	
7. CRITICIZES OR JUSTIFIES AUTHORITY		
8. STUDENT TALK (RESPONSE)	3 g	
9. STUDENT TALK (INITIATION)		
10. SILENCE OR CONFUSION		

Figure 3. Sample Pattern of Recorded Behaviors.

RECORDING SHEET (PIT)

Three Second Tallies															
1	T														
2	.														
3	.														
4	.														
5	.														
6	T _i														
7	.														
8	.														
9	.														
10	P														
11	.														
12	.														
13	.														
14	M														
15	.														
16	.														
17	T _i														
18	.														
19	.														
20	.														
Minute	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

Figure 4. Observation Recording Sheet Used with the PIT System.

teacher and students. This procedure was effective in reducing anxiety associated with the videotaping and in assuring routine classroom behavior during the actual taping sessions.

Approximately fifteen minutes of videotapes were made of each teacher in 1977 and again in 1979. During the actual collection of data on tapes, teachers and students did not know when the videotape recorder was on and when it was not. Tapes were made only of reading sessions.

VI. RATER RELIABILITY

All of the data used in this study was coded by the principal investigator. However, in order to establish rater reliability, four observers, including the principal investigator and the designated expert, coded and recoded data from the videotapes used in the study. The observers were trained in the use of the IDER System by one of the developers of the IDER and PIT Systems, who was also designated the expert for purposes of this study. It was necessary to establish inter-rater reliability between the principal investigator and each of the observers, including the expert.

Three tapes were randomly selected and used to compute two kinds of reliability coefficients (see Appendix D). One reliability computation consists of a Scott (1955) reliability coefficient using the formula

$$\pi = \frac{P_o - P_e}{1 - P_e}$$

P_o represents the observed percent of agreement between raters coding the same data. P_e represents the acceptable percent agreement (.80

for this study). The second computation utilizes the percentage method. The formula is:

$$P = \frac{N\text{-Neophyte}}{N\text{-Expert}} \text{ or } P = \frac{N\text{-Expert}}{N\text{-Neophyte}}$$

The second computation was used to measure the percentage of observer agreement on independent ratings (N represents the number of Encouraging behaviors recorded) between the principal investigator and each of the observers, including the expert.

The mean Scott coefficient was .89. Using the percentage of rater agreement computation, an average inter-rater reliability of .97 was obtained (Table IV). Intra-rater reliability for the principal investigator, who coded the same tape twice, three weeks apart, was established using the same methods employed to establish inter-rater reliability. Intra-rater reliability was computed at .88 using the Scott coefficient and at .98 according to the percentage method (see Appendix E for computations).

Only the principal investigator was trained in the use of the PIT System and, for purposes of this study, coded all of the data using that system. Rater agreement in the use of the PIT System was established between the principal investigator and the trainer using the percentage method. N represented the number of Task communication events recorded. An average inter-rater agreement of .84 was achieved (see Table V).

VII. CODING PROCEDURES

The teaching behaviors were recorded on modified matrices as shown in Figure 1, page 10. IDER ratios for each teacher were then

TABLE IV
INTER-RATER RELIABILITY COMPUTATION RESULTS^a
IDER

Scott Pi Method ^b					P Method ^c				
Observers	Tapes				Observers	Tapes			
	1	2	3	$\bar{x}$		1	2	3	$\bar{x}$
A/B	1.00	.86	.94	.93	EN ₁	.97	.98	.96	.97
A/C	.93	.77**	.95	.88	EN ₂	.97	.99	.98	.98
A/D	.86	.90	.82	.86	EN ₃	.99	.93	.96	.96
$\bar{x}$	.93	.84	.90	.89	$\bar{x}$	.98	.97	.97	.97

^aAll computations and details appear in Appendix D.

^bA = Observer 1 (Principal Investigator); B = Observer 2;
C = Observer 3; D = Expert Observer.

^cE = Expert; N₁ = Principal Investigator; N₂ = Observer 2;
N₃ = Observer 3.

**This reliability, although below .80, was accepted because the final ratings were all done by the principal investigator who established .80 or better with the other two observers and the mean over three tapes exceeded .80.

TABLE V
PIT SYSTEM (P METHOD)

Tape	Neophyte	Expert	Rater Agreement
1	52	65	.80
2	53	62	.85
3	21	24	.88
			$\bar{x} = 84$

computed using the methods described on page 51. The data coded on the matrices were transferred to data sheets from which computer cards were punched. The data sheets showed each teacher's encouraging and restricting behaviors, by category and by student race and sex (see Figure 5).

The following card format was used:

- Card 1. Teacher interactions in categories 1-4 on pretape
- Card 2. Teacher interactions in categories 5-7 on pretape
- Card 3. Teacher interactions in categories 8-10 on pretape
and teacher/student demographics
- Card 4. Teacher interactions in categories 1-4 on posttape
- Card 5. Teacher interactions in categories 5-7 on posttape
- Card 6. Teacher interactions in categories 8-10 on posttape
and teacher/student demographics

There were six IDER data cards for each teacher, three cards for teacher/student interactions and demographic data recorded from the pretapes and three cards for teacher/student interaction and demographic data recorded from the posttapes. Table VI shows the column format for each of the cards.

The PIT data sheet contained the number of group and individual task events, the average duration of task events and the total time spent on task events for each teacher. Figure 6 shows a sample of the PIT data sheet format.

VIII. STUDY DESIGN

This field study was based on an ex post facto design. According to Kerlinger (1964) ex post facto research can be defined as:

TABLE VI
COMPUTER CARD FORMAT

Card Number	Data	Column Number
1	Teacher number	1
	Pretape number	2
	*E1,**R1 (Accepts student feelings)	4-15, 16-21
	E2, R2 (Praises or encourages)	23-34, 35-40
	E3, R3 (Accepts student ideas)	42-53, 54-59
	E4, R4 (Asks questions)	61-72, 73-78
	Card number	80
2	Teacher number	1
	Pretape number	2
	E5, R5 (Lectures)	4-15, 16-21
	E6, R6 (Gives directions)	23-34, 35-40
	E7, R7 (Criticizes or justifies authority)	42-53, 54-59
	Card number	80
4,5	Repeat for posttape - data	
3	Teacher number	1
	Pretape number	2
	Teacher sex	3
	Teacher race	5
	Grade	4
	*E8,**R8 (Student talk--teacher initiated)	7-18, 19-24
	E9, R9 (Student talk--student initiated)	26-37, 38-43
	E10, R10 (Silence or confusion)	45-56, 57-62
3	Students by class:	
	# of males	66-67
	# of females	68-69
	# of black students	70-71
	# of white students	72-73
	Total # by class	74-75
	Card number	80
6	Repeat for posttape - data	

*Encouraging, category 1; **Restricting, category 1 (Accepts student feeling), etc.

systematic inquiry in which the scientist does not have direct control of independent variables because their manifestations have already occurred or because they are inherently not manipulable. Inferences about relations among variables are made, without direct intervention, from concomitant variation of independent and dependent variables (p. 379).

Kerlinger states that ex post facto research is valuable to social science and education because it can accommodate any research problems that do not lend themselves to experimental inquiry. For example, some of the important variables in educational research, i.e., intelligence, aptitude, teacher, personality, classroom atmosphere, home environment, are not manipulable. Related research is therefore limited to controlled inquiry. Ex post facto research is also not without weaknesses, major of which are "(1) the inability to manipulate independent variables, (2) the lack of power to randomize, and (3) the risk of improper interpretation" (p. 390).

The effort in this study was to collect, categorize, and analyze teacher behavior of reading teachers exhibited at the beginning and at the end of a Special Emphasis Reading Project. The purpose was to determine whether change occurred in teaching behaviors as identified by the French and Galloway IDER System and the PIT Model.

The Chi-square statistic was used to determine whether observations differed from what is expected by chance. The Chi-square test requires no assumptions regarding the nature of the underlying distribution and is therefore appropriate for ordinal data (Champion, 1970).

A secondary concern of this study was whether the race and sex of teachers and students appeared to be variables in the communication cues given by teachers to students. Chi-square analyses were

performed on combinations of E/R, I/D, i/d ratios, and teacher/student race and sex variables.

Data from other University of Tennessee IDER studies, i.e., Cosper (1970), Shepherd (1971), Fowler (1972), Crump (1974), London (1975), and Fullerton (1978) were used to compare communication behaviors of students in this study with those of teachers in other settings and circumstances. These studies were selected because they had the same basic research design and used one of the same classroom interaction observation and classification systems utilized in this study.

CHAPTER IV

PRESENTATION AND ANALYSIS OF DATA

The purpose of this study was to identify and describe teacher behavior during reading instruction and to identify and describe any changes that occurred over a three-year experimental program. Teacher behaviors (teaching reading to pupils in grades 2-5) were recorded on videotapes in a classroom setting. Behavioral segments were categorized by the principal investigator using two behavioral coding and analysis systems, IDER and PIT. The four major categories of the IDER system are: 1) Indirect verbal behavior--encourages further verbal interaction; 2) Direct verbal behavior--discourages further verbal interaction; 3) Encouraging nonverbal behavior--promotes continued nonverbal interaction; and 4) Restricting nonverbal interaction--discourages continued nonverbal interaction. The PIT System classifies classroom interactions in terms of their functions. The acronym PIT is derived from the first letters of Personal, Institutional, and Task, each a major category of communication events that occur in the classroom. The PIT model was derived following a determination that classroom activities may be observed as communication events or mixed in nature.

The data were collected from ten videotaped teaching sessions.*

*Pretapes were made of twelve teachers; posttapes were made of six teachers. Only five sets of tapes met the criteria of the same teachers teaching reading to the same grade levels in both pre and post sessions. Only these five sets of tapes are used in this study. Basic matrices for each teacher are in Appendix G.

Five tapes were recorded in 1977 and five in 1979. The same teachers were recorded teaching the same subject, at the same grade level for each videotaping. Pre and post videotapes of teacher behaviors were compared using the IDER and PIT behavioral analysis systems. The data are presented and analyzed with respect to the questions outlined in Chapter I, page 6.

Table VII shows the frequency of teacher behaviors in the major categories of the IDER system: I, D, E, R, i, d for both pre and post tapes. Note the reduction in R behaviors from 1.02 percent to .21 percent; the reduction of D behaviors from 20.95 to 15.88 percent; the reduction of d behaviors from 17.33 to 12.34 percent, and the increase in i behaviors from 9.46 to 11.44 percent between the pre and post sessions. These shifts are toward a more interactive, less teacher-centered approach to instruction.

Table VIII presents a summation of the number and duration of Task events observed (from the PIT analysis). Since the videotaping was of reading instruction, there were negligible Personal and Institutional events in the PIT analyses; only Task events were present in sufficient numbers for analysis (only twenty events in both analyses were not Task events). Except for teacher one, the average duration (in seconds) of group events was longer in the pre than in the post tapes. The average duration of post events, both group and individual, is greater than the pre-tape events.

Table IX presents a summary of IDER data aggregated by student (race and sex) and teacher (race) variables. (All teachers were female. There were three white and two black teachers.) The data in

TABLE VII
FREQUENCY OF TEACHER BEHAVIORS^a

Teacher Number	Pretapes					Posttapes								
	1	2	3	4	5	Σ	Percent	1	2	3	4	5	Σ	Percent
(E) ^b	361	322	279	279	318	1559	98.98	275	243	313	387	221	1439	99.79
(R)	0	6	2	8	0	16	1.02	0	2	1	0	0	3	.21
(I)	78	127	128	113	72	518	32.89	36	99	134	137	74	480	33.29
(D)	75	75	49	48	83	330	20.95	66	40	61	40	22	229	15.88
(i)	12	53	45	14	25	149	9.46	10	42	61	41	11	165	11.44
(d)	70	47	37	45	74	273	17.33	52	28	56	21	21	178	12.34

^aSummary of raw data using the IDER System for Chi-square analysis and arithmetic computations.

^bEncouraging Behaviors (E), Restricting Behaviors (R), Indirect Behaviors (I), Direct Behaviors (D), Revised Indirect Behaviors (i), Revised Direct Behaviors (d).

TABLE VIII
NUMBER AND DURATION OF TASK EVENTS OBSERVED

Teacher	Number of Task Events				Average Duration (Seconds)				Time on Tasks (Seconds)				Total Time on Tasks (Seconds)			
	Pre		Post		Pre		Post		Pre		Post		Pre		Post	
	Group	Ind.	Group	Ind.	Group	Ind.	Group	Ind.	Group	Ind.	Group	Ind.	Group	Ind.	Group	Ind.
1	09	46	55	03	06	09	58.30	10.10	172.00	38.50	525	465	516	231	990	747
2	08	17	25	10	12	22	48.30	31.40	41.10	30.20	387	534	411	363	921	774
3	06	10	16	11	41	52	105.50	20.70	30.50	15.40	633	207	336	642	840	978
4	06	47	53	16	29	45	48.00	14.00	39.90	14.80	288	657	639	429	945	1068
5	11	24	35	11	27	38	29.40	16.60	21.80	15.10	324	399	240	408	723	648
Average	8	28.8	36.8	10.2	23	33.2	57.90	18.60	61.10	22.80	431.4	452.4	428.4	414.6	4419	4215
																8634

^aGroup = Group Events, Ind. = Individual Events, Total = Total Events.

TABLE IX
TEACHER/STUDENT RACE AND SEX IMPACT DATA: IDER^a

Category	Totals	Black Teachers						White Teachers					
		Student Receivers						Student Receivers					
		M ^b	F	B	R/S		NI	M	F	B	W	R/S	
Encouraging (E)	1559	74	210	232	52	399		226	185	262	149	465	
Restricting (R)	16		4	4		2		4	3	4	3	3	
Total	1575	74	214	236	52	401		230	188	266	152	468	
Pretapes	Indirect (I) ^c	520	20	55	61	14	130	93	84	115	62	138	
	Direct (D) ^c	328	15	39	44	10	96	35	31	42	24	112	
	indirect		5	15	17	3	45	32	18	39	11	34	
	direct		9	28	30	7	80	33	24	36	21	99	
	Student talk ^c	590	39	120	131	28	148	102	73	109	66	108	
	Silence or confusion ^c	137					27					110	
	Total	1575	74	214	236	52	401	230	188	266	152	468	
Posttapes	Encouraging (E)	1439	88	53	132	9	377	361	134	449	46	426	
	Restricting (R)	3	2		2							1	
	Total	1442	90	53	134	9	377	361	134	449	46	427	
	Indirect (I) ^c	481	15	10	24	1	110	173	56	212	17	117	
	Direct (D) ^c	228	8		7	1	98	20	2	19	3	100	
	indirect (i)		6	4	10		42	65	14	76	3	34	
	direct (d)		7		6	1	73	17	2	17	2	68	
	Student talk ^c	593	67	43	103	7	160	168	76	218	26	79	
	Silence or confusion ^c	140					9					131	
	Total	1442	90	53	134	9	377	361	134	449	46	427	

^aSummary of raw data analyzed for impact of teacher/student race and sex.

^bM = Male, F = Female, B = Black, W = White, R/S = Race/Sex, NI = Not Identifiable.

^cIncluded in column total.

Table IX form the basis for ratios computed and presented in Tables X and XI and in future analyses.

Data analysis included the use of the Chi-square statistic to determine significance of differences in the recorded frequencies of behaviors, and rather extensive arithmetic computations of ratios and percentages for comparison (see Figure 7). The data were also analyzed to determine the impact, if any, of demographic variables such as teacher and pupil race and sex. Chi-square analyses are in Appendix F.

I. QUESTION ONE: DID CHANGE IN TEACHER BEHAVIORS OCCUR DURING
AN EXPERIMENTAL READING PROJECT WHICH PRODUCED PUPIL READING
SCORE GAINS?

Of the 3,017 total behaviors in the study, 1,575 were coded from the pretapes and 1,442 were coded from the posttapes (see Table X). Of the 1,575 behaviors coded from the pretapes, 98.98 percent was encouraging and 1.02 percent was restricting. The basic nonverbal climate-setting behaviors exhibited by the reading teachers were encouraging of further nonverbal interactions. Approximately 33 percent of the behaviors observed in the pretapes was classified as Indirect. Indirect teacher behaviors require students to think creatively, to interact with teacher and other students and generally these behaviors increase the freedom of the student to respond. Approximately 63 percent of these behaviors was question asking by the teacher. All five of the teachers exhibited this behavior (questioning) more than the other three indirect behaviors.

TABLE X
FREQUENCY AND PERCENT OF TEACHER BEHAVIORS

IDER Categories	Teacher Talk							Student Talk		Silence	Totals
	1	2	3	4	5	6	7	8	9		
Pretapes ^a	Encouraging	90	59	365	56	255	7	576	14	137	1559
	Restricting			4		8	3				16
	Percent	5.71	3.75	23.43	3.62	16.70	.63	36.57	.89	8.70	100.0
Posttapes ^b	Encouraging	36	129	315	62	156	8	577	16	140	1439
	Restricting					2	1				3
	Percent	2.50	8.95	21.84	4.30	10.96	.62	40.01	1.11	9.71	100.0
Total	Pretapes	32.9							37.5	8.7	100.0
Percent by Categories	Posttapes	33.3							41.1	9.7	100.0

^aPretapes: E/R = 97.44, I/D = 1.57, i/d = .55.

^bPosttapes: E/R = 479.60, I/D = 2.10, i/d = .93.

TABLE XI
COMPOSITE RATIO COMPUTATIONS BASED ON
VARIABLE CATEGORIES

Variable Categories	Total Teacher Behaviors	Percent	Number of Teachers	Ratios Based on Totals
PRETAPES				
Encouraging (E) 1-10	1,559	98.98	5	E/R = 97.44
Restricting (R) 1-10	16	1.02	5	
Indirect (I) 1-4	518	32.89	5	I/D = 1.57
Direct (D) 5-7	330	20.95	5	
Revised Indirect (i) 1-3	149	9.46	5	i/d = .55
Revised Direct (d) 6-7	273	17.33	5	
Total	1,575	100.00	5	
POSTTAPES				
Encouraging (E) 1-10	1,439	99.79	5	E/R = 479.60
Restricting (R) 1-10	3	.21	5	
Indirect (I) 1-4	480	33.29	5	I/D = 2.10
Direct (D) 5-7	229	15.88	5	
Revised Indirect (i) 1-3	165	11.44	5	i/d = .93
Revised Direct (d) 6-7	178	12.34	5	
Total	1,442	100.00	5	

IDER Categories	TEACHER TALK										STUDENT TALK			Silence	Total
	Indirect Cues					Direct Cues					TALK			10	
	1	2	3	4	5	6	7	8	9	10	Student Talk - Response	Student Talk - Initiation	Silence or Confusion		
Encouraging	Accepts Feelings	Praises or Encourages	Accepts Ideas	Asks Questions	Lectures	Gives Directions	Criticizes or Justifies Authority	Student Talk - Response	Student Talk - Initiation						
Restricting															
Total															

E/R = Encouraging 1-10 I/D = Categories 1-4 i/d = Categories 1-3
Restricting 1-10 Categories 5-7 Categories 6-7

Figure 7. A Delineation of the IDER System Showing Categories Used to Compute Ratios in This Study.

Praising and encouraging behaviors had the next highest percent (17) of behaviors classified as Indirect. None of the teachers was observed accepting student feelings, which is category one of the IDER system. Approximately 21 percent of the pretape behaviors was classified as Direct. Direct teacher behaviors consist mainly of information and direction giving and have the effect of restricting student freedom of further interactions and limiting student responses. Giving directions comprised 80 percent of the Direct behaviors. Lecturing consisted of 17 percent of Direct behaviors. Only two teachers were observed criticizing or justifying authority and behaviors coded in that category accounted for 3 percent.

The basic verbal and nonverbal communication climate setting behaviors exhibited by the teachers were encouraging and supportive of further student/teacher interactions in the classroom.

In order to gain insight into teacher communication cues which have the effect of student motivation or student control, the revised Indirect Verbal component includes only categories 1, 2, and 3; and the revised Direct Verbal component includes only categories 6 and 7. This removes the more "neutral" categories of questioning and lecturing and leaves the intensely direct and indirect categories. The revised indirect categories comprised 9.46 percent of the total behaviors and the revised direct categories comprised 17.33 percent of the total behaviors. The differences in these percentages indicate greater emphasis on control and the limiting of student freedom for further interaction. It should be noted, however, that 96 percent of the revised direct behaviors consists of teacher direction giving, leaving a minute amount in the teacher criticism category.

Posttape data revealed a total of 1,442 IDER behaviors (Table IX, page 71; Table X, page 73). Of those behaviors 99.79 percent was Encouraging and .21 percent was Restricting. Thirty-three percent of the behaviors observed in the posttapes was classified as Indirect. Sixty-six percent of these behaviors was question asking by the teacher. All of the teachers exhibited this behavior more than the other three Indirect behaviors. Accepts Students Ideas had the next highest percent (27) of behaviors classified as Indirect.

Direct behaviors accounted for 16 percent of all behaviors recorded. Giving directions comprised 69 percent of the Direct behaviors. Lecturing comprised 27 percent of these behaviors. Four teachers were observed criticizing or justifying authority, and behaviors in that category accounted for 3.9 percent.

The revised indirect categories comprised 11 percent of total behaviors and the revised direct behaviors comprised 12 percent. Ninety-five percent of the revised direct (d) behaviors falls in the "Gives Directions" category and only 5 percent in the criticism category. The basic verbal and nonverbal communication climate setting behaviors were encouraging and promoted further student/teacher interaction.

Student talk comprised 37 percent of the behaviors observed on the pretapes. Less than 3 percent of student talk was student-initiated communication incidents (category 9). Student responses to something the teacher said or did were clearly the basis for the large number of behaviors coded in this category.

Approximately 9 percent of the communication cues fell in the "Silence" or "Confusion" category. Observation of the videotaped

classroom interaction segments revealed that the majority of the tallies in this category resulted from silent reading activity and not from confusion. Ninety-one percent of the time someone was talking, either a teacher or a student.*

Student talk made up 41 percent of the posttape behaviors. Ninety-seven percent of these behaviors was student response to something the teacher said or did. A little more than 9 percent (9.7) of the posttape behaviors fell in the "Silence" or "Confusion" category. The majority of the tallies in this category resulted from observed silent reading activity and not from confusion.

Teacher communication patterns can also be determined by comparing the composite Encouraging/Restricting (E/R) ratio with the composite Indirect/Direct (I/D) and the composite revised indirect/direct (i/d) ratios (see Table XII). The composite ratios were developed by totaling behaviors by category variables and computations were based on those totals. The information provided by composite ratios generally gives an indication of the communication climate established in teaching/learning settings observed. The mean E/R ratio for the five teachers computed from pretape data was 97.44 and the mean I/D ratio was 1.57. These ratios show that for every 97 Encouraging behaviors, there was one Restricting behavior, and for every one and one-half Indirect behaviors, there was one Direct behavior. The mean i/d ratio was .55 and shows that for every indirect behavior there were more than one and three-fourths direct

*This is a high percent in comparison to other IDER studies. The percents of silence or confusion in two other studies were: Crump (1974), 23; Fullerton (1978), 33.

TABLE XII
FREQUENCY AND PERCENT OF TEACHER BEHAVIORS BY CATEGORY

Teacher Number	1		2 ^a		3		4 ^a		5	
	N	%	N	%	N	%	N	%	N	%
PRETAPES										
Encouraging (E)	361	100.00	322	98.17	279	99.29	279	97.21	318	100.00
Restricting (R)	0	0	6	1.83	2	.71	8	2.79	0	0
Indirect (I)	78	21.61	127	38.72	128	45.55	113	39.37	72	22.64
Direct (D)	75	20.78	75	22.87	49	17.44	48	16.72	83	26.10
Revised Indirect (i)	12	3.32	53	16.16	45	16.01	14	4.88	25	7.86
Revised Direct (d)	70	19.39	47	14.33	37	13.17	45	15.68	74	23.27
E/R Ratio	N/C ^b		53.66		139.50		34.88		N/C	
I/D Ratio	1.04		1.69		2.61		2.35		.87	
i/d Ratio	.17		1.13		1.21		.31		.33	
POSTTAPES										
Encouraging (E)	275	100.00	243	99.18	313	99.68	387	100.00	221	100.00
Restricting (R)	0	0	2	.82	1	.32	0	0	0	0
Indirect (I)	36	13.09	99	40.41	134	42.68	137	35.40	74	33.48
Direct (D)	66	24.00	40	16.33	61	19.43	40	10.34	22	9.95
Revised Indirect (i)	10	3.64	42	17.14	61	19.43	41	10.59	11	4.98
Revised Direct (d)	52	18.91	28	11.43	56	17.83	21	5.43	21	9.50
E/R Ratio	N/C		121.50		313.00		N/C		N/C	
I/D Ratio	.55		2.48		2.20		3.43		3.36	
i/d Ratio	.19		1.50		1.09		1.95		.52	

^aReading specialist.

^bN/C = Not Computed (Divisor would be zero).

behaviors. The i/d ratio provides specific indications about the classroom emotional climate. The ratio is a comparison of the most personal verbal interaction in the Indirect/Direct variables. The high i/d ratio generally indicates warm, unstructured, accepting behaviors. A low i/d ratio generally indicates cold, formal, structured, unaccepting behavior.

A high percent of Encouraging nonverbal behaviors and a high percent of Indirect verbal behaviors indicate a consistent pattern of classroom interaction in which the student is encouraged to respond. A low percent of Encouraging behaviors indicates a classroom interaction pattern in which student response is restricted. When the ratio of one of these components is high and the other is low, an inconsistent interaction pattern is indicated. The percent of Encouraging nonverbal behaviors (98) and the percent of indirect behaviors (33) indicate a consistent behavior pattern. The teachers' nonverbal and verbal behaviors encouraged student interaction. It should be noted that the only verbal variable category with a percent of behaviors higher than the Indirect variable was Student Talk (37 percent).

The composite E/R ratio for the five teachers computed from posttape data was 479.60; the composite I/D ratio was 2.10; and composite i/d ratio was .93. These ratios show that for every 479 Encouraging behavior there was one Restricting behavior; that there was one Direct behavior for every two Indirect behaviors and that there is almost a one for one relationship between the revised i/d behaviors in relation to Restricting behaviors and Direct behaviors.

The pretapes revealed varied teaching styles of the five teachers observed (see Table XII). Encouraging behaviors varied from

100 percent to 97 percent and Restricting behaviors ranged from 0 to 4 percent. All teachers were highly encouraging by their behaviors; all had high E/R ratios. Variation among the teachers was noted in the I/D ratios. The range was from .87 for teacher five to 2.61 for teacher three. The i/d ratios ranged from .17 for teacher one to 1.21 for teacher three. Student talk ranged from a low of 21 percent for teacher three to 46 percent for teacher one (see Table XIII). Teacher one was the only teacher to have a higher percent of Student Talk (56) than Teacher Talk (42). "Ask Questions" had the highest frequency of behaviors observed of the IDER Teacher Talk categories (44 percent). This was followed by "Gives Directions" (31 percent); "Praises or Encourages" (11 percent); "Accepts Student Ideas" (7 percent); "Lectures" (6.7 percent); and "Criticizes or Justifies Authority" (1.2 percent). No behaviors were observed, hence no tallies recorded, in the category "Accepts Student Feelings." (A Basic Matrix of Teacher/Pupil Interactions for each teacher is found in Appendix G.)

The posttapes also revealed varied teaching styles. While the teacher behaviors revealed very little variation in Encouraging/Restricting behaviors, variation was noted in the I/D ratios. The range was from .55 for teacher one to 3.36 for teacher five. The I/d ratio ranged from .19 for teacher one to 1.95 for teacher four. Student talk ranged from 27 percent for teacher four to 61 percent for teacher one, who had a higher percent of Student Talk (61) than Teacher Talk (37).

"Asks Questions" had the highest frequency of behaviors observed of the Teacher Talk Categories (44 percent). This was

TABLE XIII

NUMBER AND PERCENT OF TEACHER AND STUDENT TALK--
TALLIES FROM IDER ANALYSIS

Teacher Number	Teacher Talk		Student Talk	
	Number	Percent	Number	Percent
Pretapes				
1	153	42	204	56
2	202	62	103	31
3	177	63	59	21
4	161	56	69	24
5	155	49	155	49
Totals	848		590	
Average		54		37
Posttapes				
1	102	37	169	61
2	139	57	101	41
3	195	62	98	31
4	177	46	104	27
- 5	96	43	121	.55
Totals	709		593	
Average		49		41

followed by "Gives Directions" (22 percent); "Accepts Student Ideas" (18 percent); "Lectures" (8.7 percent); "Praises or Encourages" (5 percent); and "Criticizes or Justifies Authority" (1.3 percent).

Pretape and posttape data have also been classified according to the PIT Model for Recording Teacher Pupil Interactions. The PIT Model classifies classroom interaction in terms of communication events. The communication events included in the PIT Model are Personal, Institutional, Task and Mixed events (Appendix B).

Coding of pretapes behaviors according to the PIT Model revealed four Personal events, seven Institutional events, 184 Task events, and two Mixed events. The primary concern of the study limited the variety of communication events recorded on the videotapes. The purpose was to observe and reach conclusions about how the teachers taught reading. The teaching of reading is a classroom Task event which can be either a group event or an individual event. Because of the comparatively small numbers of Personal, Institutional, and Mixed events observed, data are presented regarding only Task events. Totals, duration, and average duration for Task events have been computed and compiled (see Table VIII, page 70 and Table XIV).

Of the 184 Task events observed, 78.3 percent (144) was individual events and 21.7 (40) was group events. The group events had an average duration of 58 seconds, and the individual events had an average duration of 19 seconds. The five teachers spent 2,157 seconds on group events and 2,262 seconds on individual events. The teachers spent considerably less time per event on individual events than on group events as evidenced by an individual/group event ratio of 3/6.

TABLE XIV
PRE AND POST PIT EVENTS DATA

Events Data	1976	1979
Total Number of Task Events	184	166
Total Number of Group Task Events	40	51
Total Number of Individual Task Events	144	115
Average Duration of Group Events (in seconds)	58	61
Average Duration of Individual Events (in seconds)	19	23
Time on Group Task Events (in seconds)	2157	2142
Time on Individual Task Events (in seconds)	2262	2073
Personal Events	4	1
Institutional Events	7	4
Mixed Events	2	2
Total Events Recorded	197	173

Variation in teaching styles was also revealed by data generated with the PIT Model. The number of Task events ranged from ten to forty-seven. A somewhat smaller range was observed for group events, six to eleven. Average duration of group events ranged from twenty-nine seconds for teacher five to 105 seconds for teacher three. Time on group Task events ranged from 633 seconds for teacher three to 288 seconds for teacher four. It is noted that both teacher three and teacher four had the same number (six) of group events.

Posttape communication events consisted of one Personal event, four Institutional events, 166 Task events, and two Mixed events. Totals, duration and average duration for Task events have been computed and compiled. Of the 166 Task events observed, 69 percent (115) was individual events and 31 percent (fifty-one) was group events. The group events had an average duration of sixty-one seconds and the individual events an average duration of twenty-three seconds. The five teachers spent 2,142 seconds on group events and 2,073 seconds on individual events. Variation in teacher use of time in teaching reading was also revealed by posttape data. The number of Task events ranged from fifty-two for teacher three to nine for teacher one. Individual Task events ranged from six for teacher one to forty-one for teacher three. Time on individual Task events ranged from 231 seconds for teacher one to 642 seconds for teacher three.

A comparison of the pretape and posttape data collected using the IDER system indicates that there were some changes in teacher behavior during the twenty-six months between the videotapings.

II. QUESTION TWO: IF TEACHER BEHAVIORS DID CHANGE,
HOW CAN THESE CHANGES BE DESCRIBED?

Though the teachers exhibited a very high percent of Encouraging behaviors on both pretapes and posttapes, the posttapes showed a reduction in Restricting behaviors. Chi-square analysis (see Appendix F) showed the reduction to be significant beyond the .01 probability level. Direct teacher behaviors decreased by five percentage points (Table X, page 73). According to the raw data and percentage computations, the teachers emitted less "Gives Directions" behaviors on the posttapes than on the pretapes. Chi-square analysis showed the reduction to be significant beyond the .001 probability level. Even though there is almost no overall change reflected in the pre and post percents of indirect behaviors, a major shift took place within that variable category. In the pretapes, behaviors in the category "Accepts Student Ideas" comprised only 7 percent of the Teacher Talk behaviors. Posttape behaviors in that category accounted for 18 percent of the Teacher Talk behaviors. There was a statistically significant reduction in the revised direct (d) behaviors according to that variable's tallies from the posttapes. Chi-square analysis established the significance beyond the .001 probability level.

A significant increase in Student Talk was noted and verified by Chi-square analysis at the .05 probability level. The increase in Student Talk was consistent by teacher. Computations based on tally sums displayed in the individual matrices of teacher/pupil interactions reveal that Student Talk for teacher one increased from 56

percent to 61 percent; teacher two, 21 percent to 41 percent; teacher three, 21 percent to 31 percent; teacher four, 24 percent to 27 percent, and teacher five, 40 percent to 55 percent (see Table XIII, page 82). Since there was no significant increase in indirect behaviors, teacher Direct behaviors were decreased in favor of increased opportunities for student responses.

There was change or difference between the pre and post data derived using the PIT system. There was a 10 percent reduction in the number of Task events and a 20 percent reduction in individual task events. There was a slight increase in the number of group events and an increase in the average duration for both group and individual events. This information indicates that the teachers were spending more time on tasks but engaging in fewer Task events at the time of the posttapes (see Table VIII, page 70).

III. QUESTION THREE: HOW DO TEACHER/PUPIL RACE AND SEX IMPACT ON CLASSROOM INTERACTION IN THIS STUDY?

There were two black teachers and three white teachers in the study sample. All of the teachers were female. All of the teachers worked with small groups of students. Group size ranged from five to six students in 1977 and four to twelve students in 1979 (see Table XV). The student population for this study totaled twenty-nine in 1977 and consisted of twelve males, seventeen females, twenty blacks, and nine whites. The student total was thirty-three in 1979 and consisted of twenty males, thirteen females, twenty-eight blacks, and five whites.

TABLE XV
NUMBER AND DISTRIBUTION OF STUDENT RACE AND
SEX BY CLASS

Teacher Number and Description		Pretapes			Posttapes		
		Black	White	Total	Black	White	Total
1-BF	Male	2		2	1		1
	Female	2	2	4	4	1	5
		4	2	6	5	1	6

2-BF	Male	1		1	6	2	8
	Female	4	1	5	4		4
		5	1	6	10	2	12

3-WF	Male	3		3	5		5
	Female	3		3	1		1
		6		6	6		6

4-WF	Male	1	1	2	2	1	3
	Female	2	2	4	1		1
		3	3	6	3	1	4

5-WF	Male	1	3	4	2	1	3
	Female	1		1	2		2
		2	3	5	4	1	5

Totals:		Male	12		Totals:	Male	20
		Female	17			Female	13
		Black	20			Black	28
		White	9			White	5

Pretape Analysis

Data coded from the pretapes revealed that black teachers displayed a total of 689 behaviors and the white teachers displayed a total of 886 behaviors (see Tables XVI and XVII).

Fifty-eight percent of pretape behavior transmitted by black teachers was classified as Sex/Race Not Identifiable (S/R,NI). White teachers had 53 percent behaviors classified as Race/Sex Not Identifiable. The composite ratios for white teachers were: $E/R = 97.44$; $I/D = 1.77$; $i/d = .54$. The composite ratios for black teachers were: $E/R = 113.83$; $I/D = 1.37$; $i/d = .56$. Both black and white teachers displayed consistent verbal/nonverbal behavior patterns. The black teachers were a bit more encouraged nonverbally than white teachers and white teachers were more verbally encouraging of student response and further interaction. Black teachers displayed no restricting behaviors toward white students or male students and had a composite E/R ratio toward black students of 58.0 and a composite E/R ratio toward female students of 52.5. White teachers displayed Restricting behaviors toward all categories of students and had composite Race/Sex E/R ratios as follows: white students, 49.66; black students, 65.5; male students, 56.5, and female students, 61.6. These ratios revealed that white teachers were less encouraging toward white students than toward black students and less encouraging toward male than female students.

There were twelve students in the black teachers' classes. Of that number nine were black and three were white; nine were male and three were female; a ratio of three to one in each instance. Assuming that teachers and students had equal opportunities to interact,

TABLE XVI

BLACK TEACHERS' BEHAVIORS TOWARD CATEGORIES OF STUDENTS BY MAJOR STUDY VARIABLES

	Students			Sex/Race Not Identifiable	Totals
	Black	White	Male		
PRETAPES					
Encouraging (E)	232	52	74	210	399
Restricting (R)	4	0	0	4	2
Indirect (I)	61	14	20	55	130
Direct (D)	44	10	15	39	96
Revised Indirect (i)	17	3	5	15	45
Revised Direct (d)	30	7	9	28	80
E/R Ratio	58	N/C ^a	N/C	52.50	199.50
I/D Ratio	1.39	1.40	1.33	1.41	1.35
i/d Ratio	.57	.43	.56	.54	.56
POSTTAPES					
Encouraging (E)	132	9	88	53	377
Restricting (R)	2	0	2	0	0
Indirect (I)	24	1	15	10	110
Direct (D)	7	1	8	0	98
Revised Indirect (i)	10	0	6	4	42
Revised Direct (d)	6	1	7	0	73
E/R Ratio	66.00	N/C	44.00	N/C	N/C
I/D Ratio	3.43	1.00	1.88	N/C	1.12
i/d Ratio	1.50	N/C	1.00	N/C	.58

a)N/C = Not Computed (Divisor would be zero).

TABLE XVII

WHITE TEACHERS' BEHAVIORS TOWARD CATEGORIES OF STUDENTS BY MAJOR STUDY VARIABLES

	Students			Sex/Race Not Identifiable	Totals
	Black	White	Male		
PRETAPES					
Encouraging (E)	262	149	226	185	465
Restricting (R)	4	3	4	3	3
Indirect (I)	115	62	93	84	138
Direct (D)	42	24	35	31	112
Revised Indirect (i)	39	11	32	18	34
Revised Direct (d)	36	21	33	24	99
E/R Ratio	65.50	49.66	56.50	61.66	155.00
I/D Ratio	2.74	2.58	2.66	2.71	1.23
i/d Ratio	1.08	.52	.97	.75	.34
POSTTAPES					
Encouraging (E)	449	46	361	134	426
Restricting (R)	0	0	0	0	1
Indirect (I)	212	17	173	56	117
Direct (D)	19	3	20	2	100
Revised Indirect (i)	76	3	65	14	34
Revised Direct (d)	17	2	17	2	68
E/R Ratio	N/C ^a	N/C	N/C	N/C	426.00
I/D Ratio	11.16	5.66	8.65	28.00	1.17
i/d Ratio	4.47	1.50	3.82	7.00	.50
					921.00
					2.84
					1.30

^aN/C = Not Computed (Divisor would be zero).

one would expect three interactions to black students for each interaction to white students and three interactions to female students for each interaction to male students. Black teachers transmitted a total of 236 (82 percent) behaviors to black students and fifty-two (18 percent) behaviors to white students, a ratio of 4.5 instead of three as could be expected. Black teachers transmitted a total of seventy-four (25.7 percent) behaviors toward male students and 214 (74.3 percent) behaviors toward black and white students, a ratio of 2.9, one-tenth less than the expected ratio. Thus, black teachers' behaviors toward black and white students were not proportionate to the students' incidence in the classroom. Chi-square analysis show this difference to be significant beyond the .001 probability level (see Appendix F and Tables XVIII and XIX). Black teachers directed more behaviors toward black students; however, there were minute differences in their verbal and nonverbal behaviors toward the two groups.

There were seventeen students in the white teachers' classes. Of that number eleven were black and six were white, a ratio of 1.8 or almost two black students for each white student. Nine were male and eight were female, a ratio of 1.1. The data revealed that white teachers transmitted a total of 266 (63.6 percent) behaviors toward black students and 152 (36.4 percent) behaviors toward white students, a ratio of 1.8--equal to the black/white student ratio. White teachers transmitted a total of 230 (55 percent) behaviors toward males and 188 (45 percent) behaviors toward females, a ratio of 1.2. White teachers emitted behaviors toward students in proportion to the student's race and sex incidence in the classroom. White teachers were significantly and consistently more verbally and

TABLE XVIII

FREQUENCY AND PERCENT OF BLACK TEACHERS' BEHAVIORS
TOWARD STUDENTS BY SEX AND RACE VARIABLES

Variables	Sex Variables		Race Variables	
	No.	%	No.	%
Male				
Pretapes (n=3)	74	25.7		
Posttapes (n=9)	90	62.9		
Females				
Pretapes (n=9)	214	74.3		
Posttapes (n=9)	53	37.1		
Total				
Pretapes (n=12)	288	100.0		
Posttapes (n=18)	143	100.0		
Black				
Pretapes (n=9)			236	81.9
Posttapes (n=15)			134	93.7
White				
Pretapes (n=3)			52	18.1
Posttapes (n=3)			9	6.3
Total				
Pretapes (n=12)			288	100.0
Posttapes (n=18)			143	100.0

TABLE XIX
 FREQUENCY AND PERCENT OF WHITE TEACHERS' BEHAVIORS
 TOWARD STUDENTS BY SEX AND RACE VARIABLES

Variables	Sex Variables		Race Variables	
	No.	%	No.	%
Male				
Pretapes (n=9)	230	55.0		
Posttapes (n=11)	361	72.9		
Female				
Pretapes (n=8)	188	45.0		
Posttapes (n=4)	134	27.1		
Total				
Pretapes (n=17)	418	100.0		
Posttapes (n=15)	495	100.0		
Black				
Pretapes (n=11)			266	63.6
Posttapes (n=13)			449	90.7
White				
Pretapes (n=6)			152	36.4
Posttapes (n=2)			46	9.3
Total				
Pretapes (n=17)			418	100.0
Posttapes (n=15)			495	100.0

nonverbally encouraging than restricting in their behaviors toward all categories of students (see Tables XIX and XX).

Posttape Analysis

Data coded from the posttapes revealed that black teachers transmitted a total of 520 behaviors and white teachers displayed a total of 922 behaviors (Tables XVI, page 90 and XVII, page 91). Seventy-two percent of the behaviors transmitted by black teachers was classified as Sex/Race Not Identifiable (S/R,NI). The composite ratios for black teachers were: $E/R = 259$; $I/D = 1.27$; $i/d = .64$. The composite ratios for white teachers were: $E/R = 921$; $I/D = 2.84$; $i/d = 1.30$. Both black and white teachers were consistent in their verbal and nonverbal behavior patterns. In the posttape, the white teachers were more encouraging than black teachers and displayed more verbal motivational and positive climate-setting behaviors. Black teachers displayed restricting behaviors toward black males and had a composite E/R ratio toward black students of sixty-six, and a composite E/R ratio toward male students of forty-four. White teachers displayed no restricting behaviors toward any of the students identified by sex and race. (No E/R ratios were computed.)

There were eighteen students in the black teachers' classes. Of this number, fifteen were black and three were white; nine were male and nine were female (see Table XVIII and Table XXI). Analysis of the data revealed that although there were only five black students for every white student, black teachers transmitted approximately fifteen behaviors to black students for every one behavior transmitted to white students. Black teachers' behaviors toward male and

TABLE XX
NUMBERS AND RATIOS OF PUPILS AND TEACHER
BEHAVIORS BY RACE AND SEX VARIABLES
(PRE DATA)

Race/Sex Variables	Black Teachers				White Teachers			
	Pupils		Behaviors		Pupils		Behaviors	
	N	Ratio	N	Ratio	N	Ratio	N	Ratio
Black	9	3.0	236	4.5	11	1.8	266	1.8
White	3		52		6		152	
Male	3	.33	74	2.9	9	1.1	230	1.2
Female	9		214		8		188	

Tabulations of numbers and ratios of pupils and of teacher behaviors by teacher and pupil sex and race variables (Pre Data). For Chi-square Analyses of Differences, see Tables XXX and XXXI.

TABLE XXI
NUMBERS AND RATIOS OF PUPILS AND TEACHER
BEHAVIORS BY RACE AND SEX VARIABLES
(POST DATA)

Race/Sex Variables	Black Teachers				White Teachers			
	Pupils		Behaviors		Pupils		Behaviors	
	N	Ratio	N	Ratio	N	Ratio	N	Ratio
Black	15		134		13		449	
		5.0		14.9		6.5		9.8
White	3		9		2		46	
Male	9		90		11		361	
		1.0		1.7		2.8		2.7
Female	9		53		4		134	

Tabulations of numbers and ratios of pupils and of teacher behaviors by teacher and pupil sex and race variables (Post Data). For Chi-square Analyses of Differences, see Tables XXXII and XXXIII.

female students achieved a ratio proportionate to the male/female student ratio in the classroom.

Consistent with the finding from the pretapes, black teachers' behaviors toward black and white students were disproportionate to the students' incidence in the classroom in favor of black students.

There were fifteen students in the white teachers' classes. Of this number thirteen were black and two were white; eleven were male and four were female. Analysis of data regarding student race/sex ratios and teacher behavior toward categories of students revealed that although there were six black students for every white student, teachers transmitted approximately ten behaviors to black students for every one behavior to white students. White teachers' behaviors toward male and female students achieved a ratio proportionate to the male/female student ratio in the classroom.

Composite pre and posttape data show that black and white teachers directed significantly more behaviors toward black students than would have been expected by chance. Black and white teachers were more indirect--verbally encouraging--with black students than with white students. White and black teachers were more than three times as indirect toward female students as they were toward male students.

Pupil race and sex variables appeared to impact the number of teacher behaviors directed toward a specific student category and the type of verbal behaviors emitted by the teachers.

IV. QUESTION FOUR: HOW DO RESULTS OF THIS STUDY COMPARE TO
PREVIOUS STUDIES USING THE TWO OBSERVATIONAL TECHNIQUES
THAT WERE ALSO EMPLOYED IN THIS STUDY?

Data related to E/R, I/D, and i/d ratios from this study were compared with ratio data from six other IDER studies conducted at The University of Tennessee, Knoxville. Researchers for the six studies were: Cosper (1970), Shepard (1971), Fowler (1972), Crump (1974), London (1975), and Fullerton (1978). The six studies had the same basic research and design format as the present study. The studies reflect different populations and different points of emphasis and interests concerning classroom communications. Cosper questioned whether boys and girls in the fifth and sixth grades received different communication cues. Cosper's student population was academically talented boys and girls. Shepard analyzed teacher communication cues to determine if differences follow socio-economic status. Fowler observed teachers who taught elementary and secondary students during the day and Adult Basic Education at night to see if communication cues of the same teacher differed with different groups. Crump analyzed teacher/pupil interactions to determine if there were differences in verbal and nonverbal behaviors of teachers toward adjudicated delinquents. Major variables in the Crump study were teacher and pupil race and sex. London replicated Crump's study to determine the degree of similarities in the perceptions of a black and a white female observer with respect to communication cues of black and white male and female teachers. Fullerton analyzed the verbal and nonverbal behavior of teachers toward Educable Mentally

Retarded pupils to determine if there was systematic positive or negative verbal or nonverbal discrimination.

The comparison is centered around the three IDER ratios. The E/R ratio provides a picture of the teacher's nonverbal behaviors that encourage further interaction. The I/D ratio measures the teacher's verbal interaction and indicates to what degree teachers are controlling the interactions and giving information. The i/d ratio further defines the tone of verbal interactions, and focuses on the emotional climate of the classroom (see Table XXII).

The E/R ratios in this study were higher than those of the other University of Tennessee IDER studies. It is interesting to note that the last three studies completed have the highest E/R ratios, and that each of the studies focused on a student population that could be considered "special" in some way. These ratios are followed in rank by the ratios from the Crump and Cosper studies, both with special student populations. While the students in the present study have not been officially designated "special," nor do they carry any label which denotes specialty, they were participants in a Special Emphasis Reading Project which had a direct influence on teacher/student interactions.

The E/R (post) ratio in this study (479.6) is extremely high because there were so few Restricting behaviors, and especially since some teachers exhibited no restricting behaviors in the videotaped segments of behavior. This is unusual, but the teachers were working in small groups and were two years more experienced in the teaching of reading than during the pretape sessions.

TABLE XXII

COMPARISON OF STUDY RATIOS (E/R, I/D, i/d) OF SEVEN IDER STUDIES

Researcher	Teachers (N)	Student Population	Behaviors (N)	E/R Ratio	I/D Ratio	i/d Ratio
Cosper	4	Intellectually Gifted	8,648	13.18	1.05	0.94
Crawford (Pre)	5	Elementary: Grades 2-5	1,575	97.44	1.57	0.55
Crawford (Post)	5	Elementary: Grades 2-5	1,442	479.60	2.10	0.93
Crump	25	Adjudicated Delinquents Elementary & Secondary	17,551	14.28	0.35	0.21
Fowler	12	Adult Basic Education	15,134	1.73	0.98	1.25
Fowler	12	Elementary & Secondary	15,294	2.55	0.97	1.28
Fullerton	8	Elementary with Mainstreamed EMR Regular Mainstreamed	3,241	72.66 73.77 372.00	0.90 8.08 0.96	0.90 4.73 0.53
Fullerton	6	Elementary Educable Mentally Retarded	2,889	61.80	0.75	0.46
Shepard	11	Upper, Middle & Lower Socio-economic Status Elementary & Secondary	12,914	2.07	0.47	1.90

TABLE XXII (Continued)

Researcher	Teachers (N)	Student Population	Behaviors (N)	E/R Ratio	I/D Ratio	i/d Ratio
London	20	Adjudicated Delinquents Elementary & Secondary	18,902	40.180	0.391	0.167
Crump (recomputed for 20)	20	Adjudicated Delinquents Elementary & Secondary	13,763	11.696	0.386	0.209

The I/D ratios in this study, while lower than those produced by the Fullerton study, are higher than the others. The Fullerton study was, as this study was, characterized by teachers working with small groups of students. Is there something about small student groups that generates more verbal, as well as nonverbal, encouraging behaviors? Teachers in this study were more indirect than teachers in the other IDER studies, and encouraged pupils to talk.

It is noted that the highest i/d ratios, after Fullerton, were produced by studies with "regular" student populations, Shepard and Fowler. (This may be a function of the teacher/pupil backgrounds in those studies. Both studies were done in small, rural districts where teachers knew students and their families extremely well.) The present study i/d ratios are quite similar to those recorded for three of the Fullerton groups and to the Cosper study i/d ratio. Do teachers of academically gifted students and teachers of academically deprived students feel the need for verbal closeness to their students? Do they feel it necessary to deal with their pupils on a close, personal level? The comparison of this study to the other IDER has provided some interesting viewpoints and has given rise to more questions than answers.

It may well be that teachers are more comfortable with their students and with their own teaching behaviors when they perceive themselves and their students to be in "special" teaching/learning situations.

Crist (1975), using the PIT Model, conducted a companion study to the Crump study. Adjudicated youth comprised the student population. Some of Crist's findings closely parallel some of the

observations recorded in the present study. He reported that teachers in schools for delinquents engaged in twice as many individual events as did teachers in regular junior high schools in Ohio. (Crist compared his findings to an earlier study conducted by French [1968] in Ohio.) It was also noted that teachers in the Crist study engaged in more Task events than Institutional events. Crist found a very small number of Personal and Mixed events. The larger number of Task events and the duration (average duration longer than other events) are reflective of the nature of schooling. Since teachers are supposed to teach, it is expected that they will spend the greatest amount of time on Task (teaching). On the whole, group events were longer in duration than individual events even though the frequency of individual events was considerably higher.

It is recognized, notwithstanding the similarities reported, that the Crist study was conducted on a much larger sample of teachers and students than the present study.

V. QUESTION FIVE: ARE THERE ANY PATTERNS OF TEACHER/PUPIL INTERACTIONS THAT CAN BE IDENTIFIED, CLASSIFIED, AND DESCRIBED AS THESE TEACHERS TEACH READING?

The answer to question five is derived from a summation of responses to the other four study questions. Yes, there are some patterns of teacher/pupil interactions that can be identified, classified, and described. They are:

1. The teachers exhibited very encouraging and open nonverbal behaviors.

2. There was a very good balance between teacher Indirect and Direct behaviors (composite pre and post I/D ratio was 1.8).
3. There was a good balance between Teacher Talk and Student Talk (a ratio of 1.3 was achieved).
4. The question and answer was the prevailing teaching technique used.
5. Almost all teaching behaviors were on Task. Three hundred and seventy communication events were recorded; 350 were Task events.
6. There was a large number of teacher/individual behaviors. Two hundred and fifty-nine were identified using the PIT system and 1,344 were identified using the IDER system (56 percent).
7. Teachers transmitted behaviors to male and female students in proportion to the number of students in each category in the class.
8. White teachers achieved more balance in communication cues toward black and white students than black teachers. This was not a distorted matter. Overall, there was a pretty even and fair pattern of race/sex communication cues.

VI. SUMMARY

The data have been presented and analyzed with respect to the five questions addressed in this study. The data were derived from videotapes of reading teachers working with small groups of students.

The teachers and students were participants in a Special Emphasis Reading Project.

The data show that while there was some change in direction of teaching behaviors over time, the teachers were consistently encouraging in their communication cues to students. Teachers were also more verbally indirect (promoting further student interaction) than direct. There was some demonstration of teacher/student race and sex variable influence on teacher behaviors.

Comparison of the data in this study with reports from other IDER studies conducted at The University of Tennessee, Knoxville show similarities between those reports and observations made during the course of this research project. The E/R ratios of this study were higher than those of the other studies. The I/D ratios were also high when compared to all of the other studies except the Fullerton (1978) study. Teachers in this study displayed consistent behavior patterns. They were verbally as well as nonverbally encouraging of student active participation in classroom interactions.

CHAPTER V

SUMMARY, FINDINGS, CONCLUSIONS, IMPLICATIONS, AND DISCUSSION

I. SUMMARY

The purpose of this study was to determine if teachers participating in a Special Emphasis Reading Project changed their teaching behaviors during the course of the project. The Special Emphasis Reading Project was an educational experiment mandated by Congress and required that special reading programs be conducted for grades 1-6. The reading project and this study were conducted in a rural elementary school located in Shelby County, Tennessee. The project was operated from January, 1977 through the summer of 1979. Pupil gain in reading scores exceeded what could be expected by chance. Evaluation of pupil gain results appear in reports of pupil progress by Achilles, et al., 1980 and Smedley, 1979.

This study addressed the following questions concerning the teaching behaviors of the five teachers who began with the project and remained through its duration:

1. Did change in teacher behavior occur during an experimental reading project which produced pupil reading score gains?
2. If teacher behaviors did change, how can these behaviors be described?

3. How do teacher/pupil race and sex impact on classroom interaction in this study?
4. How do results of this study compare to previous studies using the two observational techniques that were also employed in this study?
5. Are there any patterns of teacher/pupil interactions that can be identified, classified and described as these teachers teach reading?

Teacher behaviors (teaching reading to small groups of students) were recorded on videotapes. Behavioral segments were categorized by the principal investigator using two behavioral coding and analysis systems, IDER and PIT. The four major categories of the IDER system are: 1) Indirect verbal behavior--encourages further verbal interaction; 2) Direct verbal behavior--discourages further verbal interaction; 3) Encouraging nonverbal behavior--promotes continued nonverbal interaction; and 4) Restricting nonverbal interaction--discourages continued nonverbal interaction. The PIT system looks at classroom interactions in terms of their functions. The acronym PIT is derived from the first letters of Personal, Institutional, and Task, each a major category of communication events that occur in the classroom. The PIT system is based on the assumption that classroom behavior may be observed and classified as communication events.

The data consisted of 3,387 teacher behaviors, 3,017 classified according to the IDER system and 370 according to the PIT Model. Pretape data consisted of 1,772 behaviors and posttape data consisted of 1,615 behaviors. There were five teachers in the study.

The same teachers were observed on both pre and post videotapes. Two of the teachers were black and three were white. The student population consisted of elementary students in grades 2-5. The pretape student group totaled twenty-nine and consisted of twelve males, seventeen females; twenty blacks and nine whites. The posttape student group totaled thirty-three and consisted of twenty males, thirteen females; twenty-eight blacks and five whites.

Data analysis included the use of the Chi-square statistic to determine significance of difference and extensive arithmetic computations of ratios and percentages. These analysis techniques were also applied to the data to determine the impact, if any, of teacher/student race and sex variables on communication cues.

II. FINDINGS

Findings from the study are:

1. Communication cues transmitted by teachers were consistent because the verbal cues as well as the nonverbal cues were encouraging of further teacher/pupil interaction.
2. More than one-third of the behaviors observed consisted of student talk--mainly in response to something the teacher said or did.
3. Although differences in teaching approaches, methods, and frequency of behaviors among the teachers were observed, all of the teachers displayed similar verbal and nonverbal communication patterns. All of the teachers were more Encouraging than Restricting in their nonverbal behaviors

and all of the teachers were more Indirect than Direct in their verbal behaviors.

4. Silence and/or confusion constituted less than 10 percent of the total behaviors observed.
5. The most frequently-observed teacher behavior was asking questions.
6. Fifty-six percent of teaching behaviors observed was identified as being directed toward individuals.
7. The revised indirect (i/d) ratios indicate teacher tendency toward control of student group. However, many of these behaviors resulted from teachers simply instructing students to read, spell, sound out letters, and repeat words for sound correctness.
8. Task events comprised 95 percent of all communication events observed.
9. Individual Task events accounted for 72 percent of all task events.
10. Individual events had an average duration of 20 seconds, and group events had an average duration of 60 seconds.
11. Posttape data analysis revealed: (a) a significant reduction in Restricting and revised direct [d] behaviors; (b) a decrease of five percentage points in Teacher behaviors classified in the Direct verbal categories; (c) a major shift in Indirect behaviors--teachers expressed acceptance of student ideas more often; (d) a significant increase in student talk; (e) a 10 percent reduction in the number of Task events and a 20 percent

reduction in individual Task events; (f) an increase in the number of group events and (g) an increase in average duration of both group and individual events.

12. Black and white teachers were equally consistent in their verbal/nonverbal behavior patterns.
13. The numbers of black teachers' behaviors toward black and white students were not as proportionate to the ratio of black/white students in the classes as were white teachers' behaviors.
14. Both black and white teachers exhibited more behaviors toward black students than toward white students (proportionately).
15. Black and white teachers' behaviors toward male and female students were generally proportionate to the male/female student ratio in the classes.
16. Black and white teachers were more Indirect with black students than with white students.
17. Data for this study produced a higher E/R ratio than previous IDER studies conducted at The University of Tennessee, Knoxville.
18. This study presented certain similarities to the Crump (1974) study in regard to teacher/pupil race and sex variables.
19. Observations made in this study indicate that teacher behavior patterns can be identified and described.
20. The changes between pre and post analyses that were most noticeable were a reduction in teacher Direct behaviors

(from 20.9 to 15.9 percent) and a gain in student talk (37.5 to 41.1 percent). The internal analyses of these changes show that in the post data teachers gave fewer directions (16.70 to 10.96 percent) and pupils responded more to teacher questions (36.57 to 40.01 percent).

III. CONCLUSIONS

Based on the data presented in this study, the following conclusions seem warranted:

1. The combination of more time (duration in PIT analysis) spent on tasks, the reduction in the teacher direct cues from 20.9 percent to 15.9 percent and the increase in student talk appears to be the major difference between pre and post analysis. If so, this change in the total behavior appears to positively influence pupil gains.
2. Since the teachers were not teaching the same students when both videotapes were made and the major changes reported applied to each teacher as well as to the total group, it appears that teacher behavior change can be, in part, attributed to some influence external to the regular day-to-day classroom teaching/learning practices.
3. Less teacher direction giving and more opportunity for pupil response to teacher questions seemed to provide a better learning environment for pupils in this study.
4. There was a small amount (9.2 percent) of non-talk time observed (activity classified as silence or confusion) and most of that was attributed to silent reading. The absence

of more confusion in the classrooms observed appeared to provide a positive learning environment and suggests that teachers and students knew what to expect of the other and what were acceptable responses to those expectations.

5. There seems to be a positive relationship between reading gain (as shown in the evaluation reports) and teacher behavior change as shown in this study.

IV. IMPLICATIONS

The following implications for in-service training of teachers who teach academically deprived pupils are drawn from the findings of this study:

1. Teachers should be made aware of the different categories of behavior that are demonstrated in classroom interaction.
2. Teachers should be given instruction in self assessment of their nonverbal communication cues--to increase their consciousness of the messages they send--and should be advised in how to be nonverbally encouraging.
3. Teachers should be given instructions in how to achieve and maintain a verbal/nonverbal consistent communication pattern.
4. Teachers should be taught to reduce their time on direct behaviors--especially direct behaviors toward the group--and allow more time for overt solicited responses from pupils.

5. Teachers should slow down the pace of instruction and have fewer tasks, but spend more time on each task until closure is reached.
6. Teachers should be taught how to use individualization in reading instruction while also accommodating the instructional needs of the group. One of the teachers observed in this study was especially adept at nonverbally obtaining attending behaviors by the total group while working with an individual student.
7. Since the teachers in this study used the behavior category "ask questions" to a large extent, teachers should be taught how to ask questions effectively and how to vary their behaviors in order to transmit more praise and accepting students' ideas behaviors.

V. DISCUSSION

This investigator believes that this study was sufficient to answer the questions posed for consideration. However, as is expected of effective research, it raised questions that could not be answered within its framework or with the data collected for the study. It was noted that all pupils in the study were from rural lower socioeconomic backgrounds. Other information obtained, peripheral to the study data, suggested that the pupils were also verbally deprived. Achilles and French (1973) suggested that the verbally deprived pupil is more dependent on nonverbal cues than pupils from verbally enriched environments. Were the teachers aware of this suggestion? How were teacher behaviors toward these pupils influenced by the

pupils' backgrounds and their home verbal environments? Comparison between this study and other University of Tennessee IDER studies indicate teacher behavior similarities, but with educationally different (including student population) settings. Cosper (1970) had intellectually gifted students, Crump (1974) had adjudicated delinquents, London (1975) also had adjudicated delinquents, and Fullerton (1978) had regular students and Educable Mentally Retarded (EMR) students. The question is raised, What is the relationship, if any, between perceived "specialness" of pupils and teacher behaviors?

In recent years reading, or the lack of adequate reading ability on the part of a large number of elementary and secondary pupils, has become a national concern and in some cases a political issue. This study resulted from a congressionally mandated reading program. The special reading projects were predicated on the opinion that almost all children can learn to read if provided with appropriate learning conditions. This study has been concerned with only one aspect of the learning conditions that were involved in the Shelby County (TN) project. What impact did the involvement of other persons have on teacher behavior? Weber's (1971) research indicated that "strong leadership" by principals made the difference in schools with successful reading programs. How did the teachers utilize teaching assistants, reading specialists, and what was the nature of the parent involvement that was included in the project? Studies that seek information concerning what influences teacher behavior change should also produce significant considerations for teacher training for reading and other subject matter instruction.

Although not conclusive (due to small number of teachers and students), this study suggests that in racially integrated classrooms, especially where special educational needs are addressed, black students receive a greater frequency of behaviors from teachers than is expected by chance. This suggestion is in agreement with a Crump (1974) study finding in which there was a large number of students and both male and female teachers. It is the opinion of this writer that this disproportionate attention is the result of teacher tendency to view the black student's educational deficiency in terms of our society's history of unequal educational opportunities for blacks. Hence, teachers engage in unconscious "make-up" behaviors toward black students.

Two notes concerning the inability to generalize from the results of this study appear to be in order. First, while the post-tape data analyses revealed a reduction in teacher restricting behaviors, all of the teachers exhibited above 95 percent encouraging behaviors at the beginning of the study. It was expected that the teachers would remain more encouraging than restricting. The possibility for restricting teachers existed at the beginning of the study and for even greater change to have occurred than was found. It cannot be generalized from the five teachers observed in this study that teachers are more encouraging than restricting. Secondly, because of the small number of teachers, students and behaviors compared to other IDER and PIT studies, no generalizations should be attempted concerning the type and categories of behaviors exhibited by teachers. Even though most of the teacher behaviors in this study

were classified as question asking, no conclusion about the extent of question asking behaviors of elementary reading teachers can be drawn.

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APPENDIXES

APPENDIX A

MEASUREMENT OF TEACHER VERBAL AND NONVERBAL BEHAVIOR

APPENDIX A

MEASUREMENT OF TEACHER VERBAL AND NONVERBAL BEHAVIOR*

Recently researchers have attempted to measure teacher nonverbal language. Galloway (1962) developed and categorized nonverbal behaviors into seven categories: (1) enthusiastic support; (2) helping; (3) receptivity; (4) pro forma; (5) inattentive; (6) unresponsive; and (7) disapproval. According to Galloway (1970, p. 3), "much information in the classroom is in the form of behavioral actions, and the meaning of behaviors in communication influences the teaching-learning process."

Evolving from this research, French and Galloway (1969) developed the Indirect/Direct--Encouraging/Restricting (IDER) system for categorizing simultaneously teacher verbal and nonverbal behavior. The Flanders System of Interaction Analysis (1960) served as the framework for the IDER system.

Nonverbal behavior may closely represent the affective elements of the teaching-learning process. Also, students attend to teachers' nonverbal expressive behaviors to determine the accuracy of the verbal message. French and Galloway stated: "If we assume that the teacher is the dominant influence in the classroom, teachers obviously must give attention to their own nonverbal behaviors" (1969, p. 307).

*All material in this appendix has been taken directly (with minor adaptations) from Inside Classrooms: Studies in Verbal and Nonverbal Communication by Charles M. Achilles and Russell L. French, 1977, pp. 71-76.

To examine teachers' nonverbal behaviors, it is necessary to have a reliable instrument to categorize and analyze such behaviors. The IDER system is one of several such systems which have been successfully researched. The IDER system and its antecedents are examined in the following sections.

Flanders Interaction Analysis

The Flanders (1960) system of categorizations of behavior is perhaps the most widely accepted model of conceptualizing teacher-student verbal interaction. This observational instrument has served as the technique used for much research in classroom interaction and its reliability has been validated.

The Flanders (1960) system categorized teacher behaviors as either Direct or Indirect. The categories are:

1. Accepts feeling.
2. Praises or encourages.
3. Accepts or uses student ideas.
4. Asks questions.
5. Lectures.
6. Gives directions.
7. Criticizes or justifies authority.
8. Student talk--teacher-initiated.
9. Student talk--student-initiated.
10. Silence, confusion or other.

The first seven categories measure teacher behaviors as Indirect or Direct: the first four categories represent Indirect influence; the last three represent Direct influence.

In using the system, Flanders stated:

Every three seconds the observer writes down the category number of the interaction he has just observed. He records these numbers in sequence in a column. He will record approximately 20 numbers per minute; plus, at the end of a period of time, he will have several long columns of numbers. The observer preserves this sequence of numbers that he has recorded. It is important to keep the tempo as steady as possible, but it is even more crucial to be accurate. He may also wish to write down marginal notes from time to time, which can be used to explain what has been happening in the classroom. . . . The observer stops classifying whenever the classroom activity is changed so that observing is inappropriate. . . . He will usually draw a line under the recorded numbers, make a note of the new activity, and resume categorizing when the total class discussion continues. At all times the observer notes the kind of activity he is observing (1960, pp. 13-14).

The complexities of categorization make the establishment of a series of ground rules essential to any categorization system. The ground rules considered basic to the use of interaction analysis were:

1. When not certain in which of two or more categories a statement belongs, choose the category that is numerically farthest from category 5.
2. If the primary tone of the teacher's behavior has been consistently Direct or consistently Indirect, do not shift into the opposite classification unless a clear indication of shift is given by the teacher.
3. The observer must not be overly concerned with his own biases or with the teacher's intent.
4. If more than one category occurs during the three-second interval, then all categories used in that interval are recorded; therefore, record each change in category. If no change occurs within three seconds, repeat that category number.
5. If a silence is long enough for a break in the interaction to be discernible, and if it occurs at a three-second recording time, it is recorded as a 10 (French, 1968, pp. 122-123).

The Galloway Model of Nonverbal Communication

Galloway (1962) attempted to construct a system for categorizing nonverbal behavior which resulted in seven observational categories focusing on teacher facial expressions, actions, and vocal qualities.

He identified the following seven categories:

1. Enthusiastic support.
2. Helping.
3. Receptivity.
4. Pro forma.
5. Inattentive.
6. Unresponsive.
7. Disapproval.

Galloway (1970) also worked with what he termed observation episodes, which could be interpreted as being Encouraging, inhibiting, or pro forma. From this experience, Galloway derived his model of teacher nonverbal communication which represents six dimensions of nonverbal activity. He suggested that Encouraging nonverbal communication has six basic characteristics:

1. Congruity between verbal intent and nonverbal referents.
2. Responsiveness to feedback.
3. Positive affectivity.
4. Attentive to others.
5. Facilitative by being receptive to others.
6. Supportive of pupils and pupil behavior.

The Restrictive teacher nonverbal communication has six opposite characteristics:

1. Discrepancy between verbal intent and nonverbal referents.
2. Unresponsiveness to feedback.
3. Negative affectivity.
4. Inattentive to others.
5. Unreceptive to others.
6. Disapproving of pupil behavior.

In model form these characteristics appear as six dimensions:

<u>Teacher-Initiated</u>	<u>Teacher Response</u>
Congruity - Incongruity	Attentive - Inattentive
Responsive - Unresponsive	Facilitating - Unreceptive
Positive - Negative Affectivity	Supporting - Disapproval

The IDER System of Behavioral Analysis

The IDER system of behavioral analysis developed by French and Galloway (1969) was an attempt to match the ten verbal categories of Flanders' (1960) interaction analysis with appropriate nonverbal dimensions. Flanders' Direct to Indirect teacher influence was incorporated into a larger framework ranging from Encouraging to Restricting interaction.

The IDER system is designed to enable an observer to use the categories, time intervals, and ground rules of the original Flanders system, while encoding nonverbal behaviors simultaneously with verbal ones. By marking a slash (encouraging) or dash (restricting) to the right of recorded numerical tallies, the observer can record both dimensions of teacher behavior within the allotted three-second interval. The appropriate category number circled is used to designate a teacher behavior which is solely nonverbal.

Category 1 (accepts student feeling) suggests both verbal and nonverbal phenomena. The verbal and nonverbal behaviors employed by the teacher in accepting student feelings are so closely related that any specification of particular cues which distinguish either the verbal or nonverbal aspect becomes exceedingly difficult. Indeed, the verbal characteristics are more elusive and hazardous to predict and defend than the nonverbal. It is not difficult to determine whether the teacher does or does not accept student feeling, but an observer is pushed to make an observation solely on the basis of verbal information. The teacher behavior of accepting student feeling is a conjoint verbal and nonverbal activity.

Category 2 (praises or encourages) implies a nonverbal dimension which can be classified as congruent or incongruent. When congruency occurs between the teacher's nonverbal cues and his verbal message, the fidelity of teacher intent is clear and believable. Nonverbal cues can reinforce and further clarify the credibility of a verbal message so that no ambiguity is present. When a discrepancy or contradiction appears between verbal and nonverbal, the incongruity can be observed. Individual styles of teacher behavior are so variant in their consequence that congruencies and incongruencies can appear in many behaviors for teachers, but incongruities occur most frequently when praising or encouraging students. An important ground rule to be noted in observing teacher praise and encouragement is that all behavior should be viewed as congruent until obvious incongruity is evident.

The nonverbal consequences of category 3 (uses student ideas) are related to whether a teacher actually uses an idea or merely

acknowledges it, which differentiates it as either an implementing or perfunctory behavior. There are two ways in which teachers respond to student ideas or thoughtful contributions: (1) merely recognizing or acknowledging student expression by automatically repeating or restating it (a teacher's use of student ideas in this way is perfunctory or pro forma); (2) by using a student's idea in subsequent discussion (by reflecting on the idea or turning it to the class as worthy of consideration). This response can be distinguished from perfunctory acknowledgment of student ideas and can be understood as truly using or implementing ideas. Both perfunctory and implementing teacher response are largely dependent upon the purpose and direction of teacher response. While nonverbal cues are always present, they are often fewer and more mechanical in a perfunctory response. The continued perfunctory use of student ideas undoubtedly provides steady reinforcement, and the value of this response cannot be denied, but the active involvement and reinforcement provided by implementing student ideas in discussion is important to fostering classroom interactions and classroom learning.

Category 4 (teacher question-asking) can be personal or impersonal. The difference between personalized and impersonalized questions is the difference between face-to-face confrontation and a verbal interchange in which mutual glances and intimate physical expressions of feeling are avoided. Nonverbal cues which personalize questions carry warmth, a sense of proximity and the implication that the teacher has a personal involvement in meaningful interactions. Impersonal question-asking will convey detachment, aloofness and a

sense of distance. In both instances, nonverbal cues provide the basis for the distinction.

Category 5 (lecture or giving information) can be observed in terms of teacher ability or willingness to use pupil nonverbal responses as cues to guide teacher talk. A teacher can be responsive or unresponsive to student behavior, and the key of this dimension is the teacher's sensitivity to his own behavior when talking to students. If pupils indicate that they are restive, bored, disinterested or inattentive, the teacher may change the pace or direction of his own talk--this is responsive behavior. Teachers are frequently unable or unwilling to alter the pace or direction of their talk; they also have difficulty in detecting the meaning and relation of pupil nonverbal behavior to their verbal performance--teacher talk that continues in the same pace or direction in the face of unreceptive student behavior is unresponsive. A significant dimension in a description of teacher information-giving behavior is the response of pupil behavior to teacher talk and the teacher's use of that feedback.

Category 6 (gives directions) can be viewed as behaviors that involve or dismiss students. Teacher directions can involve students in a clarification of either maintenance or learning tasks, or they can dismiss or control student behavior. While involving behaviors facilitate further pupil-teacher interactions, controlling behaviors restrict interaction. Facilitating directions get across to students the idea that learning is a conjoint venture in which both pupils and teacher have a mutual purpose. Dismissing directions tend to be punitive. The notion is communicated that the teacher would rather

not clarify with directions but would rather control activity independent of student involvement.

The dimensions of firm or harsh help to qualify category 7 (criticizes or justifies authority). Firm criticisms or justifications of authority have their use in the classroom. Such criticisms evaluate a situation clearly and crisply and clarify expectations. They lack the hostility, severity and indignity of harsh criticisms; they are devoid of the aggressive or defensive behaviors which criticisms can sometimes yield. Teacher nonverbal expressions most often provide the means for differentiating between criticisms or authority justifications that make the difference between appearing firm or harsh.

Flanders separates student talk into two categories (response to teacher--category 8; and student-initiated talk--category 9). One nonverbal dimension is appropriate to both categories, for teacher behavior during student talk is almost entirely the nonverbal activity of being receptive or inattentive. Receptive teacher behaviors involve attitudes of listening and interest, facial involvement, eye contact and suppression of teacher distraction and egoism. Inattentive teacher behaviors during student talk generally involve a lack of attending, little eye contact and teacher travel or movement.

Category 10 (silence or confusion) in the Flanders system is used as a "catch-all" category and possesses little inherent value. Yet, different kinds of silence and confusion can exist in a classroom. The dimension of comfort or distress is useful for recording the distinction. Comfortable silences are characterized by time of reflection, thought or work; distressing instances are produced by

embarrassment or tension-filled moments. Comfortable periods of confusion are those in which students are stimulated or exhibit excitement, while distressing instances of confusion reflect disorganization and disorientation. It is primarily through nonverbal cues that the teacher sets the stage for comfortable or distressful classroom occurrences.

Figure 8 presents a schematic summary of the IDER system of interaction analysis.

		VERBAL	NONVERBAL
TEACHER TALK	Indirect Influence	1. ACCEPTS FEELINGS	1. ENCOURAGING
		2. PRAISES OR ENCOURAGES	2. CONGRUENT: nonverbal cues reinforce and further clarify the credibility of a verbal message.
		3. ACCEPTS OR USES IDEAS OF STUDENTS	3. IMPLEMENTATION: occurs when the teacher actually uses student's idea either by discussing it, reflecting on it or turning it to the class for consideration.
		4. ASKS QUESTIONS	4. PERSONAL: face-to-face confrontation.
	Direct Influence	5. LECTURES	5. UNRESPONSIVE: inability or unwillingness to alter the pace or direction of lecture disregarding pupil cues.
		6. GIVES DIRECTIONS	6. INVOLVE: students are involved in clarification or maintenance of learning tasks.
		7. CRITICIZES OR JUSTIFIES AUTHORITY	7. FIRM: criticisms which evaluate a situation cleanly and crisply and clarify expectations for the situation.
	STUDENT TALK	8. STUDENT TALK (RESPONSES)	8. & 9. RECEPTIVE: involves attitude of listening and interest, facial involvement and eye contact.
		9. STUDENT TALK (INITIATION)	8. & 9. INATTENTIVE: involves a lack of attending eye contact and teacher travel or movement.
		10. SILENCE OR CONFUSION	10. COMFORT: silences characterized by times of reflection, thought or work.

Figure 8. A Schematic Summary of the IDER System of Interaction Analysis.

Reprinted from Inside Classrooms: Studies in Verbal and Non-verbal Communication by Charles M. Achilles and Russell L. French, 1977.

APPENDIX B

THE PIT MODEL

APPENDIX B

THE PIT MODEL*

The PIT Model was developed by French (1968) as a means of quantifying teacher/pupil interaction. PIT is an acronym derived from the first letter of Personal, Institutional, and Task, each a major category of communication events in the model.

Communication Events

A communication event can be defined as a sequence of teacher-pupil communicative behaviors separated from preceding and succeeding sequences of behaviors (events) by naturally occurring boundaries.

As defined by Galloway (1962), these boundaries are:

1. A variation or change in the direction of a teacher's communicative behavior;
2. A change in the teacher's behavior toward a new interaction;
3. The occurrence of a significant or potent act which appears influential; and
4. Social intervention in which an interruption is instigated by either a pupil or the teacher.

As implied, communication events are composed of both verbal and nonverbal behaviors by both teachers and pupils. It is not uncommon to find an entire event composed entirely of nonverbal behavior.

*The material in this appendix has been adapted from Crist (1975) and French and Galloway (1970).

Observation of elementary and secondary classrooms suggests that what goes on there may be described as communication events which are Institutional, Task-oriented, Personal, or Mixed in nature.

Institutional Events

Institutional events are those which relate to managing the classroom and meeting the expectations of the institution. The following are illustrative Institutional events:

1. A verbal and/or nonverbal reprimand to a student for chewing gum because this action is against school rules.
2. Teacher handing back quiz papers and explaining grading procedures.
3. Teacher calling roll and pupils responding verbally or nonverbally.
4. Pupils and teacher preparing for the use of a motion picture.
5. Teacher announcement and/or explanation of school events or activities.
6. Teacher calling for, signing, and discussing with pupils absence excuses.
7. Teacher cueing pupils verbally and/or nonverbally in an attempt to maintain silence or order and pupils responding.
8. Teacher directing pupils to begin their homework; pupils feigning industrious activity.
9. Teacher verbal and/or nonverbal direction to pupils in how to leave the classroom for some particular purpose.

Task Events

Task events focus on the teaching and learning of subject matter content whether cognitive, affective, or skill-oriented. Task events are characterized by stating, asking, showing, acknowledging, and clarifying communicative behaviors on the part of both teachers and pupils.

Illustrative Task events include:

1. A teacher-pupil discussion of the functions of Congress.
2. A teacher demonstration of how to read a weather map.
3. Teacher explanation of the factors influencing the Battle of Gettysburg while pupils take notes.
4. Teacher aiding individual pupils during an independent study period.
5. A student report on inflation.
6. A laboratory exercise in which pupils are using microscopes with the teacher assisting them.

Personal Events

Personal events are those in which personal needs, goals, and emotions of a pupil, a group of pupils and/or the teacher provide the central focus. Emotional expressions relevant to these events are admiration, affection, amusement, anger, boredom, cheerfulness, despair, disgust, dislike, fear, impatience, joy, satisfaction, and surprise.

Typical Personal events are:

1. Pupil expressions of frustration and teacher response to these.

2. Teacher expression of personal interest in or concern for a pupil or his problems.
3. Pupil expression of affection toward the teacher and teacher response, either verbal or nonverbal.
4. Angry dialogue between two pupils concerning actions on the playground.

Mixed Events

Mixed events also occur in classrooms. These contain elements of more than one of the event types previously described. While one might classify Mixed events according to the elements which they contain (task-personal events, institutional-personal events, etc.), this would appear to be a somewhat difficult and useless procedure. Interaction and communication become distorted when the focus of an event becomes complex and when participants are no longer aware of the specific nature of the event. Therefore, the descriptive category "Mixed events" better describes the function of these behavioral sequences than does any further breakdown of the category.

Coding Communication Events

Personal, Institutional, Task, or Mixed events can involve the teacher with a single pupil or with a group of pupils. Since any attempt to identify the focus and intent of interaction in the classroom at any given time must include clarification of the number of participants involved, communication events must be classified as individual (interaction between the teacher and one pupil) or group (interaction between the teacher and several pupils).

A simple identification of classroom communication events involves a coding scheme utilizing the symbol I to signify Institutional events, P for Personal events, T for Task events, and M for events which cannot be clearly defined (events mixed in nature). Further, Institutional, Task, or Personal events involving the teacher with a single student (individual events) are indicated by the symbol i placed after the symbol characterizing the basic nature of the event (e.g., Ti, Pi, Ii).

An important aspect of a communication event is its duration. This facet is captured by tallying the appropriate reference symbol at the initiation of the event and marking continuance of the event with dots tallied at three-second intervals. If this system is used, an observer's coding of a group-task event occupying twenty seconds of classroom time would resemble the following: T

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APPENDIX C

ANALYSIS OF COVARIANCE COMPARISONS

APPENDIX C*

ANALYSIS OF COVARIANCE COMPARISONS

Selected data analyses for the Right-to-Read Project included a series of F tests computed using an Analyses of Covariance between selected Total Reading (TR) Scores for various grade/year comparisons between the Control and Experimental Groups. Generally, these comparisons used score/base year, such as TR, Fall 1979 and compared these results with each previous Fall TR Test results for both groups. The results of these comparisons appear in Tables XXIII and XXIV. Adjusted mean values are presented as well as F values and the associated probability levels.

Covariance: Fall Data

As may be seen from the data, adjusted scores produce no significant F values for Grade 4 comparisons. With Grade 5 results, significant values of F were obtained for the Fall 1978 comparison with Fall 1977, Fall 1976, Fall 1974 and Fall 1973. Similarly, significant F's were found between Fall 1977 data and Fall 1973 results.

Results show that apparently some major gains occurred in Grade 4 (since the fifth grade Fall score would be the entering fifth grade--or after fourth grade--score). This pattern of gain shows significance in four of nine comparisons at or beyond .05 (Table

*Taken directly from Achilles, et al., "Final Evaluation Report: Shelby County (TN) Special Emphasis Right-to-Read Project," 1980.

TABLE XXIII

SUMMARY RESULTS FOR ANALYSIS OF COVARIANCE COMPARISONS OF TOTAL
READING SCORES OVER SELECTED TEST PERIODS FOR THE SHELBY
COUNTY RIGHT-TO-READ PROJECT, GRADE 4 (FALL DATA)

				Experimental Mean (Adjusted)	Control Mean (Adjusted)	F	Prob.
Total Reading Fall 1979 with:							
(a)	Total Reading,	Fall, 1978		4.61	4.71	0.02	0.88
(b)	"	"	Fall, 1977	4.52	4.73	0.00	0.99
(c)	"	"	Fall, 1976	4.46	4.71	2.41	0.13
(d)	"	"	Fall, 1975	4.35	4.82	0.38	0.54
(e)	"	"	Fall, 1974	4.23	4.92	2.12	0.15
Total Reading Fall 1978 with:							
(a)	Total Reading,	Fall, 1977		4.40	4.37	0.71	0.49
(b)	"	"	Fall, 1976	4.24	4.27	0.43	0.51
(c)	"	"	Fall, 1975	4.26	4.19	0.15	0.70
(d)	"	"	Fall, 1974	4.30	4.17	0.05	0.95
Total Reading Fall, 1977 with:							
(a)	Total Reading,	Fall, 1976		3.20	3.47	0.86	0.36
(b)	"	"	Fall, 1975	3.51	3.41	0.55	0.46
(c)	"	"	Fall, 1974	3.44	3.48	0.72	0.79

TABLE XXIV

SUMMARY RESULTS FOR ANALYSIS OF COVARIANCE COMPARISONS OF
TOTAL READING SCORES OVER SELECTED TEST PERIODS FOR
THE SHELBY COUNTY RIGHT-TO-READ PROJECT,
GRADE 5 (FALL DATA)

				Experimental Mean (Adjusted)	Control Mean (Adjusted)	F	Prob.
Total Reading Fall 1978 with:							
(a)	Total Reading,	Fall 1977		5.10	4.28	9.63	0.00
(b)	"	"	Fall 1976	4.88	4.43	4.98	0.03
(c)	"	"	Fall 1975	4.95	3.97	1.38	0.24
(d)	"	"	Fall 1974	4.93	4.00	2.08	0.16
(e)	"	"	Fall 1973	4.88	4.21	25.50	0.00
Total Reading Fall 1977 with:							
(a)	Total Reading,	Fall 1976		4.11	4.11	0.56	0.46
(b)	"	"	Fall 1975	4.09	3.60	0.68	0.42
(c)	"	"	Fall 1974	4.14	3.56	0.18	0.68
(d)	"	"	Fall 1973	4.01	3.78	6.64	0.01

XXIV). No significant results were shown in Grade 4 on 12 comparison (Table XXIII).

Covariance: Spring Data (Grade 4)

Total Reading Spring 1979 data compared with Total Reading Spring 1978 data showed no significant F value for Grade 4. The adjusted mean score for the Control group was, however, 0.19 years higher. Similar results were found when Total Reading Spring 1979 data were compared with Total Reading Fall 1977 data.

Results for the comparisons of Total Reading Spring 1979 with Total Reading Spring 1977 produced a significant F value of 9.96. This was significant at the .003 level. The adjusted mean score favored the Control group by a value of 0.60 years.

Comparisons between Total Reading Spring 1978 and Total Reading Spring 1977 also showed a significant F value at the 0.04 level. A comparison between Total Reading Spring, 1978 and Total Reading Fall 1977 was not significant.

Covariance: Spring Data (Grade 5)

Comparisons for Grade 5 between Total Reading Spring 1979 and Total Reading Spring 1978 and Total Reading Fall 1977 showed significant F values of 0.024 and 0.013. In both cases, the adjusted mean scores favored the Experimental Group. No other fifth grade comparisons were significant.

Inspection of Table XXV shows that, although only two of five comparisons were significant, all adjusted means favor the experimental school for grade 5 data; all adjusted means favor the control school for grade 4 data (except one of five, where the means were

TABLE XXV

SUMMARY RESULTS FOR ANCOVA COMPARISONS OF TOTAL READING SCORES
OVER SELECTED TEST PERIODS FOR SHELBY COUNTY RIGHT-TO-READ
PROJECT, GRADES 4 AND 5 (SPRING DATA)

	Experimental Mean (Adjusted)	Control Mean (Adjusted)	F	Prob.
<u>Grade 4</u>				
Total Reading Spring 1979 with:				
(a) Total Reading Spring 1978	5.05	5.24	0.43	0.517
(b) " " Fall 1977	5.05	5.23	0.073	0.788
(c) " " Spring 1977	4.90	5.50	9.96	0.003
Total Reading Spring 1978 with:				
(a) Total Reading Fall 1977	4.44	4.43	0.214	0.645
(b) " " Spring 1977	4.47	4.58	4.397	0.040
<u>Grade 5</u>				
Total Reading Spring 1979 with:				
(a) Total Reading Spring 1978	6.43	5.01	5.41	0.024
(b) " " Fall 1977	6.35	5.00	6.63	0.013
(c) " " Spring 1977	5.97	5.11	2.06	0.156
Total Reading Spring 1978 with:				
(a) Total Reading Fall 1977	5.16	5.12	0.02	0.968
(b) " " Spring 1977	5.15	5.09	0.56	0.456

4.44 and 4.43, or virtually identical). Once again, data continue to suggest that grade 4 seems to be a crucial point, and that the special emphasis project seems to make most gains at grade 4.

APPENDIX D

RATER RELIABILITY

APPENDIX D*

RATER RELIABILITY

A Note on Definitions

Research literature contains much discussion about "reliability" in the use of observation techniques. Although this study uses the familiar "inter-rater" and "intra-rater" designations for "reliabilities," more proper designations would probably be "coefficient of observer agreement" and "stability coefficient."

Note Medley and Mitzel:

We will use the term reliability coefficient to refer to the correlation to the expected between scores based on observations made by different observers at different times. The correlation between scores based on observations made by different observers at the same time will be referred to as a coefficient of observer agreement. A correlation between scores based on observations made by the same observer at different times will be referred to as stability coefficient (Medley and Mitzel, 1963, pp. 253-254).

And a second view has been stated by Herbert and Attridge:

The position we adopt is the traditional one, namely that reliability, in the measurement-theoretic sense, is a property of measures obtained through the application of a system, not a property of an instrument, nor of a system, nor of a record, nor of observer, though qualities of each of these constrain the reliability of measures obtained.

Yet researchers in observation still consider inter-observer agreement the most common form of reliability . . . despite the fact that in the measurement sense it is not (Herbert and Attridge, 1975, p. 14).

*All material in this appendix has been taken directly (with minor adaptations) from Inside Classrooms: Studies in Verbal and Nonverbal Communication by C. M. Achilles and Russell L. French, 1977, p. 81.

APPENDIX E

INTER-RATER RELIABILITIES: COMPUTATIONS

APPENDIX E*

INTER-RATER RELIABILITIES: COMPUTATIONS

The Scott Coefficient ($\pi = \frac{P_o - P_e}{1 - P_e}$) was used for one measure of inter-rater reliability. P_o (observed percent agreement) represents the percent of judgments on which two raters agree when coding the same data independently, and P_e is the acceptable percent agreement (.80 in this study). The Scott Coefficient (π) is the ratio of actual difference between obtained and chance agreement (Scott, 1955, pp. 321-325).

	Tape 1	Tape 2	Tape 3
Observer A	279	313	322
Observer B	279	304	326
Observer C	283	328	319
Observer D	287	307	334

$$\text{Tape 1: } A/B = \frac{279/279 - .80}{1 - .80} = \frac{.200}{.20} = 1.0$$

$$A/C = \frac{279/283 - .80}{1 - .80} = \frac{.185}{.20} = .93$$

$$A/D = \frac{279/287 - .80}{1 - .80} = \frac{.172}{.20} = .86$$

$$\text{Tape 2: } B/A = \frac{304/313 - .80}{1 - .80} = \frac{.171}{.20} = .86$$

$$A/C = \frac{313/328 - .80}{1 - .80} = \frac{.154}{.20} = .77$$

*Adapted from Crump (1974) and Fullerton (1978).

$$D/A = \frac{307/313 - .80}{1 - .80} = \frac{.190}{.20} = .95$$

$$\text{Tape 3: } A/B = \frac{322/326 - .80}{1 - .80} = \frac{.188}{.20} = .94$$

$$C/A = \frac{319/322 - .80}{1 - .80} = \frac{.190}{.20} = .95$$

$$A/D = \frac{322/334 - .80}{1 - .80} = \frac{.164}{.20} = .82$$

A second computation of inter-rater reliability consisted of the percentage of rater agreement on independent ratings by a rater designated as an "expert" and other raters designated as neophytes. In this study the total number of Encouraging tallies per tape for each observer was compared to the total number of Encouraging tallies per tape of the expert, who instructed the neophyte observers. The percentage formula is:

$$P = \frac{N\text{-Neophyte}}{N\text{-Expert}} \text{ or } \frac{N\text{-Expert}}{N\text{-Neophyte}}$$

Computations are as follows:

	Tape 1	Tape 2	Tape 3	$\bar{X}$
EN ₁	$\frac{279}{287} = .97$	$\frac{307}{313} = .98$	$\frac{322}{334} = .96$	.97
EN ₂	$\frac{279}{287} = .97$	$\frac{304}{307} = .99$	$\frac{326}{334} = .98$	.98
EN ₃	$\frac{283}{287} = .99$	$\frac{307}{328} = .93$	$\frac{319}{334} = .96$	.96

INTRA-RATER RELIABILITY: COMPUTATIONS

Intra-rater reliability was established using the same two reliability measures used for inter-rater reliability. Intra-rater reliability was computed using the total number of tallies from each

of two ratings of the same tape three weeks apart. The total tallies from the first rating was 328 and total tallies from the second rating was 336.

Computations using the two methods are:

$$\text{Scott Coefficient: } \pi = \frac{328/336 - .80}{1 - .80} = \frac{.176}{.20} = .88$$

$$\text{P Method: } P = \frac{328}{336} = .98$$

APPENDIX F

CHI-SQUARE ANALYSES

APPENDIX F

CHI-SQUARE ANALYSES

TABLE XXVI

CHI-SQUARE ANALYSIS OF CHANGE IN TEACHER RESTRICTING
BEHAVIORS TOWARD STUDENTS BASED ON
PRE AND POST DATA

	Restricting Behaviors	Encouraging Behaviors
Pretapes	16	1559
Posttapes	3	1442

c.v., $p = .05$, 1df: $\chi^2 \geq 3.84$ [$\chi^2 = 7.65$] $p \geq .05$ (.01).

TABLE XXVII

CHI-SQUARE ANALYSIS OF CHANGE IN TEACHER INDIRECT BEHAVIORS
TOWARD STUDENTS BASED ON PRE AND POST DATA

	Indirect Behaviors	All Other Behaviors
Pretapes	518	1057
Posttapes	480	962

c.v., $p = .05$, 1df: $\chi^2 \geq 3.84$ [$\chi^2 = .539^{NS}$].

TABLE XXVIII

CHI-SQUARE ANALYSIS OF CHANGE IN TEACHER DIRECT BEHAVIORS
TOWARD STUDENTS BASED ON PRE AND POST DATA

	Direct Behaviors	All Other Behaviors
Pretapes	330	1245
Posttapes	229	1213

c.v., $p = .05$, 1df: $x^2 \geq 3.84$ [$x^2 = 12.72$] $p \geq .05$ (.001).

TABLE XXIX

CHI-SQUARE ANALYSIS OF CHANGE IN TEACHERS' INDIRECT BEHAVIORS
TOWARD STUDENTS BASED ON PRE AND POST DATA

	Indirect Behaviors	All Other Behaviors
Pretapes	149	1426
Posttapes	165	1277

c.v., $p = .05$, 1df: $x^2 \geq 3.84$ [$x^2 = 7.65$] $p \geq .05$ (.01).

TABLE XXX

CHI-SQUARE ANALYSIS OF CHANGE IN TEACHERS' DIRECT BEHAVIORS
TOWARD STUDENTS BASED ON PRE AND POST DATA

	Direct Behaviors	All Other Behaviors
Pretapes	273	1302
Posttapes	178	1264

c.v., $p = .05$, 1df: $x^2 \geq 3.84$ [$x^2 = 15.07$] $p \geq .05$ (.001).

TABLE XXXI

CHI-SQUARE ANALYSIS OF CHANGE IN STUDENT TALK BASED ON
PRE AND POST DATA

	Student Talk	All Other Behaviors
Pretapes	590	985
Posttapes	593	849

c.v., $p = .05$, 1df: $x^2 \geq 3.84$ [$x^2 = 4.38$] $p \geq .05$.

TABLE XXXII

CHI-SQUARE ANALYSIS OF THE RELATIONSHIP BETWEEN TEACHER RACE
AND SEX AND STUDENT RACE AND SEX BASED ON PRETAPES
TEACHER BEHAVIORS DATA

Teachers	Students	
	Black	White
Black	236	52
White	266	152

c.v., $p = .05$, 1df: $x^2 \geq 3.84$ [$x^2 = 26.45$] $p \geq .05$ (.001).

TABLE XXXIII

CHI-SQUARE ANALYSIS OF THE RELATIONSHIP BETWEEN TEACHER RACE
AND STUDENT SEX BASED ON PRETAPES TEACHER BEHAVIORS DATA

Teachers	Students	
	Male	Female
Black	74	214
White	230	188

c.v., $p = .05$, 1df: $x^2 \geq 3.84$ [$x^2 = 59.79$] $p \geq .05$ (.001).

TABLE XXXIV

CHI-SQUARE ANALYSIS OF THE RELATIONSHIP BETWEEN TEACHER RACE
AND SEX AND STUDENT RACE AND SEX BASED ON POSTTAPES
TEACHER BEHAVIORS DATA

Teachers	Students	
	Black	White
Black	134	9
White	449	46

c.v., $p = .05$, 1df: $\chi^2 \geq 3.84$ [$\chi^2 = 1.8^{NS}$].

TABLE XXXV

CHI-SQUARE ANALYSIS OF THE RELATIONSHIP BETWEEN TEACHER RACE
AND STUDENT SEX BASED ON POSTTAPES TEACHER BEHAVIORS DATA

Teachers	Students	
	Male	Female
Black	90	53
White	361	134

c.v., $p = .05$, 1df: $\chi^2 \geq 3.84$ [$\chi^2 = 5.16$] $p \geq .05$ (.02).

APPENDIX G

BASIC MATRICES OF TEACHER/PUPIL INTERACTIONS AND SUMMARY TABLE

Ratios:

I/D = 1.04

E/R = N/C

I/d = 0.17

STUDENT	1		2		3		4		5		6		7		8		9		10		TOTAL
	E	R	E	R	E	R	E	R	E	R	E	R	E	R	E	R	E	R	E	R	
(1) Male, black			4				10				6				32						52
(2) Male, white																					
(3) Female, black			3				13		2		5				40		4				67
(4) Female, white			1				9				6				20						36
(5) Race/Sex not identifiable			4				30		3		53				108				4		202
(6) Nonverbal Only							4														4
TOTALS			12				66		5		70				200		4		4		361

TEACHER DATA

Black	2	White	2	TOTAL	2	Teacher Sex	F	Teacher Race	B
Male	2		2						
Female	2		2						
TOTAL	4		2						

READING SPECIALIST

Yes	Pre	No	Post
X	X		

Figure 9. Basic Matrix of Teacher/Pupil Interactions--Teacher One (Pretape).

Ratios:		1/D = 1.69		E/R = 53.66		i/d = 1.13																	
STUDENT		1		2		3		4		5		6		7		8		9		10		TOTAL	
		E	R	E	R	E	R	E	R	E	R	E	R	E	R	E	R	E	R	E	R		
(1) Male, black						1		5		6		3				7						22	
(2) Male, white																							
(3) Female, black			7		2		14	2	5	1	10	1	5		48							95	
(4) Female, white			1		1		2		3		1				8							16	
(5) Race/Sex not Identifiable			25		16		49		13		25	1			37		3	23				192	
(6) Nonverbal Only							1	1			1											3	
TOTALS			33		20		71	3	27	1	40	2	5		100		3	23				328	

PUPIL DATA		TEACHER DATA				READING SPECIALIST							
Male	Black	White	TOTAL	Teacher Sex	F	Teacher Race	B	Yes	X	No	Pre	X	Post
Female	4	1	5				2						
TOTAL	5	1	6				5						

Figure 10. Basic Matrix of Teacher/Pupil Interactions--Teacher Two (Pretape).

Ratios:

$$I/D = 2.61$$

$$E/R = 139.5$$

$$i/d = 1.21$$

STUDENT

(1) Male, black

(2) Male, white

(3) Female, black

(4) Female, white

(5) Race/Sex not
identifiable

(6) Nonverbal
Only

TOTALS

PUPIL DATA

TEACHER DATA

READING SPECIALIST

Black

White

TOTAL

Teacher Sex

Teacher Race

Teacher Number

Grade Taught

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Figure 11. Basic Matrix of Teacher/Pupil Interactions--Teacher Three (Pretape).

STUDENT	1		2		3		4		5		6		7		8		9		10		TOTAL
	E	R	E	R	E	R	E	R	E	R	E	R	E	R	E	R	E	R	E	R	
(1) Male, black			2	1			17				5	1	2	1	10						39
(2) Male, white							15	1			2				12						30
(3) Female, black						3	19		2		1			1	19						48
(4) Female, white						3	30		1		6	2			18						61
(5) Race/Sex not identifiable						1	15				20				10				57		103
(6) Nonverbal Only							2				2	1		1							6
TOTALS			8		6		98	1	3		36	4	2	3	69				57		287

Ratios:
 I/D = 2.35
 E/R = 34.88
 i/d = 0.31

PUPIL DATA		TEACHER DATA				READING SPECIALIST			
Black	White	TOTAL	Teacher Sex	F	Teacher Race	W	Yes	X	No
1	1	2							
2	2	4					Pre	X	Post
3	3	6							
TOTAL			Grade Taught	2					

Figure 12. Basic Matrix of Teacher/Pupil Interactions--Teacher Four (Pretape).

Ratios:

$$I/U = 0.87$$

$$E/R = N/C$$

$$I/d = 0.33$$

STUDENT	1	2	3	4	5	6	7	8	9	10	TOTAL
	E	R	E	R	E	R	E	R	E	R	
(1) Male, black		1		4		6		22			33
(2) Male, white		7		5	2	11		36			61
(3) Female, black		2		8	1	10		27			48
(4) Female, white											
(5) Race/Sex not Identifiable		15		25	6	47		70	8		171
(6) Nonverbal Only				5							5
TOTALS		25		47	9	74		155	8		318

PUPIL DATA

TEACHER DATA

READING SPECIALIST

	Black	White	TOTAL	Teacher Sex	F	Yes	No	X
Male	1	3	4	Teacher Race <td>W</td> <td>Pre</td> <td>X</td> <td>Post</td>	W	Pre	X	Post
Female	1	1	2	Teacher Number	5			
TOTAL	2	3	5	Grade Taught	3			

Figure 13. Basic Matrix of Teacher/Pupil Interactions--Teacher Five (Pretape).

Ratios:

$$I/D = 0.55$$

$$E/R = N/C$$

$$I/d = 0.19$$

STUDENT	1	2	3	4	5	6	7	8	9	10	TOTAL
(1) Male, black	E	R	E	R	E	R	E	R	E	R	11
(2) Male, white											
(3) Female, black			1	5				26			32
(4) Female, white				1				7			8
(5) Race/Sex not identifiable		1		19	14	52		126	4		224
(6) Nonverbal Only											
TOTALS		1	9	26	14	52		169		4	275

Figure 14. Basic Matrix of Teacher/Pupil Interactions--Teacher One (Posttape).

Ratios:

1/D = 2.48

E/R = 121.5

1/d = 1.50

STUDENT	1 Accepts Student Feelings		2 Praises or Encourages		3 Accepts Student Ideas		4 Asks Questions		5 Lectures		6 Gives Directions		7 Criticizes or Justifies Authority		8 Student Talk-- Teacher-Initiated		9 Student Talk-- Student-Initiated		10 Silence or Confusion		TOTAL
	E	R	E	R	E	R	E	R	E	R	E	R	E	R	E	R	E	R	E	R	
(1) Male, black			1		5		8		1		4	1	1	56	1		1				78
(2) Male, white											1										1
(3) Female, black			2		1									10							13
(4) Female, white																					
(5) Race/Sex not Identifiable			8		25		46		11		19		1		32		2		5		149
(6) Nonverbal Only							3				1										4
TOTALS			11		31		57		12		25	1	1	1	98		3		5		245

PUPIL DATA

TEACHER DATA

READING SPECIALIST

	Black	White	TOTAL	Teacher Sex		Teacher Race		Teacher Number		Grade Taught		Yes		X		No		Pre		Post	
Male	6	2	8																		
Female	4		4																		
TOTAL	10	2	12																		

Figure 15. Basic Matrix of Teacher/Pupil Interactions--Teacher Two (Posttape).

Ratios:

$$I/D = 2.20$$

$$E/R = 3/3$$

$$i/d = 1.09$$

STUDENT	1	E	R	2	E	R	3	E	R	4	E	R	5	E	R	6	E	R	7	E	R	8	E	R	9	E	R	10	E	R	TOTAL	
	Accepts Student Feelings			Praises or Encourages			Accepts Student Ideas			Asks Questions			Lectures			Gives Directions			Criticizes or Justifies Authority			Student Talk--Teacher-Initiated			Student Talk--Student-Initiated			Silence or Confusion				
(1) Male, black				3			39			45			1			12			66			2										168
(2) Male, white																																
(3) Female, black							4			7																						20
(4) Female, white																																
(5) Race/Sex not Identifiable							11			21			4			40			2			17			4			21				120
(6) Nonverbal Only							4												1													6
TOTALS				3			58			73			5			52			3			92			6			21				314

PUPIL DATA

TEACHER DATA

READING SPECIALIST

	Black	White	TOTAL	Teacher Sex	F	W	Yes	No	X
Male	5		5	Teacher Race			Pre	Post	X
Female	1		1	Teacher Number	3				
TOTAL	6		6	Grade Taught	3				

Figure 16. Basic Matrix of Teacher/Pupil Interactions--Teacher Three (Posttape).

Ratios:		I/D = 3.43		E/R = N/C		i/d = 1.95															
STUDENT	Accepts Student Feelings		Praises or Encourages		Accepts Student Ideas		Asks Questions		Lectures		Gives Directions		Criticizes or Justifies Authority		Student Talk--Teacher-Initiated		Student Talk--Student-Initiated		Silence or Confusion		TOTAL
	E	R	E	R	E	R	E	R	E	R	E	R	E	R	E	R	E	R	E	R	
(1) Male, black			9		37		1								35		2				93
(2) Male, white			2		9		1				1				10						24
(3) Female, black			2		22										27		4				61
(4) Female, white																					
(5) Race/Sex not Identifiable			3		28		17				17				26				106		209
(6) Nonverbal Only																					
TOTALS			16		96		19				18				98		6		106		387

PUPIL DATA		TEACHER DATA				READING SPECIALIST							
	Black	White	TOTAL	Teacher Sex	Teacher Race	Teacher Number	Grade Taught	Yes	X	No	Pre	Post	X
Male	2	1	3	F	M	4	2						
Female	1		1										
TOTAL	3	1	4										

Figure 17. Basic Matrix of Teacher/Pupil Interactions--Teacher Four (Posttape).

TABLE XXXVI

SUMMARY TABLE: NUMBER AND PERCENT OF INDIVIDUAL TEACHER BEHAVIORS EXHIBITED
TOWARD CATEGORIES OF STUDENTS

Teacher Number and Description	Black		White		Male		Female		Sex/Race Not Identifiable		Total Behaviors
	No.	%	No.	%	No.	%	No.	%	No.	%	
1-BF ^a	119	32.96	36	9.97	PRETAPES		103	36.01	206	57.06	361
2-BF	117	35.67	16	4.88	52	14.40	111	33.84	195	59.45	328
3-WF ^b	98	34.88	0	0	22	6.71	31	11.03	183	65.12	281
4-WF	87	30.31	91	31.70	67	23.84	109	37.98	109	37.98	287
5-WF	81	25.47	61	19.18	69	24.04	48	15.09	176	55.35	318
					94	29.56					
1-BF	43	15.64	8	2.91	POSTTAPES		40	14.55	224	81.45	275
2-BF	91	37.12	1	.41	11	4.00	13	5.31	153	62.45	245
3-WF ^b	188	59.87	0	0	79	32.24	20	6.37	126	40.13	314
4-WF	154	39.79	24	6.20	168	53.50	61	15.76	209	54.00	387
5-WF	107	48.42	22	9.95	117	30.23	53	23.98	92	41.63	221
					76	34.39					

^aBF = Black Female; WF = White Female.

^bNo whites in the class.

VITA

Doris Scott Crawford was born in Prince Edward County, Virginia to Robert James and Gladys Berryman Scott. She attended elementary schools in Prospect, Virginia and graduated from Robert Russa Moton High School in Farmville, Virginia.

Ms. Crawford's post-secondary education has taken place at five institutions of higher education including Virginia Union University, Richmond, Virginia; Tuskegee Institute, Tuskegee Institute, Alabama; Union Theological Seminary, New York City; Columbia University, New York City; and The University of Tennessee, Knoxville. She received the Bachelor of Arts degree from Virginia Union University, the Master of Arts degree from Columbia University, and the Doctor of Education degree from The University of Tennessee, Knoxville.

Ms. Crawford's work experiences include several directorships of Employment and Training Programs administered by the Knoxville-Knox County Community Action Committee; Associate Dean of Students at Knoxville College; and founder and executive director of Education and Training Adaptations Service, Inc. Presently she is the CETA (Comprehensive Employment and Training Act) Director for the Knoxville-Knox County Manpower Consortium. The Knoxville-Knox County Community Action Committee administers the CETA Program for the consortium.

Ms. Crawford is active in community and service organizations and activities. She currently serves on the advisory board of the Knoxville Women's Center and The University of Tennessee, Knoxville,

School of Social Work Continuing Education Department. She serves on the Board of Directors of the Beck Cultural Exchange Center and the Knoxville International Energy Exposition, Inc. She holds memberships in Phi Delta Kappa, Phi Lambda Theta, The American Educational Research Association, the Southeastern Employment and Training Association and many other service and professional organizations.