

AN ANALYSIS OF THE DEGREE OF RELIABILITY BETWEEN FOUR OBSERVERS
USING FLANDERS INTERACTION ANALYSIS

by

LARRY LESTER CARROLL

A study submitted to the Graduate Faculty in partial
fulfillment of the requirements for the degree

of

MASTER OF EDUCATION

in

EDUCATION

Approved:

Head, Major Department

Chairman, Examining Committee

Dean, Graduate Division

MONTANA STATE UNIVERSITY
Bozeman, Montana

August, 1968

ACKNOWLEDGMENT

The writer wishes to gratefully acknowledge the following who have helped so graciously in this study:

Dr. Melvin Rexroat of Idaho State University who unselfishly gave time, interest, and suggestions to the writer with such enthusiasm that he was sure to succeed and was gracious enough to process the data thru computers at Idaho State University.

Dr. Willis Vandiver of Montana State University, who laboriously struggled through the study as chairman of the writers committee.

Dr. Melvin Monson and Miss Laura Nicholson, committee members, whose efforts in the writers graduate program will always be remembered.

Mr. Gerald Sullivan who, with a quick smile and word of wisdom, managed to prod the writer on to the finish.

The principals and teachers from Emerson and Willson elementary schools in Bozeman who graciously allowed observers in their classrooms to gather the data.

Mrs. Willa Barsness, Mrs. Samuel Curtis, and Mr. Herman Tushaus who coded data as they observed with the writer in the various classrooms.

Most loyal in those acknowledged has been the writers wife, Jo Ann Carroll, who with great tolerance and dedication managed

to wade through the mess, endure the late hours, overlook the short temper, and even type the paper.

This study is dedicated to the ESEA Title III Program in Bozeman, Montana, in the hope that it will aid in their study of optimum learning conditions for elementary school children.

TABLE OF CONTENTS

Chapter	Page
I. INTRODUCTION	1
Statement of the Problem	2
Limitations	2
Procedures	3
II. REVIEW OF LITERATURE	8
III. PROCEDURE OF OBSERVATION AND PROCESSING OF DATA	15
Procedure of Observation	15
The Interpretation of Matrices	18
Processing of Data	21
IV. DIRECT AND INDIRECT TEACHER INFLUENCE	26
V. SUMMARY, CONCLUSIONS AND RECOMMENDATIONS	29
Summary and Conclusions	29
Recommendations	31
LITERATURE CITED	33
APPENDIX	35
Interaction Analysis Matrices	36

LIST OF TABLES

TABLE	PAGE
I. Tabulation Matrix	17
II. Reliability Between Observers	22

LIST OF FIGURES

FIGURE	PAGE
1. Categories of the Flanders System of Interaction	
Analysis	5
2. Matrix Area Identification	20

ABSTRACT

The main purpose of this study was to determine the degree of reliability of four observers using the Flander's system of coding verbal interaction in the classroom. The system is defined and identified in the study.

A secondary problem of this study was to describe the results of the data as it related to direct and indirect teacher influence measured by coding verbal interaction in each room.

Procedures

Teachers from grades K through 6 were requested to allow observations in their classrooms as four observers coded the verbal interaction. Flander's system was used since this system would later be used in the ESEA Title III Program and because a workshop was available at Montana State University to train observers. Sixty-nine observations were made, data was processed through I.B.M. computers, and the result was interpreted through this study in keeping with the stated purposes. Scott's co-efficient formula was used to determine reliability.

Conclusions

1. Reliability requires considerably more experience, coding practice from planned tape recordings, and time in discussing coding in various categories.
2. Reliability also depends on observers sitting where they can hear the same thing the other coding observers hear as they code.
3. Reliability is greatly affected by the number of tallies recorded each minute. Practice is a must so that observers can become consistent in number of tallies per minute, which should be around 20 per minute.
4. The second problem studied proved very satisfactory since the teachers observed were consistently indirect. This system of coding could give them opportunity to compare what really happened with their intentions.
5. New judgements must be discussed so that all observers treat them consistently.

CHAPTER I

INTRODUCTION

Among the host of new ideas and innovations being introduced into educational circles is the Flander's Interaction Analysis system. This system designed for coding verbal statements in the classroom is barely coming of age with only about ten years of research and application. At the present time, the field is surely in what will be considered, just a few years from now, a primitive stage (1).

The Department of Continuing Education at Montana State University secured the services of Dr. Melvin Rexroat of Idaho State University to conduct a workshop for Northwest Laboratories on Flander's Interaction Analysis. Three of our personnel in the ESEA Title III Program enrolled in the course to learn how to apply this technique in our Elementary Educational Research Center. The data for this study is the result of these three observers and Mr. Herman Tushaus, a learning specialist in the Bozeman Public School system who also participated in the workshop.

This system will continue to be used in our ESEA Title III Program in the Bozeman Elementary Schools. This paper will serve as a descriptive study of the introduction of Interaction Analysis for our program. The aims of the paper will be two-fold:

1. To study the problems of reliability between observers and
2. To describe the patterns of teacher-talk and the resulting pupil response obtained from this system of coding verbal statements in the classroom.

STATEMENT OF THE PROBLEM

The main purpose of this study was to determine the degree of reliability of four different observers in recodring certain verbal interaction in fifteen classrooms, Kindergarden through Sixth Grades, in the Bozeman Public Schools. A total of sixty-nine observations were made in these classrooms by the four observers.

A secondary problem of this study was to describe the results of the data as it related to direct and indirect teacher influence measured by our coding of verbal interaction in each room.

LIMITATIONS

This study is a pilot study designed to introduce the Flander's system of Interaction Analysis into the ESEA Title III Program. With only an introduction to the system, the writer feels the following limitations should be acknowledged:

1. The sources for reference and research have been limited to the text, Interaction Analysis. It was edited by Amidon and Hough with an introduction by Ned A. Flanders. This book is a compilation of theory, research, and application taken from selected readings about early and current efforts to code verbal behavior in the classroom.
2. The exposure as observers and trainees for this system, has been limited to one individual, Dr. Melvin Rexroat, Idaho State University.

3. The time for gathering data was limited, being consolidated into three brief weeks of observations and coding.
4. The training period was limited to three week-end sessions with Dr. Rexroat totaling about twenty-seven hours. The observers coded from tapes twice before going into the classroom. However, they did tape the first ten sessions and were able to go back and recode or compare to gain a better feel for the system and a higher degree of reliability.
5. The observers were also limited by not being able to attend the advanced course in Interaction Analysis to be conducted in June at Western Montana College, Dillion.
6. The observers were limited to fifteen classrooms since teachers were given the opportunity to volunteer their classes for this study, or say they didn't want to be bothered this year.
7. The observers limited the observations to two schools, one kindergarten through fourth grades and the other, a fifth and sixth intermediate school.

PROCEDURES

To become acquainted with this system of classroom analysis the observers enrolled in the workshop conducted by Dr. Melvin Rexroat of Idaho State University at Montana State University of Continuing Education. They learned that the Flander's Interaction Analysis system is one of several systems designed to measure verbal behavior in the classroom. The need for such a system was suggested by these three facts:

Two-thirds of all classroom time is taken up in talking.
Two-thirds of this time is taken up by the teacher.
Two-thirds of the teacher-talk is direct.

The system is not suggesting that one should ignore non-verbal behavior as an influence in the classroom and acknowledges that non-verbal influence is a very important factor in classroom behavior both in teaching and student interaction. However, the system does suggest that since so much of the time in the classroom is taken up with verbal behavior, a system of analysis of such behavior is of prime importance to the teacher.

Flander's system consists of ten categories describing verbal behavior. The categories are described in Figure I on the following page. The first four categories indicate the indirect influence of teacher-talk while the next three categories deal with direct influence in teacher-talk. Categories eight and nine are designed to distinguish between direct student response and student-initiated response but both deal with pupil-talk. The tenth category indicates silence or confusion. The first task was to understand the categories and to memorize each by its coded number.

The second phase of becoming acquainted with the system was to learn to listen to verbal interaction (teacher-pupil talk) on tapes as Dr. Rexroat wrote the category number on the board for the class to observe. He explained that the problem of observer training is twofold: first, converting men into machines, and second, keeping them in that condition while they are observing. After memorizing the categories, training begins with recordings of classroom interaction.

OF INTERACTION ANALYSIS

TALK	INDIRECT INFLUENCE	1. ACCEPTS FEELING: accepts and clarifies the feeling tone of the students in a nonthreatening manner. Feelings may be positive or negative. Predicting or recalling feelings are included.
		2. PRAISES OR ENCOURAGES: praises or encourages student action or behavior. Jokes that release tension, not at the expense of another individual, nodding head or saying "um hm?" or "go on" are included.
TEACHER	DIRECT INFLUENCE	3. ACCEPTS OR USES IDEAS OF STUDENT: clarifying, building or developing ideas suggested by a student. As teacher brings more of his own ideas into play, shift to category 5.
		4. ASKS QUESTIONS: asking a question about content or procedure with the intent that a student answer.
STUDENT	TALK	5. LECTURING: giving facts or opinions about content or procedure. Expressing his own ideas, asking rhetorical questions.
		6. GIVING DIRECTIONS: directions, commands, or orders which a student is expected to comply with.
SILENCE OR CONFUSION		7. CRITICISING OR JUSTIFYING AUTHORITY: statements intended to change behavior from nonacceptable to acceptable pattern; bawling someone out; stating why the teacher is doing what he is doing; extreme self-reference.
		8. STUDENT TALK-RESPONSE: talk by student in response to teacher. Teacher initiates the contact or solicits student statement and sets limits to what the student says.
		9. STUDENT TALK-INITIATION: talk by students which they initiate. Students initiate or express their own ideas. If "calling on" student is only way to indicate who may talk next, observer must decide whether student wanted to talk. If he did, use this category. Shift from 8 to 9 as student introduces own ideas.
		10. SILENCE OR CONFUSION: pauses, short periods of silence and periods of confusion in which communication cannot be understood by the observer.

It is desirable to have a variety of training tapes that provide unusual examples of indirect or direct influence patterns and to have an exact category distribution for each tape. Observer trainees seem to learn faster, working with tapes, in teams of two or more. They can start and stop the playback to discuss each classification; an experienced observer on hand is helpful and frequent, but short straight runs without interruption should be carried out to develop a consistent tempo.

To become proficient in applying this system one must be able to categorize verbal behavior and record the results by number every three seconds. To illustrate, if a teacher were lecturing, a series of fives would occur at three-second intervals. Suppose the teacher then asked a question (category four) to which the student responded (category eight). The analysis would appear as follows: 5-5-5-5-5-5-5-5-5-5-5-5-5-5-5-5-4-4-4-8-8-8-8. To the trained observers this series of numbers tell a story of verbal behavior, use of time, and teacher-pupil interaction all in a time block of ninety seconds.

Following the suggested procedures, the class borrowed tapes, practiced coding, discussed the categories, and moved to live coding in the classroom. The writer suggested that they make this pilot study for his professional paper this quarter. Four observers visited fifteen classrooms, Kindergarden through sixth grades, four sixty-nine observations. This data was processed through I.B.M. computers at Idaho State University. Soctt's co-effieient formula was used to check reliability between observers. The data description was given in

lieu of direct and indirect teacher influence in the classroom through verbal interaction.

CHAPTER II

REVIEW OF LITERATURE

The literature review section of this paper is confined to the text by Amidon and Hough (1), two periodicals, and excerpts from selected readings by Dr. Rexroat. The writer will attempt to briefly describe the different authorities methods for analyzing verbal behavior.

Amidon and Hough's book of readings is an excellent collection of descriptive studies on Interaction Analysis. There is a rather comprehensive listing of the very best references in this book of readings. It refers to theory, research, and application of Interaction Analysis.

Amidon and Hunter (3) published this second reference in the review to stimulate analysis of classroom interaction in the interest of improving teaching. It provides excellent simulation and role playing materials for methods classes in teacher education for carrying on a study of teaching behaviors. It centers around seven "intents" that teachers engage in implicitly or explicitly as they carry on classroom dialogue: planning, informing, leading discussions, disciplining, counseling, and evaluating. The VICS (Verbal Interaction Category System) developed by Amidon is employed (along with several other observation tools) in "analyzing" each situation and in providing "skill sessions" using the situational descriptions.

Another good reference is a publication concerning workshops on Interaction Analysis (4). Edmund Amidon is staff coordinator and advisor. Brochures and Interaction Analysis training kits, levels I and II are included in this material.

The Classroom Interaction Newsletter (5) is a "must" reading for anyone using Interaction Analysis in teaching as well as research. The volume at present is on multilith off-set but the quality of the articles is excellent. It provides many "leads" to what others are doing in the field.

New Flanders, for whom this system is named, has the following to say concerning Interaction Analysis:

Systems for coding verbal statements in the classroom are barely coming of age. Where three or four researchers were at work, there are now thirty or forty. The progress made each year in the technical aspects of observation, in the knowledge that we are gaining about what a teacher does while teaching, in efforts to help a teacher change his behavior, and in knowing how to create more effective classroom learning continues to increase. Here are some predictions which should be realized during the next few years.

Coding systems with as many as 100 categories will be plotted by computers into matrices that contain 10,000 cells. In effect this will be a 10,000 category system. It will be possible to code with this many categories at higher rates and reliability than were possible with John Whithall's seven categories back in 1948. Such systems will prove of interest to researchers, but may have limited practical application.

Observers, whose purpose is to help teachers understand patterns of their own overt behavior, will be trained to use a half-dozen different category clusters. A teacher wishing to study certain cognitive aspects of classroom discourse will request those clusters which provide the information desired. Another, wishing to improve his utilization of ideas expressed by the pupils, will request a different cluster. With these different category clusters to choose from, fellow teachers or older pupils who are trained can code interaction in order to provide the observed teacher with a perspective of his own behavior that otherwise could not be obtained. (1)

Of course, with the above mentioned systems will come technical devices to give instant feedback, enhancing its use in the classroom.

A variety of systems designed to analyze pupil-teacher interaction in the classroom have been developed by Withall (1949), Anderson (1939), Smith (1960), Aschner (1959), Hughes et al. (1959), Madley and Mitzell (1958) and Amidon and Flanders (1963) among others. (1)

One of the best known systems for examining verbal interactive classroom behavior was developed by Flanders in the 1950's.

The Flanders system is concerned with verbal behavior only, primarily because it can be observed with a higher reliability than can nonverbal behavior. The assumption is made that the verbal behavior of an individual is an adequate sample of his total behavior. The following description is quoted from the text (1, p. 121) in an effort to describe the Flanders system.

In the Flanders system of interaction analysis all teacher statements are classified first as either indirect or direct. This classification gives central attention to the amount of freedom the teacher grants to the student. In a given situation therefore, a teacher has a choice. He can be direct, that is, minimizing the freedom of the student to respond, or he can be indirect, maximizing the freedom of the student to respond. His choice, conscious or unconscious, depends upon many factors, among which are his perceptions of the situations and the goals of the particular learning situation.

In order to make total behavior or total interaction in the classroom meaningful, the Flanders system also provides for the categorizing of student talk. A third major section, that of silence or confusion, is included in order to account for the time spent in behavior other than that which can be classified as either teacher or student talk. All statements that occur in the classroom, then, are categorized in one of three major sections: (a) teacher talk, (b) student talk, and a separate category, (c) silence or confusion, used to handle anything else that is not teacher or student talk.

The larger sections of teacher and student verbal behavior are subdivided in order to make the total pattern of teacher-pupil interaction more meaningful. The two subdivisions for teacher

verbal behavior; indirect and direct teacher talk, are further divided into smaller categories. Indirect influence consists of four observation categories: 1. accepting feeling, 2. praising or encouraging, 3. accepting ideas, and 4. asking questions. Direct influence is divided into three categories: 5. lecturing, 6. giving directions, and 7. criticizing or justifying authority. Student talk is divided into only two categories: 8. responding to teacher, and 9. initiating talk. All categories are mutually exclusive, yet totally inclusive of all verbal interaction occurring in the classroom.

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 write approximately twenty numbers per minute; thus, 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.

No matter whether he is using a live classroom or a tape recording for his observations, it is best for the observer to spend five to ten minutes getting oriented to the situation before he actually begins to categorize. He then has a feeling for the total atmosphere in which the teacher and pupils are working. After he has begun to get the feeling of the classroom interaction, he begins to record the interaction.

The observer stops classifying whenever the classroom activity is changed so that observing is inappropriate as, for instance, when there are various groups working around the classroom, or when children are working on workbooks or doing silent reading. He will usually draw a line under the recorded numbers, make a note of the new activity, and resume categorizing as the total class discussion continues. At all times the observer notes the kind of class activity he is observing. The reading group in the elementary school is obviously different from an informal discussion period, a review of subject matter, a period of supervised seat work, teacher-directed discussion, introduction of new material, or evaluation of a completed unit. Such diverse activities may be expected to show different types of teacher-pupil interaction even when guided by the same teacher. A shift to new activity should also be noted.

Because of the complexity of the problems involved in categorization, several ground rules have been established. These rules of observation aid in developing consistency in trying to categorize teacher behavior. They have been useful in working in classrooms with all subject areas and at all grade levels.

- Rule 1: When not certain in which of two categories a statement belongs, choose the category that is numerically farther-est from category 5. This is true except when one of the two categories in doubt is category 10, which is never chosen if there is an alternate category under consideration.
- Rule 2: If the primary tone of the teacher's behavior has been consistently indirect, do not shift into the opposite classification unless a clear indication of shift is given by the teacher.
- Rule 3: The observer must not be overly concerned with his own biases or with the teacher's intent. Rather, he must ask himself the question, "What does this behavior mean to the pupils as far as restriction or expansion of their freedom is concerned?"
- Rule 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.
- Rule 5: If a silence is longer than three seconds, it is recorded as a 10. (This rule is listed because observers tend to ignore short periods of silence.) (1, pp. 121-128).

The Verbal Interaction Category System (VICS), is based on the Flanders system, but has been further developed in an attempt to overcome some of the limitations of that as well as other systems. It contains five major categories for analyzing classroom verbal behavior. There are: 1. Teacher-initiated talk, 2. Teacher response, 3. Pupil response, 4. Pupil-initiated talk, 5. other.

Perhaps the primary difference between the Flanders system and the system discussed here is that the dimension of teacher behavior pointed up in the Flanders system is directness as opposed to indirectness. The point is made that no value is implied, but there is argument about whether direct or indirect behavior is more desirable. Direct teacher

influence as opposed to indirect is not a dimension of the VICS. The teacher categories are looked at rather in terms of initiation and response. (1, p. 145)

The VICS system also allows for the division of teacher questions into "narrow," which bring forth predictable responses, and "broad," which elicit unpredictable responses, while Flanders system has only one category for questions by the teacher.

Another difference between these two systems is in the area of pupil talk. In keeping with the teacher questions, pupil response is categorized as predictable or unpredictable. Flanders system has one category to indicate silence or confusion, while the VICS separates these two.

The Flanders system has three categories for reacting positively to pupils, but only one for reacting negatively. The VICS has three for each, accepting or rejecting pupils' ideas, behavior, or feeling.

The VICS has seventeen categories compared to Flanders ten, and thus is harder to learn and use. (1, p. 146)

The Observational System for Interaction Analysis is a sixteen category system that has been developed to test instructional hypotheses generated from learning theory. The sixteen categories of the system have been grouped into four major subdivisions: 1. Teacher indirect verbal behavior, 2. Teacher direct verbal behavior, 3. Student verbal behavior, and 4. Silence or non-functional verbal behavior.

The major contribution of this system lies in its potential for testing instructional hypotheses derived from learning theory. In the

area of student verbal behavior, two types of student-declarative responses have been categorized. These two types of responses have been called elicited responses and emitted responses. Elicited responses are distinguished from emitted responses on the basis of prior conditioning and the predictability of the response. Such a distinction makes possible the study of the differential effects of several types of reinforcement given by a teacher following responses which have been previously conditioned as compared with responses which have not been previously associated with a specific stimulus. Addition of these two categories allows the function of teacher information-giving to be analyzed in terms of whether it is initiated by the teacher or by student questions.

It is therefore characteristic of this system that the categories have been developed so as to focus on observable behaviors that are commonly associated with principles of learning drawn from learning theory. The testing of hypotheses regarding the effects of instructional behavior on student learning seems to be the major contribution of this system. (1, p. 150-151)

The variety of systems all seem to point back to Flanders system as the most practical and best all-around analysis of classroom interaction. Since the training in the workshop in Bozeman used Flander's system and since most of the research read suggested the ten category system as a beginning point, this study has been limited to Flanders system. The category system used is graphically illustrated in Figure 1 on page 5.

CHAPTER III

PROCEDURE OF OBSERVATION AND PROCESSING OF DATA

It is necessary for the reader to understand the procedure of observation, recording of coded information on the matrix, and significance of areas within the matrix if he is to appreciate what this writer has done in processing this data.

Procedure of Observation

The observer sits in a classroom in the best position to hear and see the participants. At the end of each three-second period, he decides which category best represents the communication events just completed. He writes this category-number down while simultaneously assessing communication in the next period and continues at a rate of 20 to 25 observations per minute, keeping his tempo as steady as possible. His notes are merely a series of numbers written in a column, top to bottom, so that the original sequence of events is preserved. Occasionally marginal notes are used to explain the class formation or any unusual circumstances. When there is a major change in class formation, the communication pattern, or the subject under discussion, a double line is drawn and the time indicated. As soon as the total observation is completed the observer retires to a nearby room and completes a general description of each separate activity period separated by the double lines, including the nature of the activities, the class formation, and the position of the teacher. The observer also notes any additional facts that seem pertinent to an adequate interpretation and recall of the total visit.

The ten categories that we used for interaction analysis are shown in Figure # 1 on page 5.

The numbers that an observer writes down are tabulated in a 10 x 10 matrix as sequence pairs, that is, a separate tabulation is made for each overlapping pair of numbers. An illustration will serve to explain this procedure.

Teacher: "Class! The bell has rung. May I have your attention please! (6) During the next three seconds talking and noise diminish. (10)

Teacher: "Jimmy, we are all waiting for you." (7) Pause.

Teacher: "Now today we are going to have a very pleasant surprise, (5) and I think you will find it very exciting and interesting (1). Have any of you heard anything about what we are going to do? (4)

Pupil: "I think we are going on a trip in the bus that's out in front. (8)

Teacher: "Oh! You've found out! How did you learn about our trip?" (4)

By now the observer has written down 6, 10, 7, 5, 1, 4, 8, 4. As the interaction proceeds the observer will continue to write down numbers. To tabulate these observations in a 10 x 10 matrix, the first step is to make sure that the entire series begins and ends with the same number. The convention we use is to add a 10 to the beginning and end of a series, unless the 10 is already present. Our series now becomes 10, 6, 10, 7, 5, 1, 4, 8, 4, and 10.

These numbers are tabulated in a matrix one pair at a time. The column is indicated by the second number, the row is indicated by the first number. The first pair is 10-6; the tally is placed in row 10, column 6 cell. The second pair is 6-10; tally this in the row 6 column 10 cell. The third pair is 10-7, the fourth pair is 7-5 and so on. Each pair overlaps with the next and the total number of observations, "N", always will be tabulated by N-1 tallies in the matrix. In this case we started a series that produced nine tallies in the matrix.

Table one on the following page shows our completed matrix. Notice that in a correctly tabulated matrix the sums of the corresponding rows and columns are equal. (6)

The problem of reliability is extremely complex and a more complete discussion can be found in the later section of this paper titled Processing of Data. Education students can learn how to make quick field checks of their reliability and work toward higher reliability under the direction of an instructor.

TABLE I

TABULATION MATRIX

Category	1	2	3	4	5	6	7	8	9	10	Total
1				1							1
2											0
3											0
4								1		1	2
5	1										1
6										1	1
7					1						1
8				1							1
9											0
10						1	1				2
Total	1	0	0	2	1	1	1	1	0	2	9

THE INTERPRETATION OF MATRICES

A matrix should have at least 400 tallies, covering about twenty minutes or more of a homogeneous activity period, before attempting to make an interpretation.

Certain areas within the matrix are particularly useful for describing teacher influences. Some of these areas will now be discussed by making reference to Figure 2.

The column totals of a matrix are indicated as Areas "A", "B", "C", and "D". The figures in these areas provide a general picture by answering the following questions. What proportion of the time was someone talking compared with the portion in which confusion or no talking existed? When someone was talking, what proportion of the time was used by the students? By the teacher? Of the time that the teacher talked, what proportion of his talk involved indirect influence? Direct influence?

The answers to these questions form a necessary backdrop to the interpretation of the other parts of the matrix. If student participation is about 30 or 40 per cent, we would expect to find out why it was so high by studying the matrix. If the teacher is direct or indirect, we would expect certain relationships to exist with student talk and silence.

The next two areas to consider are areas "E", and "F". Evidence that categories 1, 2, and 3 were used for periods longer than three seconds can be found in the diagonal cells, 1-1, 2-2, and 2-2. The other six cells of Area E indicate various types of transitions between these three categories. Sustained praise or clarification of student ideas is especially significant because such elaboration often involves criteria for praise or reasons for accepting ideas and feelings. The elaboration of praise or student ideas must be integrated with the content being discussed by the class.

Area F is a four-cell combination of giving directions (category 6) and giving criticisms or self-justification (category 7). The transition cells 6-7 and 7-6 are particularly sensitive to difficulties that the teacher may have with classroom discipline or resistance on the part of students. When criticism follows direction follows criticism, this means that the students are not complying satisfactory. Often, there is a high loading on the 6-9 cell under these circumstances. Excessively high frequencies in the 6-6 cell and 7-7 cells indicated teacher domination and supervision of the students' activities. A high loading of tallies of the 6-6 cell alone often indicates that the teacher is merely giving lengthy directions to the class.

The next two areas to be considered are Areas G and H. Tallies in these two areas occur at the instant the student stops talking and the teacher starts.

Area H indicates those instances in which the teacher responds to the termination of student talk with indirect influence. An interesting comparison can be made by contrasting the proportion G to H versus the proportion A to B. If these two proportions are quite different, it indicates that the teacher tends to act differently at the instant that a student stops talking compared with his overall average. Often this is a mark of flexible teacher influence.

There are interesting relationships between Area E and Area G and between Areas F and H. For example, Area G may indicate that a teacher responds indirectly to students at the instant they terminate their talk, but an observer may wish to inspect Area E to see if this indirect response is sustained in any way. The same question with regard to direct influence can be asked of Area F and H. Areas G and H, together usually fascinate teachers. They are often interested in knowing more about their immediate response to student participation.

Area I indicates an answer to the question, what types of teacher statements trigger student participation? Usually, there is a high tally loading in cells 4-8 and 4-9. This is expected because students often answer questions posed by the teacher. A high loading on the 4-8 and 8-4 cells alone usually indicates classroom drill directed by the teacher. The contrast of tallies in columns 8 and 9 in this area gives a rough indication of the frequency with which students initiate their own ideas versus respond to those of the teacher.

Area I is often considered in combination with Area J. Area J indicates either lengthy student statements or sustained student-to-student communication. An above average frequency in Area C, but not in Area J indicates that short answers, usually in response to teacher stimulation, have occurred. One would normally expect to find frequencies in Area E positively correlated with frequencies in Area J.

CATEGORY	CLASSIFI- CATION	CATE- GORY	1	2	3	4	5	6	7	8	9	10	TOTAL												
ACCEPTS FEELING	INDIRECT INFLUENCE	1	AREA E																						
PRAISE		2																							
STUDENT IDEA		3																							
ASKS QUESTIONS	DIRECT INFLUENCE	4	"CONTENT CROSS"										AREA I												
LECTURES		5																							
GIVES DIRECTIONS		6																							
CRITICISM	STUDENT TALK	7	AREA F																						
STUDENT RESPONSE		8																							
STUDENT INITIATION		9																							
SILENCE		10	AREA G										AREA J												
		TOTAL											AREA A										AREA B	AREA C	AREA D
																							Indirect Teacher Talk		
						Direct teacher talk																			

FIGURE 2

MATRIX AREA IDENTIFICATION

PROCESSING OF DATA

As previously stated, four observers visited fifteen classrooms, kindergarten through sixth grades, collecting coded data on I.B.M. cards for sixty-nine observations. I.B.M. computers at Idaho State University, by direction of Dr. Melvin Rexroat, processed this coded data producing the matrices included at the end of this paper. The first aim of this paper was to determine a degree of reliability using Scott's co-efficient formula.

Scott calls his co-efficient "pi" and it is determined by the two formulae below.

$$\pi = \frac{P_o - P_e}{1.00 - P_e}$$

P_o is the proportion of agreement, and P_e is the proportion of agreement expected by chance which is found by squaring the proportion of tallies in each category and summing these over all categories.

$$P_e = \sum_{i=1}^k P_i^2$$

In formula two there are K categories and P_i is the proportion of tallies falling into each category. π , in formula one, can be expressed in words as the amount that two observers exceeded chance agreement divided by the amount that perfect agreement exceeds chance.

A Scott co-efficient of 0.85 or higher is a reasonable level of performance. (1, p. 166)

The following Table shows the degree of reliability between the four observers whose data was processed for this paper.

TABLE II

RELIABILITY BETWEEN OBSERVERS

Observers	Class	Observation	%Reliability
Carroll/Tushaus	Rdg. 5th	1	85
Carroll/Curtis	Math. 5th	1	71
Carroll/Tushaus	Science 6th	1	75
Carroll/Curtis	" "	2	67
Carroll/Curtis	Eng. 5th	1	48
Carroll/Curtis	" "	2	81
Carroll/Tushaus	" "	2	75
Carroll/Tushaus	S. S. 5th	1	59
Carroll/Curtis	K-F	1	0
Carroll/Barsness	K-F	1	55
Curtis/Barsness	K-F	1	0
Carroll/Curtis	K-W	1	26
Carroll/Barsness	K-W	1	16
Curtis/Barsness	K-W	1	28
Carroll/Curtis	K-W	2	61
Carroll/Barsness	K-W	2	60
Curtis/Barsness	K-W	2	43
Carroll/Curtis	1-G	1	42-50
Carroll/Barsness	1-G	1	0
Barsness/Curtis	1-G	1	41
Carroll/Curtis	1-H	1	63
Carroll/Barsness	1-H	1	59
Curtis/Barsness	1-H	1	69
Carroll/Curtis	1-H	2	0
Carroll/Barsness	1-H	2	37
Curtis/Barsness	1-H	2	0
Carroll/Curtis	2-B	1	14
Carroll/Barsness	2-B	1	20
Curtis/Barsness	2-B	1	28

TABLE II CONTINUED

Observers	Class	Observation	%Reliability
Carroll/Curtis	2-B	2	58
Carroll/Barsness	2-B	2	39
Curtis/Barsness	2-B	2	15
Carroll/Curtis	2-S	1	55
Carroll/Curtis	2-S	2	41
Carroll/Barsness	2-S	2	50
Curtis/Barsness	2-S	2	3
Carroll/Curtis	3-Mi	1	49
Carroll/Barsness	3-Mi	1	32
Curtis/Barsness	3-Mi	1	74
Carroll/Curtis	3-M	1	50
Carroll/Barsness	3-M	1	15
Curtis/Barsness	3-M	1	62
Carroll/Curtis	3-M	2	15
Carroll/Barsness	3-M	2	0
Curtis/Barsness	3-M	2	63
Carroll/Curtis	4-S	1	0
Carroll/Barsness	4-S	1	87
Barsness/Curtis	4-S	1	0
Carroll/Curtis	4-S	2	82
Carroll/Barsness	4-S	2	55
Curtis/Barsness	4-S	2	50
Carroll/Curtis	4-R	1	0
Carroll/Barsness	4-R	1	0
Curtis/Barsness	4-R	1	0
Carroll/Curtis	4-R	2	55
Carroll/Barsness	4-R	2	45
Curtis/Barsness	4-R	2	85

The writer was quite thrilled to compute the formula on the first set of data in Table 2 and find a 0.85 degree of reliability. But as you can see, this sweet smell of success was short lived! In fact, many times there was no compatibility between the observations. The task now became one of finding out why. But before we go into the analysis of the data in Table 2, notice the step by step method of computing the formula for the first reliability check on this table.

$$\begin{aligned} \pi &= \frac{P_o - P_e}{1.00 - P_e} & P_o &= \sum_{i=1}^k |R_{i1} - R_{i2}| - 100 \\ \pi &= \frac{.87 - .1478}{1.00 - .1478} & P_o &= \begin{array}{cccccccccccc} 0 & 3 & 9 & 13 & 13 & 17 & 1 & 16 & 7 & 22 \\ -0 & -2 & -8 & -13 & -13 & -16 & -1 & -15 & -5 & -20 \\ 0 & +1 & +1 & 0 & +5 & +1 & 0 & +1 & +2 & +2 \end{array} = 13 \\ \pi &= \frac{.7222}{.8522} & P_o &= 100 - 13 = .87 \\ \pi &= .8474 & P_e &= \sum R_i^2 \\ \pi &= \underline{0.85} & P_e &= 0^2 + 2^2 + 9^2 + 13^2 + 13^2 + 17^2 + 1^2 + 16^2 + 5^2 + 22^2 \\ & & P_e &= \underline{.1478} \end{aligned}$$

What caused the inconsistency and low or no degree of reliability? The answer to this question is of great importance to the ESEA Title III program if we are to use the Flanders Interaction Analysis system.

The first coding session is computed in rows 11, 12, and 13 in the table. The degree of reliability was 26% on the Carroll/Curtis reliability check, 16% on the Carroll/Barsness, and 28% on the Curtis/Barsness check.

Close examination revealed three major problems. First, three observers confused categories 5 and 6 in the teacher talk and categories

8 and 9 in the student talk. By adding these tallies before we apply the formula for reliability, the percent increases significantly.

Second, two observers for this session were close together, while the third observer was across the room. The two observers who were together recorded 53 and 41 tallies in category 10 due to inability to hear, while the other observer recorded only 19 tallies in category 10. This principle proved consistent throughout the reliability check. In every case of low reliability there was a significant difference in the total tallies in category 10. By eliminating this category, the degree of reliability increased 25% to 63%.

A third factor that also proved more significant than had been anticipated by the observers was the total number of tallies in the matrix. This first observation varied from 211 to 361. The other observer had 294 which was nearer the 20 tallies per minute suggested by Ned Flanders for a fifteen minute observation. The wide variation in timing proved to be a lethal factor in determining reliability.

By meeting and listening to the tapes of these sessions, the observers were able to identify many of the 10's, rhythmically close the gap in total tallies per session, and learn the importance of listening carefully to what is said.

CHAPTER IV

DIRECT AND INDIRECT TEACHER INFLUENCE

A secondary problem of this study was to describe the results of the data as it related to direct and indirect teacher influence measured by our coding of verbal interaction in each room. The Flander's system refers to the total number of indirect teacher statements divided by the total number of indirect teacher statements divided by the total number of direct teacher statements as the I/D ratio. This is a statistical description of classroom climate which the writer will use to describe the ratio of indirect and direct influence of teacher talk as measured through Flander's coding system.

Since a standard or norm was needed in order to compare the results of this study and arrive at some conclusion, the writer selected the following results in which one hundred sixty separate classroom observations were made. A minimum of 25 classrooms was observed at each grade level with a minimum of 5 observations in each of the subject areas of arithmetic, social studies, and reading at each grade level. In grades one and two the I/D ratio for all subject areas is between 1 and 1.4 indicating that the teacher uses more indirect statements than direct statements. The I/D ratio for arithmetic and reading in the third and fourth grades varies between 0.6 and 0.9, indicating more direct influence than indirect influence. Social Studies I/D's for these grade levels are 1.2 and 1.32 respectively, or slightly more indirect. In the fifth and sixth grades, the I/D's are down to 0.60 and

1.0 respectively. This is indicative of more direct than indirect influence at these grade levels. (1, p. 168)

Several studies in the Amidon-Hough (1) book of readings indicated that the children taught by the indirect teacher learned more than did the children taught by the direct teacher. (1. p. 216, 232) If such a conclusion can be drawn, teachers may want to present their lessons in less direct ways. Assuming that indirect teacher influence is desirable, the results of data collected for this paper is encouraging.

When the data in this study was processed, the following results were found:

1. Grades one and two had an I/D ratio of 1.95.
2. The I/D ratio for grades three and four averaged 1.18.
3. Grades five and six had an I/D ratio of 1.05.

It was also found that the kindergarten and first grade teachers ask many more questions than did teachers at any other grade level and that the fifth and sixth grade teachers used more, much more, lecture than other teachers. Another very interesting observation in terms of influence which excludes content, was that the fifth and sixth grade teachers showed more indirect patterns than did teachers in K through fourth grades.

This study also reveals that praise was most used in kindergarten first and second grades. It decreased to its lowest point in third and rose again in fifth and sixth grades. Praise was highest in science and social studies and lowest in reading and arithmetic. These findings support those suggested by Amidon and Furst in a paper published in

the research by Amidon and Hough. (1, p. 168 ff.) A summary of these findings is made in the second paragraph of this chapter.

CHAPTER V

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

SUMMARY AND CONCLUSIONS

This study in the use of Interaction Analysis examined some of the things that might be learned through efforts to code verbal statements during spontaneous classroom communication and to compare the frequencies of different kinds of coded statements to other measures of the classroom situation. Data collected through the use of interaction analysis can be looked at from several different points of view. The total number of direct tallies recorded in an observation. Teacher talk can be compared to student talk and the number of tallies in each specific category can be noted and compared with one another.

The matrix provides an opportunity to analyze even more specifically the amount of time certain patterns of teacher influence occur. The matrix may be studied to determine which cells are heavy with tallies and which ones are empty.

The primary problem studied in this paper was the degree of reliability between four observers learning to use Flander's Interaction Analysis in a live classroom situation in the Bozeman Elementary Schools. The results indicated a low reliability in the majority of coding sessions, but also suggested some reasons why this occurred. Three major problems that hindered reliability were found in this study.

1. Categories 5 and 6 were confused by the observers. This was due to inexperience with the Flander's system and also due to

not spending enough time in each classroom to get acquainted with the teacher. Categories 8 and 9 were also confused by the observers as student response was coded. Again, a lack of experience proved very damaging as reliability checks were compared between observers.

2. The second problem that hindered reliability was the distance between observers in the classroom. The study emphasized the importance of each observer being in a position to hear. Differences in total tallies in category 10 (silence or confusion) resulted in 24% to 63% difference in reliability. Observers must be seated where they can hear, as nearly as possible, the same things if there is to be a high degree of reliability.
3. The third problem found in this study was the variance in the total number of tallies in each observer's matrix. Again, this is due to inexperience. More practice was needed for the observers to become more rhythmic and machine-like in their number of tallies per minute. The goal is approximately 20 tallies per minute.

By meeting and listening to the tapes of ten of these sessions, the observers were able to identify many of the 10's, rhythmically close the gap in total tallies per session, and learn the importance of listening carefully to what is said.

RECOMMENDATIONS

The experience of working on this project has provided excellent opportunity for the writer to observe classroom climate and speculate on ways the climate might be directed toward optimum learning conditions. Flander's Interaction Analysis is an excellent tool for assessing effective use of time and analyzing teaching patterns being used in classrooms. It is assumed that further observation and research will result in better learning conditions in the Bozeman Elementary Schools as follow-up work is pursued in the Elementary Educational Research Center.

The writer was impressed with the system of interaction analysis and its potential use in the classroom. The following suggestions are given in the hope of improving classroom climate.

1. Teachers should learn more about verbal behavior and its affect on instruction will be benefited from this system for analyzing verbal behavior in the classroom since it offers teachers, future teachers, and supervisors a tool that can provide objective data about teaching behavior. Objective feedback is a necessary component of teacher growth and change, and educators must continue the process of developing and working with effective feedback systems.
2. Observers, training for coding, need to have access to a variety of training tapes that provide unusual examples of indirect or direct influence patterns and to have an exact

category distribution for each tape. An experienced observer on hand is helpful and frequent but short straight runs without interruption should be carried out to develop a consistent tempo. Six to ten hours of preliminary training with tapes is necessary before moving into "live" classrooms. (1, p. 159) Since most observer teams must maintain their reliability over periods of time that may be as long as three to nine months, new judgements must be discussed so that all observers treat them consistently.

3. The writer recommends that teachers learn this system of classroom interaction since it aids teachers in developing new (to them) concepts as tools for thinking about their behavior and the consequences of their behavior.

LITERATURE CITED

LITERATURE CITED

1. Amidon, Edward and Hough, John B. Interaction Analysis: Theory, Research and Application. Addison-Wesley Publishing Co. Palo Alto. 1967.
2. Amidon, Edmund, and Furst, Norma. "Teacher-Pupil Interaction Patterns in the Teaching of Reading in the Elementary School." The Reading Teacher. p. 283-287, January, 1965.
3. Amidon, Edmund and Hunter, Elizabeth. "Verbal Interaction in the Classroom: The Amidon System of Interaction Analysis". Temple University, Philadelphia, Pennsylvania.
4. Workshops on Interaction Analysis. Edmund Amidon staff coordinator. Association for Productive Teacher. Minneapolis, Minnesota.
5. Classroom Interaction Newsletter. Edited by Dr. Anita Simon. Temple University, Philadelphia, Pennsylvania.
6. Flanders, Ned A. Intent, Action and Feedback: A Preparation For Teaching. University of Michigan. The Journal of Teacher Education 14, No. 3: 251-260, September 1963.
7. Flanders, Ned A. Interaction Analysis: A Technique for Qualifying Teacher Influence. University of Michigan, 1961.

APPENDIX

TABLE III Reich, 5th Reading, Session 1, Tushaus

INTERACTION ANALYSIS

	1	2	3	4	5	6	7	8	9	10	SUM
1	0	0	0	0	0	0	0	0	0	1	1
2	0	0	3	4	1	1	0	1	1	3	14
3	0	5	1	13	12	3	0	1	6	1	42
4	0	0	0	6	2	1	0	58	0	3	70
5	0	0	0	4	39	17	0	4	4	30	98
6	1	0	1	3	25	32	1	1	6	17	87
7	0	0	0	2	0	1	0	0	3	1	7
8	0	4	17	31	2	2	2	15	2	7	82
9	0	4	17	0	3	4	2	0	4	3	37
10	0	2	3	7	14	26	2	2	11	44	111
TOTAL	1	14	42	70	98	87	7	82	37	111	549
TIMES	1	14	41	64	59	55	7	67	33	67	
PERCENT	0.	3.	8.	13.	18.	16.	1.	15.	7.	20.	
0.58	TOTAL TEACHER RATIO										
0.22	TOTAL PUPIL RATIO										
0.66	I/D RATIO										
0.61	REVISED I/D RATIO										
5.25	REVISED I/D RATIO ROW 8										
4.20	REVISED I/D RATIO ROWS 8-9										
0.00	EXTENDED INDIRECT INFLUENCE RATIO										
0.06	EXTENDED DIRECT INFLUENCE RATIO										
0.03	EXTENDED I/D RATIO										
0.25	CELL 3/9 RATIO										
0.06	THE VICIOUS CIRCLE RATIO										
2.22	PUPIL-TALK RATIO										

TABLE IV Reich, 5th Reading, Session 1, Carroll

INTERACTION ANALYSIS

	1	2	3	4	5	6	7	8	9	10	SUM
1	0	0	0	0	0	1	0	0	0	1	2
2	1	0	5	2	1	1	0	1	2	1	14
3	0	9	2	18	9	5	0	1	5	3	52
4	0	0	0	5	2	1	1	62	1	4	76
5	0	0	1	5	35	14	0	3	1	16	75
6	0	0	2	3	21	42	1	3	2	26	100
7	0	0	0	3	0	0	1	1	2	1	8
8	0	3	25	31	2	3	3	18	2	6	93
9	0	2	14	0	2	2	2	0	3	1	26
10	1	0	3	9	3	31	0	4	8	69	128
TOTAL	2	14	52	76	75	100	8	93	26	128	574
TIMES	2	14	50	71	40	58	7	75	23	59	
PERCENT	0.	2.	9.	13.	13.	17.	1.	16.	5.	22.	

0.57	TOTAL TEACHER RATIO
0.21	TOTAL PUPIL RATIO
0.79	I/D RATIO
0.63	REVISED I/D RATIO
4.67	REVISED I/D RATIO ROW 8
4.40	REVISED I/D RATIO ROWS 8-9
0.00	EXTENDED INDIRECT INFLUENCE RATIO
0.07	EXTENDED DIRECT INFLUENCE RATIO
0.05	EXTENDED I/D RATIO
0.67	CELL 3/9 RATIO
0.08	THE VICIOUS CIRCLE RATIO
3.58	PUPIL-TALK RATIO

[illegible]

TABLE VI Pinkerton, 5th, Session 1, Carroll

INTERACTION ANALYSIS

	1	2	3	4	5	6	7	8	9	10	SUM
1	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	2	0	0	0	0	0	0	2
3	0	0	0	3	2	0	2	0	0	0	7
4	0	0	0	14	1	1	2	84	0	10	112
5	0	0	0	16	27	0	1	0	0	0	44
6	0	0	0	1	1	0	0	1	0	0	3
7	0	0	0	7	1	0	2	0	1	0	11
8	0	1	6	61	8	1	4	14	1	4	100
9	0	1	0	1	0	0	0	0	0	0	2
10	0	0	1	7	4	2	0	1	0	3	18
TOTAL	0	2	7	112	44	3	11	100	2	18	300
TIMES	0	2	7	98	17	3	9	86	2	15	
PERCENT	0.	1.	2.	37.	15.	1.	4.	33.	1.	6.	

0.60	TOTAL TEACHER RATIO
0.34	TOTAL PUPIL RATIO
2.09	I/D RATIO
0.64	REVISED I/D RATIO
1.40	REVISED I/D RATIO ROW 8
1.60	REVISED I/D RATIO ROWS 8-9
0.00	EXTENDED INDIRECT INFLUENCE RATIO
0.01	EXTENDED DIRECT INFLUENCE RATIO
0.00	EXTENDED I/D RATIO
0.00	CELL 3/9 RATIO
0.01	THE VICIOUS CIRCLE RATIO
50.00	PUPIL-TALK RATIO

TABLE VII Pinkerton, 5th, Session 2, Tushaus

INTERACTION ANALYSIS

[illegible]

TABLE VIII Siebel, 5th Science, Session 1, Tushaus

INTERACTION ANALYSIS

	1	2	3	4	5	6	7	8	9	10	SUM
1	0	0	0	0	0	0	0	0	0	0	0
2	0	1	8	3	2	0	0	0	0	0	14
3	0	1	0	11	16	0	0	0	0	0	28
4	0	1	1	6	5	1	1	49	2	5	71
5	0	1	0	35	263	3	1	0	2	2	307
6	0	0	0	0	3	1	0	1	1	0	6
7	0	0	0	1	2	0	0	0	0	0	3
8	0	9	19	11	11	1	1	3	0	1	56
9	0	0	0	0	3	0	0	1	0	1	5
10	0	1	0	4	2	0	0	2	0	0	9
TOTAL	0	14	28	71	307	6	3	56	5	9	499
TIMES	0	13	28	65	44	5	3	53	5	9	
PERCENT	0.	3.	6.	14.	62.	1.	1.	11.	1.	2.	

0.86	TOTAL TEACHER RATIO
0.12	TOTAL PUPIL RATIO
0.36	I/D RATIO
4.67	REVISED I/D RATIO
14.00	REVISED I/D RATIO ROW 8
14.00	REVISED I/D RATIO ROWS 8-9
0.00	EXTENDED INDIRECT INFLUENCE RATIO
0.00	EXTENDED DIRECT INFLUENCE RATIO
1.00	EXTENDED I/D RATIO
0.00	CELL 3/9 RATIO
0.00	THE VICIOUS CIRCLE RATIO
11.20	PUPIL-TALK RATIO

TABLE IX Siebel, 5th Science, Session 1, Carroll

INTERACTION ANALYSIS											
	1	2	3	4	5	6	7	8	9	10	SUM
1	0	0	0	0	0	0	0	0	0	0	0
2	0	0	6	8	0	0	0	0	0	0	14
3	0	3	0	12	16	1	0	0	1	0	33
4	0	0	1	16	4	0	2	52	2	7	84
5	0	0	0	30	227	0	1	0	2	0	260
6	0	0	0	0	1	0	0	1	0	0	2
7	0	0	1	1	3	0	0	0	0	0	5
8	0	10	24	13	6	1	1	6	0	1	62
9	0	1	1	0	2	0	1	0	0	0	5
10	0	0	0	4	1	0	0	3	0	1	9
TOTAL	0	14	33	84	260	2	5	62	5	9	474
TIMES	0	14	33	68	33	2	5	56	5	8	
PERCENT	0.	3.	7.	18.	55.	0.	1.	13.	1.	2.	
0.84	TOTAL TEACHER RATIO										
0.14	TOTAL PUPIL RATIO										
0.49	I/D RATIO										
6.71	REVISED I/D RATIO										
17.00	REVISED I/D RATIO ROW 8										
12.00	REVISED I/D RATIO ROWS 8-9										
0.00	EXTENDED INDIRECT INFLUENCE RATIO										
0.00	EXTENDED DIRECT INFLUENCE RATIO										
0.00	EXTENDED I/D RATIO										
0.00	CELL 3/9 RATIO										
0.00	THE VICIOUS CIRCLE RATIO										
12.40	PUPIL-TALK RATIO										

TABLE X Siebel, 6th Science, Session 2, Curtis

INTERACTION ANALYSIS											
	1	2	3	4	5	6	7	8	9	10	SUM
1	0	0	0	0	0	0	0	0	0	0	0
2	0	0	2	1	2	0	0	0	0	0	5
3	0	0	0	17	18	0	0	3	0	0	38
4	0	0	0	5	0	0	0	37	21	7	70
5	0	1	0	33	185	3	0	6	9	1	238
6	0	0	0	1	1	1	0	0	0	4	7
7	0	0	0	2	1	0	1	2	0	0	6
8	0	3	26	3	12	0	3	0	2	2	51
9	0	1	10	6	14	0	0	0	24	2	57
10	0	0	0	2	5	3	2	3	1	3	19
TOTAL	0	5	38	70	238	7	6	51	57	19	491
TIMES	0	5	38	65	53	6	5	51	33	16	
PERCENT	0.	1.	8.	14.	48.	1.	1.	10.	12.	4.	
0.74	TOTAL TEACHER RATIO										
0.22	TOTAL PUPIL RATIO										
0.45	I/D RATIO										
3.31	REVISED I/D RATIO										
9.67	REVISED I/D RATIO ROW 8										
13.33	REVISED I/D RATIO ROWS 8-9										
0.00	EXTENDED INDIRECT INFLUENCE RATIO										
0.00	EXTENDED DIRECT INFLUENCE RATIO										
0.00	EXTENDED I/D RATIO										
0.00	CELL 3/9 RATIO										
0.00	THE VICIOUS CIRCLE RATIO										
0.29	PUPIL-TALK RATIO										

TABLE XI Siebel, 6th Science, Session 2, Carroll

INTERACTION ANALYSIS											
	1	2	3	4	5	6	7	8	9	10	SUM
1	0	1	0	0	0	0	0	0	0	0	1
2	0	0	2	2	3	0	0	0	0	0	7
3	0	6	1	28	29	1	0	3	4	0	72
4	0	0	0	5	0	0	0	67	3	2	77
5	1	0	0	29	185	1	0	0	7	3	226
6	0	0	0	0	0	1	0	2	0	0	3
7	0	0	0	1	0	0	0	0	0	0	1
8	0	0	52	8	6	0	1	2	5	1	75
9	0	0	17	1	1	0	0	0	10	0	29
10	0	0	0	3	2	0	0	1	0	2	8
TOTAL	1	7	72	77	226	3	1	75	29	8	499
TIMES	1	7	71	72	41	2	1	73	19	6	
PERCENT	0.	1.	14.	15.	45.	1.	0.	15.	6.	2.	
0.78	TOTAL TEACHER RATIO										
0.21	TOTAL PUPIL RATIO										
0.68	I/D RATIO										
20.00	REVISED I/D RATIO										
52.00	REVISED I/D RATIO ROW 8										
69.00	REVISED I/D RATIO ROWS 8-9										
0.00	EXTENDED INDIRECT INFLUENCE RATIO										
0.00	EXTENDED DIRECT INFLUENCE RATIO										
1.00	EXTENDED I/D RATIO										
0.10	CELL 3/9 RATIO										
0.00	THE VICIOUS CIRCLE RATIO										
2.59	PUPIL-TALK RATIO										

TABLE XII Adams, 5th English, Session 1, Curtis

INTERACTION ANALYSIS											
	1	2	3	4	5	6	7	8	9	10	SUM
1	0	0	0	0	1	0	0	0	0	0	1
2	0	0	1	2	0	0	1	0	0	0	4
3	0	0	1	32	10	1	2	1	0	13	60
4	0	1	1	11	1	2	0	53	49	2	120
5	0	0	0	20	50	2	0	0	4	3	79
6	0	0	0	0	4	6	1	0	0	0	11
7	0	0	1	10	2	0	2	0	3	5	23
8	0	3	30	7	3	0	4	5	2	6	60
9	1	0	24	16	5	0	7	0	9	6	68
10	0	0	2	22	3	0	6	1	1	4	39
TOTAL	1	4	60	120	79	11	23	60	68	39	465
TIMES	1	4	59	109	29	5	21	55	59	35	
PERCENT	0.	1.	13.	26.	17.	2.	5.	13.	15.	8.	
0.64	TOTAL TEACHER RATIO										
0.28	TOTAL PUPIL RATIO										
1.64	I/D RATIO										
1.91	REVISED I/D RATIO										
8.25	REVISED I/D RATIO ROW 8										
5.27	REVISED I/D RATIO ROWS 8-9										
0.00	EXTENDED INDIRECT INFLUENCE RATIO										
0.02	EXTENDED DIRECT INFLUENCE RATIO										
0.13	EXTENDED I/D RATIO										
0.11	CELL 3/9 RATIO										
0.02	THE VICIOUS CIRCLE RATIO										
0.88	PUPIL-TALK RATIO										

TABLE XIII Adams, 5th English, Session 1, Carroll

INTERACTION ANALYSIS											
	1	2	3	4	5	6	7	8	9	10	SUM
1	0	0	0	0	0	0	0	0	0	0	0
2	0	0	6	3	0	0	1	0	0	0	10
3	0	4	7	53	10	0	1	4	7	5	91
4	0	0	0	5	2	0	0	92	2	1	102
5	0	0	0	11	70	1	0	0	1	3	86
6	0	0	0	0	0	2	0	0	0	1	3
7	0	0	0	6	2	0	1	3	0	1	13
8	0	5	68	16	0	0	5	7	2	3	106
9	0	1	5	2	0	0	1	0	1	4	14
10	0	0	5	6	2	0	4	0	1	6	24
TOTAL	0	10	91	102	86	3	13	106	14	24	449
TIMES	0	10	84	97	16	1	12	99	13	18	
PERCENT	0.	2.	20.	23.	19.	1.	3.	24.	3.	5.	
0.68	TOTAL TEACHER RATIO										
0.27	TOTAL PUPIL RATIO										
1.99	I/D RATIO										
6.31	REVISED I/D RATIO										
14.60	REVISED I/D RATIO ROW 8										
13.17	REVISED I/D RATIO ROWS 8-9										
0.02	EXTENDED INDIRECT INFLUENCE RATIO										
0.01	EXTENDED DIRECT INFLUENCE RATIO										
2.33	EXTENDED I/D RATIO										
7.00	CELL 3/9 RATIO										
0.01	THE VICIOUS CIRCLE RATIO										
7.57	PUPIL-TALK RATIO										

	1	2	3	4	5	6	7	8	9	10	SUM
1	0	0	0	3	0	0	0	0	0	0	3
2	2	0	0	2	0	0	0	0	0	1	5
3	0	2	0	6	1	2	0	1	2	0	14
4	0	0	1	2	0	0	0	28	3	0	34
5	0	0	0	6	18	3	0	0	1	4	32
6	1	0	0	2	3	10	0	0	0	1	17
7	0	0	0	0	0	0	0	0	0	0	0
8	0	1	7	8	1	0	0	13	6	6	42
9	0	0	4	2	8	0	0	0	5	0	19
10	0	2	2	3	1	2	0	0	2	14	26
TOTAL	3	5	14	34	32	17	0	42	19	26	192
TIMES	3	5	14	32	14	7	0	29	14	12	
PERCENT	2.	3.	7.	18.	17.	9.	0.	22.	10.	14.	

0.55	TOTAL TEACHER RATIO
0.32	TOTAL PUPIL RATIO
1.14	I/D RATIO
1.29	REVISED I/D RATIO
8.00	REVISED I/D RATIO ROW 8
12.00	REVISED I/D RATIO ROWS 8-9
0.00	EXTENDED INDIRECT INFLUENCE RATIO
0.05	EXTENDED DIRECT INFLUENCE RATIO
0.00	EXTENDED I/D RATIO
0.00	CELL 3/9 RATIO
0.05	THE VICIOUS CIRCLE RATIO
2.21	PUPIL-TALK RATIO

	1	2	3	4	5	6	7	8	9	10	SUM
1	0	0	0	2	0	0	0	0	0	0	2
2	2	0	0	2	0	0	0	0	0	2	6
3	0	2	0	9	4	1	0	1	1	0	18
4	0	0	1	1	0	0	0	30	1	0	33
5	0	0	0	5	24	3	0	1	0	2	35
6	0	0	0	2	3	1	0	0	0	1	7
7	0	0	0	1	0	0	0	0	0	0	1
8	0	1	10	8	1	0	0	13	6	6	45
9	0	1	5	1	2	0	1	0	5	0	15
10	0	2	2	2	1	2	0	0	2	18	29
TOTAL	2	6	18	33	35	7	1	45	15	29	191
TIMES	2	6	18	32	11	6	1	32	10	11	
PERCENT	1.	3.	9.	17.	18.	4.	1.	24.	8.	15.	

0.53	TOTAL TEACHER RATIO
0.31	TOTAL PUPIL RATIO
1.37	I/D RATIO
3.25	REVISED I/D RATIO
11.00	REVISED I/D RATIO ROW 8
17.00	REVISED I/D RATIO ROWS 8-9
0.00	EXTENDED INDIRECT INFLUENCE RATIO
0.01	EXTENDED DIRECT INFLUENCE RATIO
0.00	EXTENDED I/D RATIO
0.00	CELL 3/9 RATIO
0.01	THE VICIOUS CIRCLE RATIO
3.00	PUPIL-TALK RATIO

TABLE XVI Adams, 5th English, Session 2, Tushaus

INTERACTION ANALYSIS											
	1	2	3	4	5	6	7	8	9	10	SUM
1	0	0	0	3	0	0	0	0	0	0	3
2	2	0	0	3	0	0	0	0	0	1	6
3	0	3	0	6	3	1	0	1	3	2	19
4	0	0	1	1	0	0	0	28	4	0	34
5	0	0	0	5	14	4	0	0	0	1	24
6	1	0	0	3	3	10	0	0	0	2	19
7	0	0	0	1	0	0	0	0	0	0	1
8	0	1	7	8	1	0	0	13	6	6	42
9	0	0	9	1	3	1	1	0	5	0	20
10	0	2	2	3	0	3	0	0	2	14	26
TOTAL	3	6	19	34	24	19	1	42	20	26	194
TIMES	3	6	19	33	10	9	1	29	15	12	
PERCENT	2.	3.	10.	18.	12.	10.	1.	22.	10.	13.	

0.55	TOTAL TEACHER RATIO
0.32	TOTAL PUPIL RATIO
1.41	I/D RATIO
1.40	REVISED I/D RATIO
8.00	REVISED I/D RATIO ROW 8
8.50	REVISED I/D RATIO ROWS 8-9
0.00	EXTENDED INDIRECT INFLUENCE RATIO
0.05	EXTENDED DIRECT INFLUENCE RATIO
0.00	EXTENDED I/D RATIO
0.00	CELL 3/9 RATIO
0.05	THE VICIOUS CIRCLE RATIO
2.10	PUPIL-TALK RATIO

TABLE XVII Thorson, 5th Social Studies, Session 1, Tushaus

INTERACTION ANALYSIS											
	1	2	3	4	5	6	7	8	9	10	SUM
1	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	3	0	0	0	0	0	0	3
3	0	1	3	25	12	2	0	1	2	3	49
4	0	0	0	9	6	0	1	75	2	18	111
5	0	0	0	32	122	0	0	2	2	6	164
6	0	0	0	3	3	4	0	0	0	1	11
7	0	0	0	1	1	0	0	0	0	0	2
8	0	2	37	23	12	3	0	3	3	2	85
9	0	0	6	1	1	2	0	0	4	0	14
10	0	0	3	14	7	0	1	4	1	5	35
TOTAL	0	3	49	111	164	11	2	85	14	35	474
TIMES	0	3	46	102	42	7	2	82	10	30	
PERCENT	0.	1.	10.	23.	35.	2.	0.	18.	3.	7.	
0.72	TOTAL TEACHER RATIO										
0.21	TOTAL PUPIL RATIO										
0.92	I/D RATIO										
4.00	REVISED I/D RATIO										
13.00	REVISED I/D RATIO ROW 8										
9.00	REVISED I/D RATIO ROWS 8-9										
0.01	EXTENDED INDIRECT INFLUENCE RATIO										
0.01	EXTENDED DIRECT INFLUENCE RATIO										
0.75	EXTENDED I/D RATIO										
0.75	CELL 3/9 RATIO										
0.01	THE VICIOUS CIRCLE RATIO										
6.07	PUPIL-TALK RATIO										

1

	1	2	3	4	5	6	7	8	9	10	SUM
1	0	0	0	1	0	0	0	0	0	0	1
2	0	1	2	2	1	0	1	0	1	0	8
3	0	0	0	5	4	0	0	1	1	0	11
4	1	1	1	2	4	0	1	27	4	5	46
5	0	0	0	9	14	1	0	3	7	1	35
6	0	0	0	1	1	2	0	0	0	3	7
7	0	0	0	3	1	1	0	1	1	2	9
8	0	3	6	14	1	2	1	16	5	3	51
9	0	3	1	6	5	0	2	1	13	3	34
10	0	0	1	3	4	1	4	2	2	5	22
TOTAL	1	8	11	46	35	7	9	51	34	22	224
TIMES	1	7	11	44	21	5	9	35	21	17	
PERCENT	0.	4.	5.	21.	16.	3.	4.	23.	15.	10.	

0.52	TOTAL TEACHER RATIO
0.38	TOTAL PUPIL RATIO
1.29	I/D RATIO
1.25	REVISED I/D RATIO
3.00	REVISED I/D RATIO ROW 8
2.60	REVISED I/D RATIO ROWS 8-9
0.00	EXTENDED INDIRECT INFLUENCE RATIO
0.01	EXTENDED DIRECT INFLUENCE RATIO
0.50	EXTENDED I/D RATIO
0.00	CELL 3/9 RATIO
0.01	THE VICIOUS CIRCLE RATIO
1.50	PUPIL-TALK RATIO

TABLE XX Franks, Kindergarten, Session 1, Curtis

INTERACTION ANALYSIS											
	1	2	3	4	5	6	7	8	9	10	SUM
1	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	3	0	0	0	0	0	15	18
4	0	0	0	1	0	1	0	8	0	17	27
5	0	0	0	1	3	1	0	1	0	8	14
6	0	0	0	2	0	4	0	2	0	10	18
7	0	0	0	0	0	0	0	0	0	4	4
8	0	0	5	3	0	3	1	0	0	16	28
9	0	0	0	0	0	0	0	0	0	0	0
10	0	0	13	17	11	9	3	17	0	206	276
TOTAL	0	0	18	27	14	18	4	28	0	276	385
TIMES	0	0	18	26	11	14	4	28	0	70	
PERCENT	0.	0.	5.	7.	4.	5.	1.	7.	0.	72.	
0.21	TOTAL TEACHER RATIO										
0.07	TOTAL PUPIL RATIO										
1.25	I/D RATIO										
0.82	REVISED I/D RATIO										
1.25	REVISED I/D RATIO ROW 8										
1.25	REVISED I/D RATIO ROWS 8-9										
0.00	EXTENDED INDIRECT INFLUENCE RATIO										
0.01	EXTENDED DIRECT INFLUENCE RATIO										
0.00	EXTENDED I/D RATIO										
0.00	CELL 3/9 RATIO										
0.01	THE VICIOUS CIRCLE RATIO										
28.00	PUPIL-TALK RATIO										

_____IM

	1	2	3	4	5	6	7	8	9	10	SUM
1	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0
3	0	0	6	7	7	3	0	12	0	2	37
4	0	0	0	30	5	7	3	61	1	25	132
5	0	0	0	24	37	10	0	8	0	3	82
6	0	0	1	5	10	19	3	12	0	4	54
7	0	0	0	0	2	3	1	3	0	1	10
8	0	0	29	44	15	9	3	27	1	5	133
9	0	0	0	1	0	0	0	1	0	0	2
10	0	0	1	21	6	3	0	9	0	14	54
TOTAL	0	0	37	132	82	54	10	133	2	54	504
TIMES	0	0	31	102	45	35	9	106	2	40	
PERCENT	0.	0.	7.	26.	16.	11.	2.	26.	0.	11.	

0.63	TOTAL TEACHER RATIO
0.27	TOTAL PUPIL RATIO
1.16	I/D RATIO
0.58	REVISED I/D RATIO
2.42	REVISED I/D RATIO ROW 8
2.42	REVISED I/D RATIO ROWS 8-9
0.01	EXTENDED INDIRECT INFLUENCE RATIO
0.04	EXTENDED DIRECT INFLUENCE RATIO
0.30	EXTENDED I/D RATIO
6.00	CELL 3/9 RATIO
0.05	THE VICIOUS CIRCLE RATIO
66.50	PUPIL-TALK RATIO

	1	2	3	4	5	6	7	8	9	10	SUM
1	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0
3	0	0	9	2	10	1	0	0	5	0	27
4	0	0	0	2	0	1	0	25	12	1	41
5	0	0	0	7	85	3	2	4	19	5	125
6	0	0	1	0	3	6	0	2	2	3	17
7	0	0	0	0	4	0	0	0	2	0	6
8	0	0	7	11	3	1	2	4	8	0	36
9	0	0	10	16	14	3	1	1	39	6	90
10	0	0	0	3	6	2	1	0	3	4	19
TOTAL	0	0	27	41	125	17	6	36	90	19	361
TIMES	0	0	18	39	40	11	6	32	51	15	
PERCENT	0.	0.	7.	11.	35.	5.	2.	10.	25.	5.	

0.60	TOTAL TEACHER RATIO
0.35	TOTAL PUPIL RATIO
0.46	I/D RATIO
1.17	REVISED I/D RATIO
2.33	REVISED I/D RATIO ROW 8
2.43	REVISED I/D RATIO ROWS 8-9
0.02	EXTENDED INDIRECT INFLUENCE RATIO
0.02	EXTENDED DIRECT INFLUENCE RATIO
1.50	EXTENDED I/D RATIO
0.23	CELL 3/9 RATIO
0.02	THE VICIOUS CIRCLE RATIO
0.40	PUPIL-TALK RATIO

	1	2	3	4	5	6	7	8	9	10	SUM
1	0	0	1	0	0	0	0	0	0	0	1
2	0	0	0	0	0	0	0	0	0	0	0
3	0	0	3	15	6	2	1	1	1	3	32
4	0	0	0	1	0	0	0	32	3	7	43
5	0	0	0	5	38	7	0	1	6	6	63
6	0	0	0	1	6	15	1	0	1	7	31
7	0	0	0	4	2	1	0	1	1	0	9
8	1	0	18	4	4	2	4	5	1	5	44
9	0	0	7	1	3	1	3	0	1	2	18
10	0	0	3	12	4	3	0	4	4	23	53
TOTAL	1	0	32	43	63	31	9	44	18	53	294
TIMES	1	0	29	42	25	16	9	39	17	30	
PERCENT	0.	0.	11.	15.	21.	11.	3.	15.	6.	18.	

0.61	TOTAL TEACHER RATIO
0.21	TOTAL PUPIL RATIO
0.74	I/D RATIO
0.83	REVISED I/D RATIO
3.17	REVISED I/D RATIO ROW 8
2.60	REVISED I/D RATIO ROWS 8-9
0.01	EXTENDED INDIRECT INFLUENCE RATIO
0.05	EXTENDED DIRECT INFLUENCE RATIO
0.20	EXTENDED I/D RATIO
3.00	CELL 3/9 RATIO
0.06	THE VICIOUS CIRCLE RATIO
2.44	PUPIL-TALK RATIO

	1	2	3	4	5	6	7	8	9	10	SUM
1	0	0	1	0	0	0	0	0	0	0	1
2	0	0	0	0	0	0	0	0	0	0	0
3	0	0	2	7	1	1	0	1	3	2	17
4	0	0	0	0	2	0	1	14	14	6	37
5	0	0	1	3	10	2	0	0	2	6	24
6	0	0	0	1	2	20	1	0	5	2	31
7	0	0	0	4	0	3	0	0	0	1	8
8	0	0	2	4	2	0	2	1	1	6	18
9	0	0	9	11	1	1	3	0	4	5	34
10	1	0	2	7	6	4	1	2	5	13	41
TOTAL	1	0	17	37	24	31	8	18	34	41	211
TIMES	1	0	15	37	14	11	8	17	30	23	
PERCENT	0.	0.	8.	18.	11.	15.	4.	9.	16.	19.	

0.56	TOTAL TEACHER RATIO
0.25	TOTAL PUPIL RATIO
0.87	I/D RATIO
0.46	REVISED I/D RATIO
1.00	REVISED I/D RATIO ROW 8
1.83	REVISED I/D RATIO ROWS 8-9
0.01	EXTENDED INDIRECT INFLUENCE RATIO
0.09	EXTENDED DIRECT INFLUENCE RATIO
0.10	EXTENDED I/D RATIO
0.50	CELL 3/9 RATIO
0.11	THE VICIOUS CIRCLE RATIO
0.53	PUPIL-TALK RATIO

	1	2	3	4	5	6	7	8	9	10	SUM
1	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0
3	0	0	3	11	3	3	1	1	2	5	29
4	0	0	0	5	1	3	0	22	5	7	43
5	0	0	0	3	13	3	0	1	1	2	23
6	0	0	0	9	5	3	0	2	0	1	20
7	0	0	1	1	0	0	0	0	0	2	4
8	0	1	18	5	0	2	1	14	0	4	45
9	0	0	4	4	0	0	0	0	1	1	10
10	0	0	3	5	1	6	2	5	1	8	31
TOTAL	0	0	29	43	23	20	4	45	10	31	204
TIMES	0	0	26	38	10	17	4	31	9	23	
PERCENT	0.	0.	14.	21.	11.	10.	2.	22.	5.	15.	

0.58	TOTAL TEACHER RATIO
0.57	TOTAL PUPIL RATIO
1.53	I/D RATIO
1.21	REVISED I/D RATIO
6.33	REVISED I/D RATIO ROW 8
7.67	REVISED I/D RATIO ROWS 8-9
0.01	EXTENDED INDIRECT INFLUENCE RATIO
0.01	EXTENDED DIRECT INFLUENCE RATIO
1.00	EXTENDED I/D RATIO
3.00	CELL 3/9 RATIO
0.01	THE VICIOUS CIRCLE RATIO
4.50	PUPIL-TALK RATIO

TABLE XXVII Walker, Kindergarten, Session 2, Barsness

INTERACTION ANALYSIS											
	1	2	3	4	5	6	7	8	9	10	SUM
1	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	1	0	0	0	0	0	0	1
3	0	0	1	11	6	0	1	3	1	0	23
4	0	0	0	3	0	0	1	27	1	8	40
5	0	0	0	11	6	0	0	2	0	2	21
6	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	2	2	0	0	0	0	0	4
8	0	1	20	8	3	0	0	3	0	3	38
9	0	0	1	0	1	0	0	0	0	1	3
10	0	0	1	4	3	0	2	3	1	2	16
TOTAL	0	1	23	40	21	0	4	38	3	16	146
TIMES	0	1	22	37	15	0	4	35	3	14	
PERCENT	0.	1.	16.	27.	14.	0.	3.	26.	2.	11.	
0.61	TOTAL TEACHER RATIO										
0.28	TOTAL PUPIL RATIO										
2.56	I/D RATIO										
6.00	REVISED I/D RATIO										
21.00	REVISED I/D RATIO ROW 8										
22.00	REVISED I/D RATIO ROWS 8-9										
0.01	EXTENDED INDIRECT INFLUENCE RATIO										
0.00	EXTENDED DIRECT INFLUENCE RATIO										
1.00	EXTENDED I/D RATIO										
1.00	CELL 3/9 RATIO										
0.00	THE VICIOUS CIRCLE RATIO										
12.67	PUPIL-TALK RATIO										

TABLE XXVIII Walker, Kindergarten, Session 2, Curtis

INTERACTION ANALYSIS											
	1	2	3	4	5	6	7	8	9	10	SUM
1	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	1	0	0	0	0	1
3	0	0	1	5	4	2	0	2	1	4	19
4	0	0	0	0	2	0	0	25	1	7	35
5	0	0	0	6	14	0	1	3	0	10	34
6	0	0	0	4	2	2	1	1	0	4	14
7	0	0	0	6	3	1	4	0	0	2	16
8	0	0	16	7	2	3	5	8	0	4	45
9	0	1	1	0	0	1	0	0	0	1	4
10	0	0	1	7	7	4	5	6	2	13	45
TOTAL	0	1	19	35	34	14	16	45	4	45	213
TIMES	0	1	18	35	20	12	12	37	4	32	
PERCENT	0.	0.	9.	16.	16.	7.	8.	21.	2.	21.	

0.56	TOTAL TEACHER RATIO
0.23	TOTAL PUPIL RATIO
0.86	I/D RATIO
0.67	REVISED I/D RATIO
2.00	REVISED I/D RATIO ROW 8
2.00	REVISED I/D RATIO ROWS 8-9
0.00	EXTENDED INDIRECT INFLUENCE RATIO
0.03	EXTENDED DIRECT INFLUENCE RATIO
0.17	EXTENDED I/D RATIO
1.00	CELL 3/9 RATIO
0.04	THE VICIOUS CIRCLE RATIO
11.25	PUPIL-TALK RATIO

TABLE XXIX Gray, 1st Grade, Session 2, Carroll

INTERACTION ANALYSIS											
	1	2	3	4	5	6	7	8	9	10	SUM
1	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0
3	0	0	6	18	2	2	1	0	2	2	33
4	0	0	1	9	2	3	0	23	35	5	78
5	0	0	0	4	2	2	0	1	0	2	11
6	0	0	0	3	3	11	1	0	4	4	26
7	0	0	0	2	1	3	0	0	0	0	6
8	0	0	4	13	0	0	1	3	4	2	27
9	0	0	21	18	0	0	1	0	22	19	81
10	0	0	1	11	1	5	2	0	14	18	52
TOTAL	0	0	33	78	11	26	6	27	81	52	314
TIMES	0	0	27	69	9	15	6	24	59	34	
PERCENT	0.	0.	11.	25.	4.	8.	2.	9.	26.	17.	

0.49	TOTAL TEACHER RATIO
0.34	TOTAL PUPIL RATIO
2.58	I/D RATIO
1.03	REVISED I/D RATIO
4.00	REVISED I/D RATIO ROW 8
12.50	REVISED I/D RATIO ROWS 8-9
0.02	EXTENDED INDIRECT INFLUENCE RATIO
0.04	EXTENDED DIRECT INFLUENCE RATIO
0.55	EXTENDED I/D RATIO
0.27	CELL 3/9 RATIO
0.05	THE VICIOUS CIRCLE RATIO
0.33	PUPIL-TALK RATIO

TABLE XXX Gray, 1st Grade, Session 1, Carroll

INTERACTION ANALYSIS											
	1	2	3	4	5	6	7	8	9	10	SUM
1	0	0	0	0	0	0	0	0	0	0	0
2	0	1	0	0	0	0	0	0	0	1	2
3	0	0	1	11	6	0	0	0	1	3	22
4	0	0	0	10	1	0	1	23	4	20	59
5	0	0	0	10	23	0	1	0	1	25	60
6	0	0	0	0	1	1	0	0	0	4	6
7	0	0	0	1	3	1	1	0	0	4	10
8	0	1	10	5	1	0	0	5	4	11	37
9	0	0	4	4	0	0	1	0	4	2	15
10	0	0	7	18	25	4	6	9	1	157	227
TOTAL	0	2	22	59	60	6	10	37	15	227	438
TIMES	0	1	21	49	37	5	9	32	11	70	
PERCENT	0.	0.	5.	13.	14.	1.	2.	8.	3.	52.	
0.36	TOTAL TEACHER RATIO										
0.12	TOTAL PUPIL RATIO										
1.09	I/D RATIO										
1.50	REVISED I/D RATIO										
11.00	REVISED I/D RATIO ROW 8										
15.00	REVISED I/D RATIO ROWS 8-9										
0.00	EXTENDED INDIRECT INFLUENCE RATIO										
0.00	EXTENDED DIRECT INFLUENCE RATIO										
1.00	EXTENDED I/D RATIO										
0.25	CELL 3/9 RATIO										
0.01	THE VICIOUS CIRCLE RATIO										
2.47	PUPIL-TALK RATIO										

TABLE XXXI Gray, 1st Grade, Session 1, Barsness

INTERACTION ANALYSIS											
	1	2	3	4	5	6	7	8	9	10	SUM
1	0	0	0	1	0	0	0	0	0	0	1
2	0	0	0	4	0	0	0	0	0	0	4
3	0	0	14	19	7	0	1	3	0	4	48
4	0	0	0	13	0	0	0	46	4	10	73
5	0	0	0	7	63	4	2	0	1	6	83
6	0	0	0	1	2	1	0	0	1	5	10
7	0	0	0	3	3	0	1	0	0	3	10
8	0	3	27	11	1	2	1	26	0	5	76
9	0	0	4	1	0	0	1	0	6	2	14
10	1	1	3	13	7	3	4	1	2	26	61
TOTAL	1	4	48	73	83	10	10	76	14	61	380
TIMES	1	4	34	60	20	9	9	50	8	35	
PERCENT	0.	1.	13.	19.	22.	3.	3.	20.	4.	16.	
0.60	TOTAL TEACHER RATIO										
0.24	TOTAL PUPIL RATIO										
1.22	I/D RATIO										
2.65	REVISED I/D RATIO										
10.00	REVISED I/D RATIO ROW 8										
8.50	REVISED I/D RATIO ROWS 8-9										
0.04	EXTENDED INDIRECT INFLUENCE RATIO										
0.01	EXTENDED DIRECT INFLUENCE RATIO										
7.00	EXTENDED I/D RATIO										
2.33	CELL 3/9 RATIO										
0.01	THE VICIOUS CIRCLE RATIO										
5.43	PUPIL-TALK RATIO										

TABLE XXXII Gray, 1st Grade, Session 1, Curtis

INTERACTION ANALYSIS											
	1	2	3	4	5	6	7	8	9	10	SUM
1	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0
3	0	0	8	13	4	0	0	1	0	5	31
4	0	0	0	4	3	0	0	29	1	11	48
5	0	0	0	6	17	0	1	0	0	12	36
6	0	0	0	1	2	1	0	0	0	1	5
7	0	0	2	6	0	1	0	0	0	3	12
8	0	0	15	14	0	0	5	5	0	8	47
9	0	0	2	0	0	0	0	0	0	1	3
10	0	0	4	4	10	3	6	12	2	68	109
TOTAL	0	0	31	48	36	5	12	47	3	109	291
TIMES	0	0	23	44	19	4	12	42	3	41	
PERCENT	0.	0.	11.	16.	12.	2.	4.	16.	1.	37.	

0.45	TOTAL TEACHER RATIO
0.17	TOTAL PUPIL RATIO
1.49	I/D RATIO
1.82	REVISED I/D RATIO
3.00	REVISED I/D RATIO ROW 8
3.40	REVISED I/D RATIO ROWS 8-9
0.03	EXTENDED INDIRECT INFLUENCE RATIO
0.00	EXTENDED DIRECT INFLUENCE RATIO
8.00	EXTENDED I/D RATIO
8.00	CELL 3/9 RATIO
0.01	THE VICIOUS CIRCLE RATIO
15.67	PUPIL-TALK RATIO

	1	2	3	4	5	6	7	8	9	10	SUM
1	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0
3	0	0	7	20	2	3	0	0	1	2	35
4	0	0	0	8	0	0	0	29	11	9	57
5	0	0	0	2	10	0	0	0	0	1	13
6	0	0	0	1	0	7	0	0	1	7	16
7	0	0	0	5	0	0	2	1	1	0	9
8	0	0	12	8	1	0	4	43	5	8	81
9	0	0	12	6	0	0	2	0	10	3	33
10	0	0	4	7	0	6	1	8	4	24	54
TOTAL	0	0	35	57	13	16	9	81	33	54	298
TIMES	0	0	28	49	3	9	7	38	23	30	
PERCENT	0.	0.	12.	19.	4.	5.	3.	27.	11.	18.	

0.44	TOTAL TEACHER RATIO
0.38	TOTAL PUPIL RATIO
2.42	I/D RATIO
1.40	REVISED I/D RATIO
3.00	REVISED I/D RATIO ROW 8
4.00	REVISED I/D RATIO ROWS 8-9
0.02	EXTENDED INDIRECT INFLUENCE RATIO
0.03	EXTENDED DIRECT INFLUENCE RATIO
0.78	EXTENDED I/D RATIO
0.70	CELL 3/9 RATIO
0.03	THE VICIOUS CIRCLE RATIO
2.45	PUPIL-TALK RATIO

	1	2	3	4	5	6	7	8	9	10	SUM
1	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	1	0	1	0	0	0	0	2
3	0	1	4	18	3	0	0	0	1	2	29
4	0	0	0	2	0	0	0	19	17	10	48
5	0	0	0	2	14	3	0	0	0	4	23
6	0	0	0	1	2	3	0	0	0	3	9
7	0	0	0	0	0	0	0	1	0	0	1
8	0	1	10	6	0	0	1	28	0	15	61
9	0	0	11	4	1	0	0	0	12	7	35
10	0	0	4	14	3	2	0	13	5	48	89
TOTAL	0	2	29	48	23	9	1	61	35	89	297
TIMES	0	2	25	46	9	6	1	33	23	41	
PERCENT	0.	1.	10.	16.	8.	3.	0.	21.	12.	30.	

0.38	TOTAL TEACHER RATIO
0.32	TOTAL PUPIL RATIO
2.39	I/D RATIO
3.10	REVISED I/D RATIO
11.00	REVISED I/D RATIO ROW 8
22.00	REVISED I/D RATIO ROWS 8-9
0.01	EXTENDED INDIRECT INFLUENCE RATIO
0.01	EXTENDED DIRECT INFLUENCE RATIO
1.33	EXTENDED I/D RATIO
0.33	CELL 3/9 RATIO
0.01	THE VICIOUS CIRCLE RATIO
1.74	PUPIL-TALK RATIO

INTERACTION ANALYSIS											
	1	2	3	4	5	6	7	8	9	10	SUM
1	0	0	0	0	0	0	0	0	0	0	0
2	0	0	1	0	0	0	0	0	0	0	1
3	0	0	0	17	5	1	0	0	1	4	28
4	0	0	0	7	4	0	0	25	5	11	52
5	0	0	0	5	24	1	0	1	0	7	38
6	0	0	0	0	1	3	0	0	0	5	9
7	0	0	1	3	0	0	0	4	0	0	8
8	0	0	16	8	1	0	7	18	1	6	57
9	0	1	5	0	0	0	0	2	12	8	28
10	0	0	5	12	3	4	1	7	9	31	72
TOTAL	0	1	28	52	38	9	8	57	28	72	293
TIMES	0	1	28	45	14	6	8	39	16	41	
PERCENT	0.	0.	10.	18.	13.	3.	3.	19.	10.	25.	

0.46	TOTAL TEACHER RATIO
0.29	TOTAL PUPIL RATIO
1.47	I/D RATIO
1.71	REVISED I/D RATIO
2.29	REVISED I/D RATIO ROW 8
3.14	REVISED I/D RATIO ROWS 8-9
0.00	EXTENDED INDIRECT INFLUENCE RATIO
0.01	EXTENDED DIRECT INFLUENCE RATIO
0.00	EXTENDED I/D RATIO
0.00	CELL 3/9 RATIO
0.01	THE VICIOUS CIRCLE RATIO
2.04	PUPIL-TALK RATIO

	1	2	3	4	5	6	7	8	9	10	SUM
1	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0
3	0	0	3	28	1	1	0	0	1	0	34
4	0	0	0	8	0	2	2	49	1	1	63
5	0	0	0	1	0	0	0	0	0	0	1
6	0	0	0	1	0	1	0	2	1	0	5
7	0	0	0	4	0	1	0	0	0	0	5
8	0	0	29	17	0	0	3	74	1	2	126
9	0	0	2	2	0	0	0	0	1	0	5
10	0	0	0	2	0	0	0	1	0	1	4
TOTAL	0	0	34	63	1	5	5	126	5	4	243
TINES	0	0	31	55	1	4	5	52	4	3	
PERCENT	0.	0.	14.	26.	0.	2.	2.	52.	2.	2.	

0.44	TOTAL TEACHER RATIO
0.54	TOTAL PUPIL RATIO
8.82	I/D RATIO
3.40	REVISED I/D RATIO
9.67	REVISED I/D RATIO ROW 8
10.33	REVISED I/D RATIO ROWS 8-9
0.01	EXTENDED INDIRECT INFLUENCE RATIO
0.00	EXTENDED DIRECT INFLUENCE RATIO
3.00	EXTENDED I/D RATIO
3.00	CELL 3/9 RATIO
0.01	THE VICIOUS CIRCLE RATIO
25.20	PUPIL-TALK RATIO

TABLE XXXVII Hanson, 1st Grade, Session 2, Barsness

INTERACTION ANALYSIS											
	1	2	3	4	5	6	7	8	9	10	SUM
1	0	0	0	0	0	0	0	0	0	0	0
2	0	1	0	0	0	0	1	0	0	0	2
3	0	0	0	22	1	3	0	1	1	1	29
4	0	0	0	8	0	0	1	34	12	4	59
5	0	0	0	2	9	1	0	1	0	2	15
6	0	1	0	1	0	1	1	2	1	0	7
7	0	0	0	3	1	2	1	4	1	1	13
8	0	0	19	10	2	0	8	82	0	14	135
9	0	0	8	7	0	0	0	0	0	0	15
10	0	0	2	6	2	0	1	11	0	11	33
TOTAL	0	2	29	59	15	7	13	135	15	33	308
TIMES	0	1	29	51	6	6	12	53	15	22	
PERCENT	0.	1.	9.	19.	5.	2.	4.	44.	5.	11.	
0.41	TOTAL TEACHER RATIO										
0.49	TOTAL PUPIL RATIO										
2.57	I/D RATIO										
1.55	REVISED I/D RATIO										
2.38	REVISED I/D RATIO ROW 8										
3.38	REVISED I/D RATIO ROWS 8-9										
0.00	EXTENDED INDIRECT INFLUENCE RATIO										
0.01	EXTENDED DIRECT INFLUENCE RATIO										
0.50	EXTENDED I/D RATIO										
0.00	CELL 3/9 RATIO										
0.02	THE VICIOUS CIRCLE RATIO										
9.00	PUPIL-TALK RATIO										

INTERACTION ANALYSIS											
	1	2	3	4	5	6	7	8	9	10	SUM
1	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0
3	0	0	1	2	0	0	0	0	0	9	12
4	0	0	0	4	0	0	0	4	2	14	24
5	0	0	0	0	0	0	0	0	0	4	4
6	0	0	0	0	0	0	0	1	0	3	4
7	0	0	0	1	0	0	0	0	0	1	2
8	0	0	2	4	0	0	0	5	0	14	25
9	0	0	1	2	0	0	0	0	0	1	4
10	0	0	8	11	4	4	2	15	2	152	198
TOTAL	0	0	12	24	4	4	2	25	4	198	273
TIMES	0	0	11	20	4	4	2	20	4	46	
PERCENT	0.	0.	4.	9.	1.	1.	1.	9.	1.	73.	

0.17	TOTAL TEACHER RATIO
0.11	TOTAL PUPIL RATIO
3.60	I/D RATIO
2.00	REVISED I/D RATIO
2.00	REVISED I/D RATIO ROW 8
3.00	REVISED I/D RATIO ROWS 8-9
0.00	EXTENDED INDIRECT INFLUENCE RATIO
0.00	EXTENDED DIRECT INFLUENCE RATIO
1.00	EXTENDED I/D RATIO
1.00	CELL 3/9 RATIO
0.00	THE VICIOUS CIRCLE RATIO
6.25	PUPIL-TALK RATIO

TABLE XXXIX Bonnell, 2nd Grade, Session 1, Carroll

INTERACTION ANALYSIS											
	1	2	3	4	5	6	7	8	9	10	SUM
1	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0
3	0	0	18	8	3	1	3	3	1	2	39
4	0	0	0	29	1	0	1	21	3	14	69
5	0	0	1	11	79	5	3	5	0	2	106
6	0	0	0	0	5	14	0	0	0	6	25
7	0	0	0	2	3	2	0	3	0	0	10
8	0	0	12	9	13	0	3	178	1	12	228
9	0	0	4	3	0	0	0	0	8	1	16
10	0	0	4	7	2	3	0	18	3	16	53
TOTAL	0	0	39	69	106	25	10	228	16	53	546
TIMES	0	0	21	40	27	11	10	50	8	37	
PERCENT	0.	0.	7.	13.	19.	5.	2.	42.	3.	10.	
0.46	TOTAL TEACHER RATIO										
0.45	TOTAL PUPIL RATIO										
0.77	I/D RATIO										
1.11	REVISED I/D RATIO										
4.00	REVISED I/D RATIO ROW 8										
5.33	REVISED I/D RATIO ROWS 8-9										
0.03	EXTENDED INDIRECT INFLUENCE RATIO										
0.03	EXTENDED DIRECT INFLUENCE RATIO										
1.29	EXTENDED I/D RATIO										
2.25	CELL 3/9 RATIO										
0.03	THE VICIOUS CIRCLE RATIO										
14.25	PUPIL-TALK RATIO										

TABLE XL Bonnell, 2nd Grade, Session 1, Curtis

INTERACTION ANALYSIS											
	1	2	3	4	5	6	7	8	9	10	SUM
1	4	1	0	4	0	0	1	0	0	0	10
2	0	1	0	2	0	1	0	0	0	0	4
3	0	0	1	13	0	0	1	0	0	0	15
4	1	0	1	19	0	1	1	22	16	2	63
5	0	0	0	2	11	3	0	0	0	0	16
6	0	0	0	5	0	18	2	4	1	3	33
7	0	1	0	7	1	2	2	1	0	1	15
8	0	0	9	6	2	6	6	65	0	2	96
9	5	1	4	5	1	0	1	0	14	0	31
10	0	0	0	0	1	2	1	4	0	0	8
TOTAL	10	4	15	63	16	33	15	96	31	8	291
TIMES	6	3	14	44	5	15	13	31	17	8	
PERCENT	3.	1.	5.	22.	5.	11.	5.	33.	11.	3.	
0.54	TOTAL TEACHER RATIO										
0.44	TOTAL PUPIL RATIO										
1.44	I/D RATIO										
0.60	REVISED I/D RATIO										
0.75	REVISED I/D RATIO ROW 8										
1.46	REVISED I/D RATIO ROWS 8-9										
0.02	EXTENDED INDIRECT INFLUENCE RATIO										
0.07	EXTENDED DIRECT INFLUENCE RATIO										
0.30	EXTENDED I/D RATIO										
0.07	CELL 3/9 RATIO										
0.08	THE VICIOUS CIRCLE RATIO										
3.10	PUPIL-TALK RATIO										

	1	2	3	4	5	6	7	8	9	10	SUM
1	0	0	0	0	0	0	0	0	0	0	0
2	0	1	2	2	0	0	0	1	0	0	6
3	0	4	7	25	11	1	0	1	0	7	56
4	0	1	0	28	3	3	0	69	10	16	130
5	0	0	0	16	35	9	0	0	0	6	66
6	0	0	0	6	3	6	0	6	0	5	26
7	0	0	1	1	1	0	0	0	0	0	3
8	0	0	28	29	7	3	3	59	9	11	149
9	0	0	14	8	0	0	0	0	44	10	76
10	0	0	4	15	6	4	0	13	13	42	97
TOTAL	0	6	56	130	66	26	3	149	76	97	609
TIMES	0	5	49	102	31	20	3	90	32	55	
PERCENT	0.	1.	9.	21.	11.	4.	0.	24.	12.	16.	

0.47	TOTAL TEACHER-RATIO
0.37	TOTAL PUPIL RATIO
2.02	I/D RATIO
2.14	REVISED I/D RATIO
4.67	REVISED I/D RATIO ROW 8
7.00	REVISED I/D RATIO ROWS 8-9
0.01	EXTENDED INDIRECT-INFLUENCE-RATIO
0.01	EXTENDED DIRECT INFLUENCE RATIO
1.33	EXTENDED I/D RATIO
0.16	CELL 3/9 RATIO
0.01	THE VICIOUS CIRCLE RATIO
1.96	PUPIL-TALK RATIO

	1	2	3	4	5	6	7	8	9	10	SUM
1	0	0	0	0	0	1	0	0	0	0	1
2	0	2	0	7	0	0	0	1	0	4	14
3	0	1	2	9	0	2	0	0	0	3	17
4	0	0	0	19	1	4	1	26	3	13	67
5	0	0	0	2	14	4	0	0	0	1	21
6	0	0	0	6	1	42	1	5	0	13	68
7	0	0	1	2	1	1	0	0	0	0	5
8	0	7	6	10	2	8	1	88	2	19	143
9	0	0	4	2	0	1	0	0	22	2	31
10	1	4	4	10	2	5	2	23	4	57	112
TOTAL	1	14	17	67	21	68	5	143	31	112	479
TIMES	1	12	15	48	7	26	5	55	9	55	
PERCENT	0.	3.	4.	14.	4.	14.	1.	30.	6.	23.	

0.40	TOTAL TEACHER RATIO
0.36	TOTAL PUPIL RATIO
1.05	I/D RATIO
0.44	REVISED I/D RATIO
1.44	REVISED I/D RATIO ROW 8
1.70	REVISED I/D RATIO ROWS 9-9
0.01	EXTENDED INDIRECT INFLUENCE RATIO
0.09	EXTENDED DIRECT INFLUENCE RATIO
0.10	EXTENDED I/D RATIO
0.09	CELL 3/9 RATIO
0.09	THE VICIOUS CIRCLE RATIO
4.61	PUPIL-TALK RATIO

	1	2	3	4	5	6	7	8	9	10	SUM
1	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	1	0	0	0	2	3
3	0	1	2	22	15	2	2	2	2	1	49
4	0	1	3	18	6	2	0	51	29	4	114
5	0	0	0	29	66	6	0	0	1	2	104
6	0	1	1	4	3	12	0	6	1	2	30
7	0	0	0	3	1	0	1	0	0	0	5
8	0	0	22	22	7	6	1	90	2	1	151
9	0	0	20	10	3	0	0	1	66	1	101
10	0	0	1	6	3	1	1	1	0	12	25
TOTAL	0	3	49	114	104	30	5	151	101	25	582
TIMES	0	3	47	96	38	18	4	61	35	13	
PERCENT	0.	1.	8.	20.	18.	5.	1.	26.	17.	4.	

0.52	TOTAL TEACHER RATIO
0.43	TOTAL PUPIL RATIO
1.19	I/D RATIO
1.49	REVISED I/D RATIO
3.14	REVISED I/D RATIO ROW 8
6.00	REVISED I/D RATIO ROWS 8-9
0.00	EXTENDED INDIRECT INFLUENCE RATIO
0.02	EXTENDED DIRECT INFLUENCE RATIO
0.15	EXTENDED I/D RATIO
0.03	CELL 3/9 RATIO
0.02	THE VICIOUS CIRCLE RATIO
1.50	PUPIL-TALK RATIO

	1	2	3	4	5	6	7	8	9	10	SUM
1	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	1	1
3	0	0	6	22	8	7	1	0	1	7	52
4	0	0	0	14	1	6	4	66	11	33	135
5	0	0	0	6	16	7	0	1	1	4	35
6	0	0	0	15	2	15	1	4	0	25	62
7	0	0	0	2	1	0	2	1	0	7	13
8	0	1	35	27	1	7	2	6	3	12	94
9	0	0	6	7	1	2	1	0	8	4	29
10	0	0	5	42	5	18	2	16	5	89	182
TOTAL	0	1	52	135	35	62	13	94	29	182	603
TIMES	0	1	46	121	19	47	11	88	21	93	
PERCENT	0.	0.	9.	22.	6.	10.	2.	16.	5.	30.	

0.49	TOTAL TEACHER RATIO
0.20	TOTAL PUPIL RATIO
1.71	I/D RATIO
0.71	REVISED I/D RATIO
4.00	REVISED I/D RATIO ROW 8
3.50	REVISED I/D RATIO ROWS 8-9
0.01	EXTENDED INDIRECT INFLUENCE RATIO
0.03	EXTENDED DIRECT INFLUENCE RATIO
0.35	EXTENDED I/D RATIO
0.75	CELL 3/9 RATIO
0.03	THE VICIOUS CIRCLE RATIO
3.24	PUPIL-TALK RATIO

TABLE XLV Spragg, 2nd Grade, Session 1, Curtis

INTERACTION ANALYSIS											
	1	2	3	4	5	6	7	8	9	10	SUM
1	0	0	0	0	0	0	0	0	0	0	0
2	0	1	0	1	1	0	0	0	0	0	3
3	0	0	1	10	3	2	1	0	3	13	33
4	0	1	0	13	1	0	1	41	15	29	101
5	0	0	1	7	10	0	0	3	0	12	33
6	0	0	0	2	1	1	0	4	1	3	12
7	0	0	0	4	1	2	1	2	0	0	10
8	0	1	12	17	5	1	1	16	1	33	87
9	0	0	7	10	1	0	2	0	14	8	42
10	0	0	12	37	10	6	4	21	8	178	276
TOTAL	0	3	33	101	33	12	10	87	42	276	597
TIMES	0	2	32	88	23	11	9	71	28	98	
PERCENT	0.	1.	6.	17.	6.	2.	2.	15.	7.	46.	
0.32	TOTAL TEACHER RATIO										
0.22	TOTAL PUPIL RATIO										
2.49	I/D RATIO										
1.64	REVISED I/D RATIO										
6.50	REVISED I/D RATIO ROW 8										
5.00	REVISED I/D RATIO ROWS 8-9										
0.00	EXTENDED INDIRECT INFLUENCE RATIO										
0.00	EXTENDED DIRECT INFLUENCE RATIO										
1.00	EXTENDED I/D RATIO										
0.07	CELL 3/9 RATIO										
0.01	THE VICIOUS-CIRCLE RATIO										
2.07	PUPIL-TALK RATIO										

INTERACTION ANALYSIS											
	1	2	3	4	5	6	7	8	9	10	SUM
1	0	0	0	0	0	0	0	0	0	0	0
2	0	0	1	2	0	0	0	0	0	1	4
3	0	0	1	12	2	1	1	1	2	13	33
4	0	0	0	19	0	2	0	45	19	54	139
5	0	0	0	6	4	0	0	0	1	6	17
6	0	0	0	6	2	1	0	3	0	3	15
7	0	0	0	4	1	2	1	2	0	3	13
8	0	2	15	22	1	2	2	13	6	30	93
9	0	0	4	15	1	2	0	0	4	33	59
10	0	2	12	53	6	5	9	29	27	166	309
TOTAL	0	4	33	139	17	15	13	93	59	309	682
TIMES	0	4	32	120	13	14	12	80	55	143	
PERCENT	0.	1.	5.	20.	2.	2.	2.	14.	9.	45.	

0.32	TOTAL TEACHER RATIO
0.22	TOTAL PUPIL RATIO
3.91	I/D RATIO
1.32	REVISED I/D RATIO
4.25	REVISED I/D RATIO ROW 8
3.50	REVISED I/D RATIO ROWS 8-9
0.00	EXTENDED INDIRECT INFLUENCE RATIO
0.00	EXTENDED DIRECT INFLUENCE RATIO
0.50	EXTENDED I/D RATIO
0.25	CELL 3/9 RATIO
0.01	THE VICIOUS CIRCLE RATIO
1.58	PUPIL-TALK RATIO

TABLE XLVII Spragg, 2nd Grade, Session 2, Barsness

INTERACTION ANALYSIS											
	1	2	3	4	5	6	7	8	9	10	SUM
1	0	0	0	0	0	0	0	0	0	0	0
2	0	0	1	5	0	1	0	0	0	1	8
3	0	0	3	34	3	1	1	0	0	6	48
4	0	0	0	12	0	0	3	44	69	24	152
5	0	0	0	9	6	0	1	0	2	3	21
6	0	0	0	0	0	1	1	6	0	1	9
7	0	0	1	14	1	1	0	2	2	1	22
8	0	3	10	23	3	2	6	14	2	6	69
9	0	2	30	30	3	0	6	0	9	6	88
10	0	3	3	25	5	3	4	3	4	11	61
TOTAL	0	8	48	152	21	9	22	69	88	61	478
TIMES	0	8	45	140	15	8	22	55	79	50	
PERCENT	0.	2.	10.	32.	4.	2.	5.	14.	18.	13.	

0.54	TOTAL TEACHER RATIO
0.33	TOTAL PUPIL RATIO
4.00	I/D RATIO
1.81	REVISED I/D RATIO
1.63	REVISED I/D RATIO ROW 8
3.21	REVISED I/D RATIO ROWS 8-9
0.01	EXTENDED INDIRECT INFLUENCE RATIO
0.00	EXTENDED DIRECT INFLUENCE RATIO
3.00	EXTENDED I/D RATIO
0.33	CELL 3/9 RATIO
0.01	THE VICIOUS CIRCLE RATIO
0.78	PUPIL-TALK RATIO

	1	2	3	4	5	6	7	8	9	10	SUM
1	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0
3	0	0	3	14	8	4	1	0	0	13	43
4	0	0	0	4	0	2	0	39	0	37	82
5	0	0	1	2	8	2	0	0	0	16	29
6	0	0	0	5	1	2	0	3	0	17	28
7	0	0	0	7	0	1	4	1	0	5	18
8	0	0	24	18	3	2	3	3	0	18	71
9	0	0	0	0	1	0	0	0	0	0	1
10	0	0	15	32	8	15	10	25	1	288	394
TOTAL	0	0	43	82	29	28	18	71	1	394	666
TIMES	0	0	40	78	21	26	14	68	1	106	
PERCENT	0.	0.	6.	12.	4.	4.	3.	11.	0.	***	

0.30	TOTAL TEACHER RATIO
0.11	TOTAL PUPIL RATIO
1.67	I/D RATIO
0.93	REVISED I/D RATIO
4.80	REVISED I/D RATIO ROW 8
4.80	REVISED I/D RATIO ROWS 8-9
0.00	EXTENDED INDIRECT INFLUENCE RATIO
0.01	EXTENDED DIRECT INFLUENCE RATIO
0.50	EXTENDED I/D RATIO
3.00	CELL 3/9 RATIO
0.01	THE VICIOUS CIRCLE RATIO
71.00	PUPIL-TALK RATIO

TABLE XLIX Mitchell, 3rd Grade, Session 1, Barsness

INTERACTION ANALYSIS											
	1	2	3	4	5	6	7	8	9	10	SUM
1	0	0	0	0	0	0	0	0	0	0	0
2	0	0	1	1	0	0	0	1	0	0	3
3	0	0	7	9	8	1	0	0	0	1	26
4	0	0	0	7	3	0	1	51	14	7	83
5	0	0	0	18	21	1	1	0	0	1	42
6	0	0	0	2	1	10	0	0	0	6	19
7	0	0	0	2	1	2	2	0	0	0	7
8	0	2	14	27	4	1	2	24	3	3	80
9	0	1	4	10	1	1	0	0	41	1	59
10	0	0	0	7	3	3	1	4	1	6	25
TOTAL	0	3	26	83	42	19	7	80	59	25	344
TIMES	0	3	19	76	21	9	5	56	18	19	
PERCENT	0.	1.	8.	24.	12.	6.	2.	23.	17.	7.	
0.52	TOTAL TEACHER RATIO										
0.40	TOTAL PUPIL RATIO										
1.65	I/D RATIO										
1.12	REVISED I/D RATIO										
5.33	REVISED I/D RATIO ROW 8										
5.25	REVISED I/D RATIO ROWS 8-9										
0.02	EXTENDED INDIRECT INFLUENCE RATIO										
0.03	EXTENDED DIRECT INFLUENCE RATIO										
0.53	EXTENDED I/D RATIO										
0.17	CELL 3/9 RATIO										
0.04	THE VICIOUS CIRCLE RATIO										
1.36	PUPIL-TALK RATIO										

TABLE L Mitchell, 3rd Grade, Session 1, Carroll

INTERACTION ANALYSIS											
	1	2	3	4	5	6	7	8	9	10	SUM
1	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	1	0	0	1
3	0	0	4	5	4	2	0	1	1	2	19
4	0	0	0	9	2	1	0	24	5	21	62
5	0	0	0	10	24	1	0	0	0	8	43
6	0	0	1	3	2	8	0	3	0	3	20
7	0	0	0	0	0	0	0	0	0	1	1
8	0	1	4	14	2	0	0	17	1	18	57
9	0	0	3	4	1	1	0	0	22	7	38
10	0	0	7	17	8	7	1	11	9	73	133
TOTAL	0	1	19	62	43	20	1	57	38	133	374
TIMES	0	1	15	53	19	12	1	40	16	60	
PERCENT	0.	0.	5.	17.	11.	5.	0.	15.	10.	36.	
0.39	TOTAL TEACHER RATIO										
0.25	TOTAL PUPIL RATIO										
1.28	I/D RATIO										
0.95	REVISED I/D RATIO										
5.00	REVISED I/D RATIO ROW 8										
8.00	REVISED I/D RATIO ROWS 8-9										
0.01	EXTENDED INDIRECT INFLUENCE RATIO										
0.02	EXTENDED DIRECT INFLUENCE RATIO										
0.50	EXTENDED I/D RATIO										
0.18	CELL 3/9 RATIO										
0.02	THE VICIOUS CIRCLE RATIO										
1.50	PUPIL-TALK RATIO										

TABLE LI Mitchell, 3rd Grade, Session 1, Curtis

INTERACTION ANALYSIS.

	1	2	3	4	5	6	7	8	9	10	SUM
1	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	1	0	0	0	0	0	1
3	0	0	3	9	5	2	0	1	0	1	21
4	0	0	0	20	5	0	1	36	16	11	89
5	0	0	0	11	31	2	1	0	1	3	49
6	0	0	1	1	1	13	0	1	0	5	22
7	0	0	0	3	0	0	1	0	0	2	6
8	0	1	8	26	1	1	2	17	3	6	65
9	0	0	3	9	1	0	1	1	29	6	50
10	0	0	6	10	4	4	0	9	1	20	54
TOTAL	0	1	21	89	49	22	6	65	50	54	357
TIMES	0	1	18	69	18	9	5	48	21	34	
PERCENT	0.	0.	6.	25.	14.	6.	2.	18.	14.	15.	

0.53	TOTAL TEACHER RATIO
0.32	TOTAL PUPIL RATIO
1.44	I/D RATIO
0.79	REVISED I/D RATIO
3.00	REVISED I/D RATIO ROW 8
3.00	REVISED I/D RATIO ROWS 8-9
0.01	EXTENDED INDIRECT INFLUENCE RATIO
0.04	EXTENDED DIRECT INFLUENCE RATIO
0.21	EXTENDED I/D RATIO
0.10	CELL 3/9 RATIO
0.04	THE VICIOUS CIRCLE RATIO
1.30	PUPIL-TALK RATIO

TABLE LII Mitchell, 3rd Grade, Session 2, Barsness

INTERACTION ANALYSIS											
	1	2	3	4	5	6	7	8	9	10	SUM
1	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0
3	0	0	4	9	6	2	0	0	1	3	25
4	0	0	0	1	0	2	0	20	7	10	40
5	0	0	0	6	64	7	0	1	0	5	83
6	0	0	0	0	1	2	0	7	0	16	26
7	0	0	0	0	0	2	0	1	1	0	4
8	0	0	9	13	6	2	0	112	1	12	155
9	0	0	7	3	0	0	1	0	11	0	22
10	0	0	5	8	6	9	3	14	1	38	84
TOTAL	0	0	25	40	83	26	4	155	22	84	439
TIMES	0	0	21	39	19	24	4	43	11	46	
PERCENT	0.	0.	6.	9.	19.	6.	1.	35.	5.	19.	
0.41	TOTAL TEACHER RATIO										
0.40	TOTAL PUPIL RATIO										
0.58	I/D RATIO										
0.83	REVISED I/D RATIO										
4.50	REVISED I/D RATIO ROW 8										
5.33	REVISED I/D RATIO ROWS 8-9										
0.01	EXTENDED INDIRECT-INFLUENCE RATIO										
0.00	EXTENDED DIRECT INFLUENCE RATIO										
2.00	EXTENDED I/D RATIO										
0.36	CELL 3/9 RATIO										
0.01	THE VICIOUS CIRCLE RATIO										
7.05	PUPIL-TALK RATIO										

	1	2	3	4	5	6	7	8	9	10	SUM
1	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0
3	0	0	3	1	7	2	0	0	0	4	17
4	0	0	1	8	3	2	0	18	0	14	46
5	0	0	1	5	49	7	0	1	0	13	76
6	0	0	0	6	2	4	0	6	0	7	25
7	0	0	0	0	0	1	0	0	0	2	3
8	0	0	5	10	7	3	1	91	2	20	139
9	0	0	2	1	0	0	1	0	2	2	8
10	0	0	5	15	8	6	1	23	4	95	157
TOTAL	0	0	17	46	76	25	3	139	8	157	471
TIMES	0	0	14	38	27	21	3	48	6	62	
PERCENT	0.	0.	4.	10.	16.	5.	1.	30.	2.	33.	

0.35	TOTAL TEACHER RATIO
0.31	TOTAL PUPIL RATIO
0.61	I/D RATIO
0.61	REVISED I/D RATIO
1.25	REVISED I/D RATIO ROW 8
1.40	REVISED I/D RATIO ROWS 8-9
0.01	EXTENDED INDIRECT INFLUENCE RATIO
0.01	EXTENDED DIRECT INFLUENCE RATIO
0.75	EXTENDED I/D RATIO
1.50	CELL 3/9 RATIO
0.01	THE VICIOUS CIRCLE RATIO
17.38	PUPIL-TALK RATIO

TABLE LIV Mitchell, 3rd Grade, Session 2, Curtis

INTERACTION ANALYSIS											
	1	2	3	4	5	6	7	8	9	10	SUM
1	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	1	0	0	0	0	1
3	0	0	0	3	3	1	0	0	0	3	10
4	0	0	0	1	1	3	0	11	3	18	37
5	0	0	0	3	18	4	0	1	0	17	43
6	0	0	0	0	1	6	0	10	0	9	26
7	0	0	0	0	1	0	0	1	0	0	2
8	0	0	2	7	0	3	1	36	0	32	81
9	0	0	2	1	0	0	0	0	6	3	12
10	0	1	6	22	19	8	1	22	3	170	252
TOTAL	0	1	10	37	43	26	2	81	12	252	464
TIMES	0	1	10	36	25	20	2	45	6	82	
PERCENT	0.	0.	2.	8.	9.	6.	0.	17.	3.	54.	

0.26	TOTAL TEACHER RATIO
0.20	TOTAL PUPIL RATIO
0.68	I/D RATIO
0.39	REVISED I/D RATIO
0.50	REVISED I/D RATIO ROW 8
1.00	REVISED I/D RATIO ROWS 8-9
0.00	EXTENDED INDIRECT INFLUENCE RATIO
0.01	EXTENDED DIRECT INFLUENCE RATIO
0.00	EXTENDED I/D RATIO
0.00	CELL 3/9 RATIO
0.01	THE VICIOUS CIRCLE RATIO
6.75	PUPIL-TALK RATIO

	1	2	3	4	5	6	7	8	9	10	SUM
1	0	0	0	0	0	0	0	0	0	0	0
2	0	0	2	1	0	0	0	0	0	0	3
3	0	2	12	30	4	1	0	2	10	0	61
4	0	0	0	13	2	2	0	27	24	15	83
5	0	0	0	4	26	5	0	0	0	6	41
6	0	0	0	2	0	3	0	5	0	5	15
7	0	0	0	4	0	0	0	1	1	0	6
8	0	0	15	11	2	3	5	16	1	2	55
9	0	1	28	3	1	0	1	0	20	4	58
10	0	0	4	15	6	1	0	4	2	86	118
TOTAL	0	3	61	83	41	15	6	55	58	118	440
TIMES	0	3	49	70	15	12	6	39	38	32	
PERCENT	0.	1.	14.	19.	9.	3.	1.	13.	13.	27.	

0.48	TOTAL TEACHER RATIO
0.26	TOTAL PUPIL RATIO
2.37	I/D RATIO
3.05	REVISED I/D RATIO
1.88	REVISED I/D RATIO ROW 8
4.89	REVISED I/D RATIO ROWS 8-9
0.03	EXTENDED INDIRECT INFLUENCE RATIO
0.01	EXTENDED DIRECT INFLUENCE RATIO
4.00	EXTENDED I/D RATIO
0.60	CELL 3/9 RATIO
0.01	THE VICIOUS CIRCLE RATIO
0.95	PUPIL-TALK RATIO

TABLE LVI Murray, 3rd Grade, Session 1, Carroll

INTERACTION ANALYSIS											
	1	2	3	4	5	6	7	8	9	10	SUM
1	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0
3	0	0	10	18	3	2	0	3	4	10	50
4	0	0	0	18	0	0	0	23	13	19	73
5	0	0	0	3	18	3	0	2	1	6	33
6	0	0	0	4	2	3	0	1	0	5	15
7	0	0	0	1	0	0	0	0	0	0	1
8	0	0	14	6	0	2	1	9	2	10	44
9	0	0	18	5	0	0	0	0	14	3	40
10	0	0	8	18	10	5	0	6	6	126	179
TOTAL	0	0	50	73	33	15	1	44	40	179	435
TIMES	0	0	40	55	15	12	1	35	26	53	
PERCENT	0.	0.	11.	17.	8.	3.	0.	10.	9.	41.	
0.40	TOTAL TEACHER RATIO										
0.19	TOTAL PUPIL RATIO										
2.51	I/D RATIO										
3.13	REVISED I/D RATIO										
4.67	REVISED I/D RATIO ROW 8										
10.67	REVISED I/D RATIO ROWS 8-9										
0.02	EXTENDED INDIRECT-INFLUENCE RATIO										
0.01	EXTENDED DIRECT INFLUENCE RATIO										
3.33	EXTENDED I/D RATIO										
0.71	CELL 3/9 RATIO										
0.01	THE VICIOUS CIRCLE RATIO										
1.10	PUPIL-TALK RATIO										

	1	2	3	4	5	6	7	8	9	10	SUM
1	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0
3	0	0	2	9	3	1	0	1	7	9	32
4	0	0	0	11	2	0	0	7	13	15	48
5	0	0	0	2	11	0	0	0	1	8	22
6	0	0	0	1	1	0	0	1	0	1	4
7	0	0	0	1	0	0	0	0	0	1	2
8	0	0	2	3	0	1	0	12	0	8	26
9	0	0	16	3	0	0	0	0	13	10	42
10	0	0	12	18	5	2	2	5	8	216	268
TOTAL	0	0	32	48	22	4	2	26	42	268	444
TIMES	0	0	30	37	11	4	2	14	29	52	
PERCENT	0.	0.	7.	11.	5.	1.	0.	6.	9.	60.	

0.24	TOTAL TEACHER RATIO
0.15	TOTAL PUPIL RATIO
2.86	I/D RATIO
5.33	REVISED I/D RATIO
2.00	REVISED I/D RATIO ROW 8
18.00	REVISED I/D RATIO ROWS 8-9
0.00	EXTENDED INDIRECT INFLUENCE RATIO
0.00	EXTENDED DIRECT INFLUENCE RATIO
2.00	EXTENDED I/D RATIO
0.15	CELL 3/9 RATIO
0.00	THE VICIOUS CIRCLE RATIO
0.62	PUPIL-TALK RATIO

	1	2	3	4	5	6	7	8	9	10	SUM
1	0	0	0	0	0	0	0	0	0	0	0
2	0	0	1	0	0	0	0	0	0	0	1
3	0	0	7	14	2	8	0	0	2	0	33
4	0	0	0	5	1	0	0	32	6	8	52
5	0	0	0	5	19	2	1	2	1	1	31
6	0	0	0	1	0	5	0	13	0	4	23
7	0	0	0	0	2	1	0	4	0	1	8
8	0	0	19	20	3	3	6	57	0	5	113
9	0	0	5	0	1	1	0	1	3	1	12
10	0	1	1	7	3	3	1	4	0	6	26
TOTAL	0	1	33	52	31	23	8	113	12	26	299
TIMES	0	1	26	47	12	18	8	56	9	20	
PERCENT	0.	0.	11.	17.	10.	8.	3.	38.	4.	9.	

0.49	TOTAL TEACHER RATIO
0.42	TOTAL PUPIL RATIO
1.39	I/D RATIO
1.10	REVISED I/D RATIO
2.11	REVISED I/D RATIO ROW 8
2.40	REVISED I/D RATIO ROWS 8-9
0.02	EXTENDED INDIRECT INFLUENCE RATIO
0.02	EXTENDED DIRECT INFLUENCE RATIO
1.40	EXTENDED I/D RATIO
2.33	CELL 3/9 RATIO
0.02	THE VICIOUS CIRCLE RATIO
9.42	PUPIL-TALK RATIO

	1	2	3	4	5	6	7	8	9	10	SUM
1	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	1	1
3	0	1	1	6	2	3	0	0	1	3	17
4	0	0	0	5	1	1	0	12	2	18	39
5	0	0	0	2	0	0	0	2	0	5	9
6	0	0	0	2	0	4	0	6	0	7	19
7	0	0	0	0	0	1	0	0	0	0	1
8	0	0	7	10	0	2	1	15	2	19	56
9	0	0	1	2	0	0	0	0	1	4	8
10	0	0	8	12	6	8	0	21	2	90	147
TOTAL	0	1	17	39	9	19	1	56	8	147	297
TIMES	0	1	16	34	9	15	1	41	7	57	
PERCENT	0.	0.	6.	13.	3.	6.	0.	19.	3.	49.	

0.29	TOTAL TEACHER RATIO
0.22	TOTAL PUPIL RATIO
1.97	I/D RATIO
0.90	REVISED I/D RATIO
2.33	REVISED I/D RATIO ROW 8
2.67	REVISED I/D RATIO ROWS 8-9
0.00	EXTENDED INDIRECT INFLUENCE RATIO
0.01	EXTENDED DIRECT INFLUENCE RATIO
0.25	EXTENDED I/D RATIO
1.00	CELL 3/9 RATIO
0.02	THE VICIOUS CIRCLE RATIO
7.00	PUPIL-TALK RATIO

	1	2	3	4	5	6	7	8	9	10	SUM
1	0	0	0	0	0	0	0	0	0	0	0
2	0	0	1	0	0	0	0	0	0	0	1
3	0	0	0	10	7	1	0	2	0	2	22
4	0	0	0	3	0	1	1	23	6	12	46
5	0	0	0	5	19	4	1	2	0	7	38
6	0	0	0	1	2	9	1	5	0	7	25
7	0	0	0	1	0	3	0	4	0	2	10
8	0	1	14	17	3	4	4	33	0	12	88
9	0	0	3	3	1	0	0	0	2	2	11
10	0	0	4	6	6	3	3	19	3	14	58
TOTAL	0	1	22	46	38	25	10	88	11	58	299
TIMES	0	1	22	43	19	16	10	55	9	44	
PERCENT	0.	0.	7.	15.	13.	8.	3.	29.	4.	19.	

0.47	TOTAL TEACHER RATIO
0.33	TOTAL PUPIL RATIO
0.95	I/D RATIO
0.66	REVISED I/D RATIO
1.88	REVISED I/D RATIO ROW 8
2.25	REVISED I/D RATIO ROWS 8-9
0.00	EXTENDED INDIRECT INFLUENCE RATIO
0.03	EXTENDED DIRECT INFLUENCE RATIO
0.00	EXTENDED I/D RATIO
0.00	CELL 3/9 RATIO
0.04	THE VICIOUS CIRCLE RATIO
8.00	PUPIL-TALK RATIO

TABLE LXI Staninger, 4th Grade, Session 1, Barsness

INTERACTION ANALYSIS											
	1	2	3	4	5	6	7	8	9	10	SUM
1	0	0	0	0	0	0	0	0	0	0	0
2	0	0	1	0	0	0	1	0	0	0	2
3	0	1	8	32	6	0	0	0	2	3	52
4	0	0	0	14	1	0	0	30	21	10	76
5	0	0	0	10	22	4	2	0	0	1	39
6	0	0	0	0	0	0	0	6	0	2	8
7	0	0	0	5	2	2	0	1	0	1	11
8	0	0	22	4	2	1	3	56	0	13	101
9	0	1	16	1	1	0	2	0	1	3	25
10	0	0	5	10	5	1	3	8	1	34	67
TOTAL	0	2	52	76	39	8	11	101	25	67	381
TIMES	0	2	44	62	17	8	11	45	24	33	
PERCENT	0.	1.	14.	20.	10.	2.	3.	27.	7.	18.	
0.49	TOTAL TEACHER RATIO										
0.33	TOTAL PUPIL RATIO										
2.24	I/D RATIO										
2.84	REVISED I/D RATIO										
5.50	REVISED I/D RATIO ROW 8										
6.50	REVISED I/D RATIO ROWS 8-9										
0.02	EXTENDED INDIRECT INFLUENCE RATIO										
0.00	EXTENDED DIRECT INFLUENCE RATIO										
8.00	EXTENDED I/D RATIO										
8.00	CELL 3/9 RATIO										
0.01	THE VICIOUS CIRCLE RATIO										
4.04	PUPIL-TALK RATIO										

	1	2	3	4	5	6	7	8	9	10	SUM
1	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0
3	0	0	12	23	13	4	0	1	1	5	59
4	0	0	0	14	4	2	1	48	6	8	83
5	0	0	0	17	29	2	0	1	1	4	54
6	0	0	0	6	1	3	0	0	1	3	14
7	0	0	0	1	1	0	0	0	4	0	6
8	0	0	32	10	2	0	2	39	4	17	106
9	0	0	9	1	1	0	3	0	3	3	20
10	0	0	6	11	3	3	0	17	0	41	81
TOTAL	0	0	59	83	54	14	6	106	20	81	423
TIMES	0	0	47	69	25	11	6	67	17	40	
PERCENT	0.	0.	14.	20.	13.	3.	1.	25.	5.	19.	

0.51	TOTAL TEACHER RATIO
0.30	TOTAL PUPIL RATIO
1.92	I/D RATIO
2.95	REVISED I/D RATIO
16.00	REVISED I/D RATIO ROW 8
8.20	REVISED I/D RATIO ROWS 8-9
0.03	EXTENDED INDIRECT INFLUENCE RATIO
0.01	EXTENDED DIRECT INFLUENCE RATIO
4.00	EXTENDED I/D RATIO
4.00	CELL 3/9 RATIO
0.01	THE VICIOUS CIRCLE RATIO
5.30	PUPIL-TALK RATIO

TABLE LXIII Staninger, 4th Grade, Session 1, Curtis

INTERACTION ANALYSIS											
	1	2	3	4	5	6	7	8	9	10	SUM
1	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	1	3	0	0	0	0	6	10
4	0	0	0	5	0	0	0	2	0	7	14
5	0	0	0	1	2	0	0	1	0	10	14
6	0	0	0	0	0	0	0	0	0	2	2
7	0	0	0	0	0	0	0	0	0	3	3
8	0	0	0	1	0	0	1	1	0	13	16
9	0	0	0	0	0	0	0	0	0	2	2
10	0	0	10	6	9	2	2	12	2	258	301
TOTAL	0	0	10	14	14	2	3	16	2	301	362
TIMES	0	0	10	9	12	2	3	15	2	43	
PERCENT	0.	0.	3.	4.	4.	1.	1.	4.	1.	83.	

0.12	TOTAL TEACHER RATIO
0.05	TOTAL PUPIL RATIO
1.26	I/D RATIO
2.00	REVISED I/D RATIO
0.00	REVISED I/D RATIO ROW 8
0.00	REVISED I/D RATIO ROWS 8-9
0.00	EXTENDED INDIRECT INFLUENCE RATIO
0.00	EXTENDED DIRECT INFLUENCE RATIO
0.00	EXTENDED I/D RATIO
0.00	CELL 3/9 RATIO
0.00	THE VICIOUS CIRCLE RATIO
8.00	PUPIL-TALK RATIO

	1	2	3	4	5	6	7	8	9	10	SUM
1	0	0	0	0	0	0	0	0	0	0	0
2	0	0	1	2	0	0	0	0	0	1	4
3	0	1	30	20	14	1	0	0	0	1	67
4	0	0	0	30	1	0	0	25	18	5	79
5	0	0	1	17	78	7	0	2	0	5	110
6	0	0	0	1	1	2	1	8	0	0	13
7	0	0	0	0	0	1	0	3	0	0	4
8	0	3	13	6	9	2	3	96	1	14	147
9	0	0	20	0	1	0	0	0	3	2	26
10	0	0	2	3	6	0	0	13	4	11	39
TOTAL	0	4	67	79	110	13	4	147	26	39	489
TIMES	0	4	37	49	32	11	4	51	23	28	
PERCENT	0.	1.	14.	16.	22.	3.	1.	30.	5.	8.	

0.57	TOTAL TEACHER RATIO
0.35	TOTAL PUPIL RATIO
1.18	I/D RATIO
4.18	REVISED I/D RATIO
3.20	REVISED I/D RATIO ROW 8
7.20	REVISED I/D RATIO ROWS 8-9
0.06	EXTENDED INDIRECT INFLUENCE RATIO
0.00	EXTENDED DIRECT INFLUENCE RATIO
15.00	EXTENDED I/D RATIO
10.00	CELL 3/9 RATIO
0.01	THE VICIOUS CIRCLE RATIO
5.65	PUPIL-TALK RATIO

TABLE LXV Staninger, 4th Grade, Session 2, Carroll

INTERACTION ANALYSIS											
	1	2	3	4	5	6	7	8	9	10	SUM
1	0	0	0	0	0	0	0	0	0	0	0
2	0	0	1	1	0	0	0	1	0	0	3
3	0	3	16	11	19	1	1	0	2	4	57
4	0	0	0	26	6	1	0	40	2	10	85
5	0	0	0	26	127	7	0	1	2	15	178
6	0	0	0	4	0	9	0	3	0	5	21
7	0	0	1	1	0	0	0	0	1	0	3
8	0	0	31	7	6	1	2	95	0	23	165
9	0	0	4	2	0	1	0	0	0	0	7
10	0	0	4	7	20	1	0	25	0	75	132
TOTAL	0	3	57	85	178	21	3	165	7	132	651
TIMES	0	3	41	59	51	12	3	70	7	57	
PERCENT	0.	0.	9.	13.	27.	3.	0.	25.	1.	20.	
0.53	TOTAL TEACHER RATIO										
0.26	TOTAL PUPIL RATIO										
0.72	I/D RATIO										
2.50	REVISED I/D RATIO										
10.33	REVISED I/D RATIO ROW 8										
8.75	REVISED I/D RATIO ROWS 8-9										
0.02	EXTENDED INDIRECT INFLUENCE RATIO										
0.01	EXTENDED DIRECT INFLUENCE RATIO										
1.78	EXTENDED I/D RATIO										
16.00	CELL 3/9 RATIO										
0.01	THE VICIOUS CIRCLE RATIO										
23.57	PUPIL-TALK RATIO										

TABLE LXVI Staninger, 4th Grade, Session 2, Curtis

INTERACTION ANALYSIS											
	1	2	3	4	5	6	7	8	9	10	SUM
1	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	1	0	0	0	0	0	0	1
3	0	1	11	11	17	2	0	0	0	4	46
4	0	0	0	17	3	1	0	17	13	11	62
5	0	0	1	16	118	7	1	2	1	18	164
6	0	0	0	1	1	6	0	9	0	4	21
7	0	0	0	1	1	0	1	0	0	0	3
8	0	0	19	3	7	1	1	73	0	14	118
9	0	0	13	3	0	0	0	0	3	2	21
10	0	0	2	9	17	4	0	17	4	47	100
TOTAL	0	1	46	62	164	21	3	118	21	100	536
TIMES	0	1	35	45	46	15	2	45	18	53	
PERCENT	0.	0.	9.	12.	31.	4.	1.	22.	4.	19.	
0.55	TOTAL TEACHER RATIO										
0.26	TOTAL PUPIL RATIO										
0.58	I/D RATIO										
1.96	REVISED I/D RATIO										
9.50	REVISED I/D RATIO ROW 8										
16.00	REVISED I/D RATIO ROWS 8-9										
0.02	EXTENDED INDIRECT INFLUENCE RATIO										
0.01	EXTENDED DIRECT INFLUENCE RATIO										
1.57	EXTENDED I/D RATIO										
3.67	CELL 3/9 RATIO										
0.01	THE VICIOUS CIRCLE RATIO										
5.62	PUPIL-TALK RATIO										

TABLE LXVII Robbins, 4th Grade, Session 1, Barsness

—INTERACTION ANALYSIS

	1	2	3	4	5	6	7	8	9	10	SUM
1	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	1	0	0	1
3	0	0	40	11	15	1	0	0	1	0	68
4	0	1	0	19	4	1	1	24	0	7	57
5	0	0	0	20	100	4	0	1	0	2	127
6	0	0	0	1	2	1	0	5	0	2	11
7	0	0	0	0	0	0	0	1	0	0	1
8	0	0	27	1	3	1	0	78	0	1	111
9	0	0	1	0	0	0	0	0	0	0	1
10	0	0	0	5	3	3	0	1	0	1	13
TOTAL	0	1	68	57	127	11	1	111	1	13	390
TIMES	0	1	28	38	27	10	1	33	1	12	
PERCENT	0.	0.	17.	15.	33.	3.	0.	28.	0.	3.	

0.68	TOTAL TEACHER RATIO
0.29	TOTAL PUPIL RATIO
0.91	I/D RATIO
5.75	REVISED I/D RATIO
27.00	REVISED I/D RATIO ROW 8
28.00	REVISED I/D RATIO ROWS 8-9
0.10	EXTENDED INDIRECT INFLUENCE RATIO
0.00	EXTENDED DIRECT INFLUENCE RATIO
40.00	EXTENDED I/D RATIO
40.00	CELL 3/9 RATIO
0.00	THE VICIOUS CIRCLE RATIO
*****	PUPIL-TALK RATIO

	1	2	3	4	5	6	7	8	9	10	SUM
1	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0
3	0	0	7	2	13	0	0	0	1	8	31
4	0	0	0	4	1	0	0	12	0	6	23
5	0	0	1	12	97	1	2	4	1	30	148
6	0	0	0	0	2	2	0	0	0	0	4
7	0	0	0	0	1	0	0	0	0	1	2
8	0	0	12	2	2	0	0	22	1	10	49
9	0	0	3	0	0	0	0	0	3	2	8
10	0	0	8	3	32	1	0	11	2	62	119
TOTAL	0	0	31	23	148	4	2	49	8	119	384
TIMES	0	0	24	19	51	2	2	27	5	57	
PERCENT	0.	0.	8.	6.	39.	1.	1.	13.	2.	31.	

0.54	TOTAL TEACHER RATIO
0.15	TOTAL PUPIL RATIO
0.35	I/D RATIO
5.17	REVISED I/D RATIO
12.00	REVISED I/D RATIO ROW 8
15.00	REVISED I/D RATIO ROWS 8-9
0.02	EXTENDED INDIRECT INFLUENCE RATIO
0.01	EXTENDED DIRECT INFLUENCE RATIO
3.50	EXTENDED I/D RATIO
2.33	CELL 3/9 RATIO
0.01	THE VICIOUS CIRCLE RATIO
6.13	PUPIL-TALK RATIO

	1	2	3	4	5	6	7	8	9	10	SUM
1	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	2	0	0	0	0	2
4	0	0	0	0	3	0	0	11	0	0	14
5	0	0	0	4	26	17	1	5	0	2	55
6	0	0	0	4	5	28	1	31	0	7	76
7	0	0	0	0	0	2	0	0	0	2	4
8	0	0	2	5	17	21	1	115	0	2	163
9	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	1	4	6	1	1	0	24	37
TOTAL	0	0	2	14	55	76	4	163	0	37	351
TIMES	0	0	2	14	29	48	4	48	0	13	
PERCENT	0.	0.	1.	4.	16.	22.	1.	46.	0.	11.	

0.43	TOTAL TEACHER RATIO
0.46	TOTAL PUPIL RATIO
0.12	I/D RATIO
0.03	REVISED I/D RATIO
0.09	REVISED I/D RATIO ROW 8
0.09	REVISED I/D RATIO ROWS 8-9
0.00	EXTENDED INDIRECT INFLUENCE RATIO
0.08	EXTENDED DIRECT INFLUENCE RATIO
0.00	EXTENDED I/D RATIO
0.00	CELL 3/9 RATIO
0.09	THE VICIOUS CIRCLE RATIO
*****	PUPIL-TALK RATIO

TABLE LXX Robbins, 4th Grade, Session 2, Barsness

INTERACTION ANALYSIS											
	1	2	3	4	5	6	7	8	9	10	SUM
1	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	1	1	0	0	0	2
4	0	0	0	0	2	1	0	14	0	1	18
5	0	0	0	7	34	19	0	1	1	2	64
6	0	0	0	1	0	12	0	30	0	14	57
7	0	0	0	0	1	1	0	4	0	0	6
8	0	0	2	9	20	16	4	118	0	3	172
9	0	0	0	0	1	0	0	0	0	0	1
10	0	0	0	1	6	7	1	5	0	34	54
TOTAL	0	0	2	18	64	57	6	172	1	54	374
TIMES	0	0	2	18	30	45	6	54	1	20	
PERCENT	0.	0.	1.	5.	17.	15.	2.	46.	0.	14.	
0.39	TOTAL TEACHER RATIO										
0.46	TOTAL PUPIL RATIO										
0.16	I/D RATIO										
0.03	REVISED I/D RATIO										
0.10	REVISED I/D RATIO ROW-8										
0.10	REVISED I/D RATIO ROWS 8-9										
0.00	EXTENDED INDIRECT-INFLUENCE-RATIO										
0.03	EXTENDED DIRECT INFLUENCE RATIO										
0.00	EXTENDED I/D-RATIO										
0.00	CELL 3/9 RATIO										
0.03	THE VICIOUS CIRCLE-RATIO										
*****	PUPIL-TALK RATIO										

	1	2	3	4	5	6	7	8	9	10	SUM
1	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	7	0	0	0	0	0	0	7
4	0	0	0	2	0	5	0	23	1	4	35
5	0	0	0	1	13	6	0	3	0	4	27
6	0	0	0	7	2	21	0	16	0	8	54
7	0	0	0	0	0	0	0	0	0	0	0
8	0	0	7	13	10	10	0	54	0	14	108
9	0	0	0	0	0	1	0	0	1	0	2
10	0	0	0	5	2	11	0	12	0	43	73
TOTAL	0	0	7	35	27	54	0	108	2	73	306
TIMES	0	0	7	33	14	33	0	54	1	30	
PERCENT	0.	0.	2.	11.	9.	18.	0.	35.	1.	24.	

0.40	TOTAL TEACHER RATIO
0.36	TOTAL PUPIL RATIO
0.52	I/D RATIO
0.13	REVISED I/D RATIO
0.70	REVISED I/D RATIO ROW 8
0.64	REVISED I/D RATIO ROWS 8-9
0.00	EXTENDED INDIRECT INFLUENCE RATIO
0.07	EXTENDED DIRECT INFLUENCE RATIO
0.00	EXTENDED I/D RATIO
0.00	CELL 3/9 RATIO
0.07	THE VICIOUS CIRCLE RATIO
54.00	PUPIL-TALK RATIO