THE UNIVERSITY OF ALBERTA

USING THE OBSERVATIONAL SYSTEM FOR THE ANALYSIS OF PRIMARY READING LESSONS IN GRADE ONE LANGUAGE EXPERIENCE READING CLASSES

by

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ABSTRACT

The major purpose of this study was to use the Observational System for the Analysis of Primary Reading Lessons (OSAPRL) in grade one Language Experience Reading (LER) classes to test the prototype instrument in order to determine its viability as an observational instrument. The data generated by the OSAPRL was analyzed using computer facilities at the University of Alberta.

The OSAPRL proved to be a viable classroom observational instrument, but refinements and modifications were suggested. The data generated by the instrument reported significantly different verbal interaction patterns in the three observed LER classes, and in all but two of the observed intra-class groups.

Among the implications of this study, the one which was most important was the need for further research to more accurately describe the verbal interaction processes which are taking place in reading lessons, so that these may more closely parallel the desired goals.

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CHAPTER 1

INTRODUCTION

Reading has remained a primary goal of education for decades. It is not surprising that so much effort, in educational circles, has been directed toward the teaching of reading, for reading is basic to so many other skills.

While methods, teacher effectiveness, classroom organizational patterns, and other aspects of reading have been investigated, few studies have taken place "where the action is," in the reading classroom. Fewer still have observed teachers and pupils -- not in terms of product variables, but in the interests of discovering what are the process behaviors which are currently being used in the teaching of reading. Present concern is reflected by Worth (1972) who stated that "improvements in process are the key to greater efficiency in schooling . . . (p. 211)."

Smith (1961) in defining teaching, was of the opinion that a definition of teaching can be merely an explanation of what teachers do, rather than what we think they ought to do. He concluded that they either (a) show how to do something, or (b) say (or tell) something.

Oral language is the basis of communication in our society (Robertson, 1966). Aschner (1960) among others, affirms that few classroom acts entail no verbal dimension. Lenneberg (1967) suggests that words, the vehicles of this dimension, "tag" conceptual processes. Builders of verbal interaction systems rely on words to represent total

behavior (Amidon and Flanders, 1971).

The gregarious nature of humans dictates that many activities take place in communion with others. Learning to read is not unique in this respect. The teaching of reading, one of the major skills to be learned in school, takes place in the context of social interaction, reciprocal contacts between teachers and pupils (Flanders, 1970). Goodacre (1969) contends that it is possible to think of the teaching of reading as a social system, and then to consider the respective roles and functions of materials and methods. It is of interest to know what kinds of interaction really take place in the "reading classroom social system" and to what extent they are influenced by materials used and methods involved.

That there are differences between reading classrooms has been documented (Chall, 1967; Berg, 1970; Browne, 1971). Moyle (1968) suggested that the development of reading and language skills may be enhanced or retarded by the pupil's perception of the environment in which he is placed, and that success in reading is more closely related to the teacher and child, than to the materials and methods used. It would seem, therefore, that cognitive outcomes are related to the affective conditions of the reading lesson as they are perceived by the learner.

Moreover, besides differences between classrooms, Fry (cited by Stauffer, 1967) found extreme differences within reading classes. Such differences suggest that communication sent may not be interpreted similarly by all persons. The child may select out of his environment his own curriculum, according to his needs, abilities, and perceptions.

If we concur that reading is a primary skill, usually learned in a social context, and that the teaching of reading is heavily dependent upon oral communication, which may influence cognitive and affective behaviors, then direct observation of the teaching of reading, using a system which focuses on verbal behavior, and/or its nonverbal substitutes, may be a viable means of gathering information.

NEED FOR THIS STUDY

Before a process can be understood, it must be described (Ivany and Neuyahr, 1970). Accurate descriptions are made on the basis of the properties of the object or behavior described. The description of reading requires an instrument specific to it (Jenkinson, 1970).

Browne (1971) has devised an instrument for examining teacher-pupil verbal behavior in the primary reading class -- the Observational System for the Analysis of Primary Reading Lessons (OSAPRL). It consists of a set of categories specific to the teaching of primary reading, and was derived from two main sources: the Flanders Interaction Analysis System (FIAS), a general, affectively-oriented observational system, and the Focused Interaction Episode in Reading (FIER), a reading-specific, cognitively-oriented system, based upon Browne's own observations of basal reading classroom behaviors. A welding of these two systems resulted in OSAPRL, which was designed to examine verbal behavior in the reading classroom from the standpoint of the affective, social-emotional characteristics of the verbal interaction, as well as from the standpoint of the reading content of the observed behavior.

Browne did not, however, test OSAPRL in the classroom. It was

tested only in a small pilot investigation, using typescripts of audiotapes collected in reading classes. In proposing the prototype instrument, Browne recommended that OSAPRL be tested in reading classrooms where methods other than basal reading are in operation, in order to determine its viability as a classroom observational instrument. Furthermore, she stated: "Until the system has been tried out and its findings interpreted, any comments on its practical value must be purely speculative (p. 342)."

This study utilized OSAPRL and interpreted the findings. It attempted to determine whether OSAPRL described accurately the reading classroom behaviors observed. As such, it is a logical extension of the work initiated by Browne and her predecessors.

Campbell and Barnes (1969) recommend objective evaluation in order to give the teacher something definite, "both in the form of diagnosis and subsequent prognosis to utilize in improving his teaching (p. 589)." Moreover, in a review of needs in educational research, Mitchell (1970) cited the need for observational instruments dealing with treatments and persons simultaneously. Browne's instrument was an attempt to answer these needs in reading. This study, dealing with the Gage Language Experience Reading approach in the primary class environment (a treatment), and teachers with their pupils (persons), using OSAPRL, was an attempt to further refine classroom observation.

Mitchell (1970) also declared that appropriate techniques for measurement are required -- techniques as reliable, valid, and precise as those now employed for measuring personological variables. This study examined OSAPRL, a hitherto untested instrument, in terms of

criteria used to examine other testing instruments, including observational systems.

Furthermore, Mitchell urged the use of in situ observation. This study satisfied this criterion, for observations were made in classrooms, and great care was taken to preserve the "natural" features of the classrooms.

Consideration of the views outlined, the expressed feeling that teachers need objective measures for examination of their verbal behavior, and the need in the reading classroom to understand better the ways in which teachers and pupils interact, characterized by specific approaches to the teaching of reading, gave direction to the treatment of the problem pursued in this study.

STATEMENT OF THE PROBLEM

The problem of this study was to describe, under natural conditions, teacher-pupil verbal interaction, in order to evaluate and refine the OSAPRL and to examine the differences, if any, in the behavior of classroom teachers using the same Gage Language Experience Reading program.

THE RESEARCH QUESTIONS

The following research questions guided the conduct of the investigation:

1. Is the Observational System for the Analysis of Primary Reading Lessons (OSAPRL) a viable instrument to describe verbal behaviors in the language experience reading lesson?

2. Does teacher-pupil verbal interaction vary in different classrooms subscribing to Gage Language Experience Reading program?

3. Does teacher-pupil verbal interaction vary among intra-classroom groups taught by the Gage Language Experience Reading program?

In order to statistically analyze the data using the Darwin chi-square, the Q-test, and the Z-test, it was necessary to formulate null hypotheses for research questions two and three. These null hypotheses follow.

1.1 Null hypothesis That there are no significant differences in the patterns of teacher-pupil verbal interaction in the three different classrooms where the same Gage Language Experience Reading approach is implemented by three different teachers.

1.2 Null hypothesis That there are no significant differences in the patterns of teacher-pupil verbal interaction among intra-classroom groups within the same classroom, where all groups are taught using the same Gage Language Experience Reading approach, and by the same teacher.

ASSUMPTIONS

The following assumptions were basic to this investigation:

1. that the verbal behavior of teachers and pupils observed during classroom visits represented an adequate sample of the total interaction in the reading classrooms which were observed in this study;

2. that the data collected by coded and anecdotal records, and by audio-tapes provided an accurate sample of the observed behavior;

3. that observer bias was minimal.

LIMITATIONS

Certain limitations were apparent to the investigator prior to

the study. Other limitations became apparent during the course of the investigation because it was carried out under natural classroom conditions where control was impossible. The two sets of limitations are reported separately.

Limitations noted prior to the study include the following:

1. The four teachers initially involved in the study were not randomly, but fortuitously selected. They were implementing the Gage Language Experience Reading program, at the same grade level, and expressed a willingness to participate in the investigation. They may not represent all grade one teachers of reading, using the Gage Language Experience Reading approach.

2. The pupils in this study were included solely on the basis of their membership in the reading classes of the participating teachers, therefore, they may not be representative of all grade one pupils.

3. It is recognized, as Jackson (1968) suggested, and Klein (1970) affirmed, that the role of the pupil as a determiner of interaction may assume greater weight in some instances, than in others. Interaction analysis, as presented here, may infer that the teacher is the chief determiner of the kinds of interaction which take place. This inference is further supported by the greater number of categories for teacher behavior, than for pupil behavior in both FIAS and OSAPRL, although OSAPRL did reduce this difference. Such an inference may bias data collection and analysis, and was considered a limitation on interaction analysis in general, and this study in particular.

4. Although several visits were made to each classroom before official data collection began, it is possible that all teachers and

pupils were not equally conditioned to the presence of the investigator and the equipment.

5. Differences in interaction patterns occurring over the course of this investigation may be due in part to the increased sensitivity of the teacher, and/or the pupils, to their roles as interactants in this investigation.

6. An investigation of this kind, carried out by a single investigator, is subject to the interpretation of that investigator. Although inter-observer tests of reliability were made in order to avoid gross subjectivity, it is possible that the second observer was biased by the major investigator.

7. Since the investigator was working under the guidance of Browne, who originated OSAPRL, it is possible that the investigation was influenced by Browne. That this might be a problem was recognized at the outset, and efforts were made so that divergent opinions were mutually respected.

The following limitations became evident during the progress of the study:

8. One teacher was unable to participate beyond the initial day of the pilot study, due to illness. This reduced the size of the sample, and the data generated.

The original sample would have included all the grade one teacher-pupil classroom units subscribing to the Gage Language Experience Reading approach, in this particular school district.

9. After data collection schedules had been arranged, two teachers made provisions for the presence of teacher-internes in their

classrooms during the scheduled data collection hours. This would have contaminated data if collection had proceeded. Therefore, visits were rescheduled to avoid the presence of teacher-internes.

Because of this unexpected problem, some visits were necessarily scheduled for the seventh week of the data collection period; one fewer visit was made to one teacher; one visit occurred during the afternoon, since this was the only convenient time for that teacher.

These changes necessitated that all statistical comparisons take into consideration the differences in time spent in each classroom, and that percentages rather than frequencies be used.

It is possible that data collected in classrooms toward the end of the study may have been affected by the increased maturity of the pupils, the increased proficiency of the investigator, the time of day during which data was collected, and that a fatigue factor, though not recognized, may have been present in the teacher, pupils, and investigator.

DEFINITIONS

1. Reading. This term includes not only word recognition, but comprehension and interpretation, appreciation, and application of what is read to the study of personal and social problems.

2. Reading teacher. The teachers in this study have been referred to as reading teachers and/or teachers of reading because each was responsible for teaching basic reading skills to pupils in self-contained classrooms. The designation of these teachers as teachers of reading does not necessarily imply that they have special qualifica-

tions which set them apart from other classroom teachers, nor that they were solely responsible for the teaching of reading in special reading classes; in all schools observed, remedial reading was taught by personnel other than those participating in this study.

3. Reading lesson. This term indicates the period of time during which the Gage Language Experience Reading program was taught in the classroom. The lesson was considered to begin when the teacher joined the group, and was considered terminated when she indicated that the lesson was over, and ceased to instruct the group using the Gage Language Experience Reading program.

4. Reading group. This term refers to the pupil-targets of teacher-pupil verbal output. Placement in a group was based upon the classroom teacher's assessment of pupil abilities and/or achievement in reading. For the purposes of this study, the designations of High, Average, combined High-Average, and Low, refer respectively to the group perceived by the teacher to be most competent, of average competence, of average to high competence, and least competent, in comparison to other learner-readers in the classroom.

5. Interaction. For the purposes of this study, this term refers to reciprocal verbal acts between teacher and pupil as described by Flanders (1970).

6. Interaction analysis. This phrase applies to those methods of observation which study behavioral transactions by coding spontaneous communication, arranging data into a useful display, and analyzing results in order to study patterns of teaching and learning (Flanders, 1970).

7. Interaction matrix. A matrix is a rectangular array of numbers. In using OSAPRL, a sixteen column, sixteen row plot used to analyze the coded verbal behaviors of teachers and pupils is the visual display identified by this term. This matrix differs from that of Flanders in the number and identification of categories.

8. Language experience reading approach. This approach to reading denotes a method of teaching reading in which, during the early phases, reading materials are developed by recording children's spoken language. The content of pupil-created reading materials represents the experiences and language patterns of the reader. Listening, speaking, reading, and writing are integrated in language arts and reading instruction (Hall, 1972). Language experience approaches vary. The rationale, theoretical background, and an explicit description of the Gage Language Experience Reading approach, identified as LER throughout this study, are included in Appendix A.

The following terms are specifically used in connection with the OSAPRL instrument:

9. Solicitation. An act on the part of a teacher which is intended to initiate a response from the pupils is designated by this term.

10. Nonsoliciting statement. This term may refer to either of two teacher acts: reading-related; not reading-related. Neither of these statements calls for an immediate pupil verbal response.

11. Reaction. This term identifies an act on the part of the teacher in reply to the responding act(s) of the pupil(s).

12. Response. This term identifies an act on the part of the

pupil in response to a teacher solicitation, or as a spontaneous act.

13. Steady state cell. This term identifies a behavior in the matrix which has "identical numbers in its address" (Flanders, 1970, p. 105). In other words, it is a behavior which recurs consecutively, for example, 10,10,10.

ORGANIZATION OF THIS STUDY

This investigation of teacher-pupil verbal interaction using the Observational System for the Analysis of Primary Reading Lessons in grade one classrooms where the Gage Language Experience Reading approach was being implemented, consists of six chapters.

The aim of Chapter 1 was to introduce the problem and the research questions. It provided background information including the need, assumptions, limitations, and definition of terms basic to this study.

Chapter 2 presents a selected review of the literature related to the research questions.

The method of investigation is described in Chapter 3, including sampling procedures, the pilot investigation, data collection, and preparation of data for analysis. The statistical procedures for the analysis of the data are indicated.

Because the analysis of the OSAPRL as an observational instrument was impossible without first testing it in the classroom, findings from the application of OSAPRL in LER classrooms are reported in Chapter 4, prior to the analysis of the instrument, which is reported in Chapter 5.

Chapter 4 reports and interprets data related to the second research question, which is concerned with the differences, if any, in the patterns of verbal interaction in the three grade one classes using the Gage Language Experience Reading approach.

Chapter 5 reports and interprets data relating to the first research question, which deals with the viability of OSAPRL as an observational instrument for the analysis of verbal interaction in primary reading classes.

Chapter 6 summarizes the findings of this investigation, presents conclusions, implications, and suggestions for future research.

CHAPTER 2

REVIEW OF RELATED LITERATURE

The purpose of this chapter is to provide a background for the present study by collating previous research which influenced the orientation and conduct of this investigation.

THE STUDY OF CLASSROOM VERBAL INTERACTION

Rationale for the Study of Classroom Verbal Interaction

Language and its nonverbal substitutes are the prime tools of classroom communication. Verbal interaction research is premised in the belief that language may best be examined by selecting representative "bits", and from these, building an image of teaching-learning. Flanders expressed this view:

> It is the tiny bits of behavior that constitute teaching. To know what teaching is impels us to take the little bits into account and use them to display a conception of the teaching that is taking place. To know what teaching is plunges us into a subjective problem; to know what teaching acts occur is by definition an objective problem. It may take years of research and development before we can synthesize the subjective and objective elements, but there can be no escape from confronting the question (Flanders, 1970, p. 24).

The actualization of human potential (Otto, Ed., 1966) must be realized at the person-to-person classroom level, if our schools are to fulfill their functions as a framework for this ideal. This places verbal transactions within a specific context.

Because the person who does not read well is disadvantaged in our society (Artley, 1969), and since reading may enhance or inhibit

social development (Smith, 1948) the two areas, reading, and social development, are intimately related.

The role of the teacher assumes importance since she can influence the amount and quality of classroom interaction (Chall, 1967; Bond and Dykstra, 1967). She is encouraged to use her skills as stimulator, orchestrater, insight sharpener, to help children achieve specific educational goals (Worth, 1972). Reading skill is a paramount educational goal.

Although a two-way relationship exists between thought and language (Vygotsky, 1962) and thought may be reflected in language, the affective ecology of the person, the group, and/or the situation may also be revealed by verbal behavior.

In the reading classroom, language assumes an additional dimension. It is not only a vehicle, but a goal of instruction. In interaction research, it is an integral part of the observational system as well.

Conceptual Framework of Classroom Interaction Studies

Because of the person-to-person characteristic of verbal behavior (Sears, 1951) and the context in which it occurs - "a stream of behavior" (Barker, 1963) two theories, one related to each of these features, are proposed.

Sears stated that the drives of each person in a sequence are satisfied only when the motivated actions of the other are carried through to completion. This infers interdependence, both cognitive and affective, between participants, if need satisfaction is to occur.

Frustration of goal achievement results from distortion within the sequence. Translated to primary reading lesson behaviors, this may take many forms including stumbling pupil responses, instructional ambiguity, interruption of goal-oriented behavior. Frustration may also occur when nonverbal behaviors contradict verbal messages.

The successful sequence provides satisfaction for the initiator of the interaction - a "watershed", affective and cognitive.

Barker defines behavior in terms of "streams". Structures which enclose or are enclosed, make up the units of the "stream of behavior". Floyd Allport (1955, cited by Barker, 1963) called this the inside-outside phenomenon.

Barker's concept, as a grid, superimposed on Sears' model, may have value in relating diadic sequences to the behavior continuum.

Enclosing structures, in terms of the primary reading lesson, may be used to describe either affective parameters, or verbal episodes, depending upon the orientation of the observer. Enclosed structures might refer to discrete diadic units requiring no further explication.

On the other hand, there is an "interloping" phenomenon in classroom verbal interaction, when verbal interaction does not logically follow from the preceding behaviors, but from some other more distant stimuli.

Discussion. Language, a subcategory or "infra-system" of communication, is the chief reading classroom tool. Because of the complexity of reading classroom verbal behavior and the social milieu in which it occurs, more than one theory may be required to describe it.

Both cognitive and affective dissonance may occur if a diadic sequence is not carried to completion, or if contradictory messages are sent.

Because communication, as the person who sends and receives it, is one integrated whole, not separable into its moieties without distortion (Cherry, 1966), it is important that classroom verbal interaction be interpreted in terms of the total context in which it occurred - that the "single strand" be rewoven into the classroom tapestry.

By using anecdotal notes to supplement the representative "bits" to which Flanders referred, the observer may rebuild a more accurate total image of classroom interaction.

Evolution of Classroom Observational Research

Initially, the purpose of classroom observation in educational research was the evaluation of teacher effectiveness (Withall and Lewis, in Gage, Ed., 1963), methodological differences (Chall, 1967), and social-emotional climate (Withall and Lewis, 1963). Representative research in each of these categories was carried out by Barr (1935), Currier (1923), and Anderson, Brewer and Reed (1946), respectively.

Two main kinds of observation systems developed: sign and category. The sign system noted behaviors but disregarded frequencies. The category system classified behaviors and noted frequencies along a temporal continuum.

Four stages of development may be identified. Three were concerned with early research. The fourth included recent research.

Early research. The first stage included research up to the end of the 1930's. The purpose of much of this research was to identify teacher effectiveness: those traits, qualities, and behaviors hypothesized to facilitate learning. (Withall and Lewis, 1963, in Gage, Ed.) However, "effectiveness" was not clearly defined. Information was collected by means of questionnaires and rating scales.

The second stage, covering the 1930's and 1940's focused attention on pupil as well as teacher behaviors, using sociometric procedures. A study by Bonney (1947) is representative of this period. It attempted to ascertain which pupils had the most friends according to separate teacher and pupil ratings. Thirteen teachers and 291 students were questioned. Divergence was found between ratings given by teachers and those by pupils. Teachers tended to overrate cooperative, intellectually active, socially inhibited children - these behaviors were valued by teachers. The present study also indicated to some extent which behaviors were valued by primary reading teachers, and attempted to make assessments under natural classroom conditions.

During this period, Johnson (1935) demonstrated that positive, direct, approving communication to pupils assured greater compliance and more frequent pupil inquiries. Johnson asked 38 children in turn to perform simple tasks, solve problems, inhibit certain activities. The "do" type of communication was more effective than the "don't". This study provided information similar to that sought by the affective categories of OSAPRL.

The third stage, cited by Withall and Lewis (1963) spanned the 1940's and 1950's, concentrating on the prediction of outcomes by the

manipulation of one or two variables. Research was based on insights into classroom climate, group life, child growth and development. These studies are well-documented (Amidon-Hough, 1967; Browne, 1971), however, some conclusions from them have a bearing on the interpretation of the present study.

Anderson (1937) concluded that teacher dominative and integrative characteristics could be measured, that teachers tended to set the "climate," and that pupils perpetuated teachers' behaviors. What was not explored were the effects of dominative and integrative behavior on different ability groups or personality types. Anderson's study lent credence to the hypothesis that pupil behavior may, in some measure, reflect teacher behavior.

Cogan's (1956) contribution was to refine this hypothesis to include pupils' perceptions of teachers' behaviors as an important variable in their achievement -- in particular, teachers' behaviors which tended to include pupils in classroom activities. Although Cogan did not attempt to categorize pupil perceptions according to pupil ability level, his questionnaire did differentiate "required" from "self-initiated" performances of pupils, and related the latter to teacher behaviors which were "inclusive".

Relevant to the present study was Cogan's assessment of pupil participation and of pupil-initiated participation. Categories 1 through 9 in OSAPRL represent teacher initiated behavior; category 15 represents pupil-initiated behavior.

Lewin, Lippitt and White (1940) studied the effects of authoritarian, laissez-faire, and democratic leadership in two different

experiments, as well as interpersonal interactions. This study was an extension of the type of research done by Anderson and his colleagues. It was relevant to the present investigation when data were interpreted, since high loadings in certain categories, and anecdotal notes, identified trends which could be interpreted as authoritarian, democratic, or laissez-faire classroom conditions.

At about this time Withall (1950) developed a seven category classification system identifying teacher verbal behaviors on a learner-centered to teacher-centered continuum (Amidon and Hough, 1967).

Withall's conclusions relating to the present study included the following: teacher statements can be categorized; verbal behaviors for a given teacher from day to day appear consistent; different verbal patterns may be identified among teachers. Withall did not identify teacher verbal patterns with respect to pupil ability groups.

Discussion. The preceding review of research traces evolution of classroom observation through five decades. Research drew from the best knowledge of the day, translating theories about teacher effectiveness, child development and sociometry, and the effects of certain variables, into practical instruments, in the search for more objective measures of the teaching-learning process.

Methods used and conclusions reached in early research continue to serve as guidelines in contemporary research: "in-classroom" observations were begun; positive, rather than negative statements were found to be more effective; classroom climate was described in terms of dominative and integrative behaviors; pupil perception of the

situation was considered; self-initiated behavior was differentiated from required behavior; the effects of different classroom climates were described; teacher behavior was recognized as a measureable entity; consistency was noted in each individual teacher's behaviors over an extended time, but different teachers presented different behavior patterns.

Because the results of much research were contradictory and inconsistent, systematic observation techniques in future studies were recommended. From these guidelines, observation systems which employed counting rather than rating specific teaching behaviors, developed.

The Current State of Interaction Research

The present stage of interaction research draws on social-psychological phenomena (Withall and Lewis, 1963). The classroom group as a social milieu was recognized. Three dimensions were defined: the teacher's actual behaviors in the classroom and her comprehension of the learner's self and social perceptions; the learner's perceptions of instructional activities; the group-life context within which teachers and pupils interact.

From this background the Flanders Interaction Analysis System (FIAS) developed (1963). Medley and Mitzel (Gage, Ed., 1963) cited FIAS as the most sophisticated category system up to that time. FIAS categories, well-documented elsewhere (Flanders, 1970) are reproduced in Appendix B.

Flanders' study was concerned with the effects of direct and indirect teaching on the learning achieved by students whose goal-perceptions were ambiguous, and those whose goal-perceptions were clear.

Flanders' teacher-class sample consisted of 32 urban social

studies and mathematics teachers, considered representative of the teachers in the region (Minnesota). Teachers taught a two-week unit of study. The hypotheses, procedures, analysis of data, and conclusions are described in detail by Flanders (1962).

Flanders found that indirect teaching produced more learning in pupils whose goals were ambiguous. When goals were clear to pupils, direct teaching was more effective (1962). It may be possible to equate certain OSAPRL categories with indirectness and directness, but the OSAPRL system was not designed for this purpose.

More important to this study than Flanders' conclusions about directness and indirectness was the observational system which he used to achieve them - the Flanders Interaction Analysis System (FIAS), from which the OSAPRL drew its format. Subsequent studies have modified FIAS thus setting precedents for Browne's use of it. Modifications of FIAS were carried out by several researchers including Amidon and Hunter (1967); Hough (1967); Bogener (1967); Shanahan and Weir (1969); Bondi (1969).

Extension of computer techniques suggested by Flanders were implemented by Ary (1969). Krahmer and Kunkel (1969), and Bondi (1969) used 5056 optical scoring sheets for recording Flanders' categories.

In January 1972, at least 70 different studies using FIAS were documented by Eric Crier (personal correspondence, Wanat, 1972).

Discussion. Walker (1972) commented that the development of classroom observational research has been, until recently, almost entirely an American achievement. It is of interest to note that India, Australia,

Africa, Denmark, Sweden, Great Britain, and Latin America have reported interaction research in both general and specific areas of classroom activities (Simon, 1971).

The increasing amount of research resulting from direct observation in the classroom indicates a growing conviction that this method promises insights at all grade levels, and in various organizational settings (Amidon and Hough, Eds., 1967; Adams and Biddle, 1970; Radebaugh and Johnson, 1970-1971).[1]

Simon and Boyer (1970) documented 79 different interaction systems. Amidon and Hough (1967) described various systems and the theories from which they were generated. Medley and Mitzel, and Withall and Lewis (Gage, Ed., 1963) traced the historical development of interaction systems. More recently, Browne (1971) and Frizzi (1971) have reviewed interaction research.

STUDIES OF THE READING LESSON

The present study was preceded by reading research using both general observational procedures as in the Chall study, summaries of previous research, as in the Bond and Dykstra study and specific observational systems. A selected review of research which directly or indirectly influenced the present study, follows.

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[1] A growing body of interaction research has been carried on at the University of Alberta, including that of Tetley (1964), Slinn (1965), Westbury (1968), Anderson (1969 and 1972), Shostak (1970), Sheppy (1971), Jones (1971), Smith (1971), Browne (1971). Only Browne's research was concerned with teacher-pupil verbal interaction in the primary reading class, and presented an instrument specific to this behavior.

General Studies of Reading

Chall (1967) visited classrooms using different reading teaching methods and reported her general observations. She cautioned that a "new" method may be credited with gains in achievement for which it may not be entirely responsible, since innovative methods may be introduced concurrently with other changes. She supported the views that the teacher is largely responsible for the success of any method (p. 308), but that code-emphasis for beginning reading produces better results than a meaning emphasis (p. 307).

These observations were pertinent to the present study since the LER program was considered relatively new by the teachers in the sample. However, the LER approach incorporates a meaning emphasis from the beginning.

Bond and Dykstra (1967) compiled and analyzed the results of 27 studies included in the Cooperative Research Program in First Grade Teaching. A purpose of the Bond and Dykstra study which was related to the present study was to discover whether any program was uniquely effective for any group of high or low readiness.

Among the conclusions which were pertinent to this study, was the statement that high-readiness pupils tended to profit more from a language experience approach than low readiness pupils. This conclusion agreed with an observation made by Currier (1922), that foreign children and children with impediments of speech were much helped by phonetic drills. LER does not emphasize this approach to skill mastery.

Bond and Dykstra noted that the unstructured nature of the language experience approach may present difficulty for some teachers.

Systematic Observation Studies in Primary Reading

Harris and Morrison (1969) summarized the Comparison of Reading Approaches in First-Grade Teaching with Disadvantaged Children (CRAFT), a program designed to explore the efficacy of various reading approaches. He concluded that the teacher was far more important than the methods used.

In a final report on the CRAFT project Harris and Morrison (1969) stated that differences within were greater than differences between methods; while slow gains may be shown by language experience programs initially, the trend reversed itself by the end of grade three; frequent efforts to maintain discipline were associated with poor achievement; teachers tended to modify an approach, and felt that more than one year of experience was necessary before a teacher was competent to teach language experience reading.

Selected for review following, are studies which observed teacher-pupil verbal interaction in primary reading lessons and in which category or observational systems were employed. The results were reported by the practising researchers.

Haffner and Slobodian (1969) observed grade three reading classrooms using the Reading Observation Record (ROR), developed by Slobodian in 1966.

The purposes of this study which concern the present investigation were: to explore verbal interaction patterns of teachers and pupils; to explore the incidence of teacher perseverative behavior (which could compare to the incidence of frequencies in steady state cells or recurring behavior patterns in the present study); to determine

if teachers using the same materials tend toward convergent teacher behaviors, which would compare to across teacher comparisons in the present study.

The reading program employed for the Haffner and Slobodian study was the readiness portion of the Ginn Basal Reading (1961) approach. The sample consisted of 24 third grade teachers who volunteered their participation and both high ability and readiness level pupils randomly selected from a suburban school district. Teachers were each visited twice.

Among results pertinent to this study, Haffner and Slobodian found that teacher initiated questioning patterns predominated; teachers and groups did not modify their behavior significantly from one instructional period to another.

The incidence of specific behaviors and the categories used were not reported in the available literature, therefore direct comparisons with OSAPRL cannot be made. As well, detailed information was not available about differential group behavior.

Chall and Feldman[2] (1966) compared reading methods, teachers' implementation of methods, and childrens' levels of prereading skill. A Classroom Observation Inventory was constructed in order to rate teachers in the study.

The sample consisted of fourteen teachers and twelve classes

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[2]The Chall and Feldman (1966) study was one of the studies included in the Bond and Dykstra (1967), Cooperative Research Program in First Grade Teaching.

of children who were described as "disadvantaged." The "natural" classroom setting was used. The study compared basal reading approaches implemented by teachers stressing either a sound-symbol or a meaning emphasis. After 140 days of instruction, Stanford Reading Achievement Tests were administered to the children.

Results of data analysis which are of interest to the present study included high correlation between achievement and: a sound-symbol emphasis (which is contrary to the LER meaning emphasis); high class participation; moderate control of classroom structure. Chall and Feldman also found that teachers did not accurately judge their own implementation of the program, and that approval did not influence pupil achievement.

While the present study does not measure reading achievement, it is concerned with the variables related to it. The sound-symbol emphasis is not present in LER; percent of pupil talk is comparable with "class participation"; control of classroom may be equated with certain OSAPRL categories (e.g. OSAPRL Cat. 5, Teacher reading statements). The Chall and Feldman study did not differentiate ability groups.

Harris and Serwer (1966) compared reading approaches in the primary grades, among disadvantaged urban children.[3] A skill-centered and a language experience program, both including supplementary materials, were used. The original sample, selected in September, consisted of 1700 urban children from 48 grade one classrooms. By

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[3]The Harris and Serwer (1966) study was one of the studies in the CRAFT Project.

post-test time in June the final sample was 1,141 children. Teachers volunteered or were selected, and were believed to represent the total sample in age, experience, years of first-grade teaching. The instrument used to assess verbal interaction was the OScAR-R, which was developed by Medley and Smith (1964) particularly for this First Grade Reading Project in order to yield information about similarities and differences of the behaviors of teachers within the same method. (personal correspondence, Medley, 1972).

Results of the study, which the authors advised should be interpreted with caution showed that the highly-structured skills approach was more effective than the language experience approach, but the differences were not significant.

Bogener (1967) compared seven different approaches to the teaching of reading using one program in each of seven classrooms from kindergarten to grade six. The language experience approach was used in one grade three classroom. Bogener's purpose was to test whether direct or indirect methods, as indicated by observed verbal behavior, differed with the approach to reading.

The Flanders' System was extended to seventeen categories for the purposes of this study. Bogener subcategorized three Flanders' categories: questioning (4); response (8); pupil initiation (9). As well, he included a category for pupil mediation, and did not combine it with silent reading, as OSAPRL requires.

The sample consisted of seven urban teachers, chosen by school officials, and their respective pupils in three reading groups. Observations were made over a period of seven weeks, for a total of

60 to 150 minutes in each classroom.

Certain parallels exist between Bogener's study and this study. In both instances a "new" instrument based on FIAS was being used. In both instances language experience reading was examined.

Findings pertinent to the present study included these: individual teacher-pupil verbal interaction over the total observational period did not vary; the most indirect behavior was observed in the language experience classroom. No comparisons of teacher interaction were made by Bogener within approaches since one teacher only used each method, nor were comparisons made among pupil groups of different ability levels.

Lamb (1971), using the OScAR-R collected teacher-pupil verbal interaction data in a comparative study of language experience and basal reading. The sample consisted of five first-grade classes of culturally disadvantaged urban children. Teachers volunteered their participation.

As a result of her study, Lamb found no significant difference in achievement between the experimental group using language experience, and the control group, using basal reading.

The specific language experience approaches were not identified in the available literature. As well, no comparisons were made within approaches or between pupil groups of different ability levels. Until these details are known, Lamb's results cannot be compared with those of other investigators in this review.

Frizzi (personal correspondence, 1972) investigated teacher-pupil verbal interaction for the purpose of identifying teaching behav-

iour patterns which result in the mastery of a stated behavioral objective in the language arts, specifically the mastery of the sounds of the letter "p".

The sample consisted of fifteen female first grade teachers, who were selected to participate. Data were collected using FIAS, and analyzed according to presage, process, and product criteria.

Among Frizzi's conclusions, those which related to this study were that the most effective[4] teachers recorded a higher proportion of teacher questions, acceptance of pupil feelings, praise and encouragement, and use of pupil ideas.

Least effective teachers used criticism twice as much as the most effective teachers. Frizzi reported little consistency in the use of methods, material, or allocation of time among the teachers.

Browne (1971) conducted a study to explore and describe teacher-pupil verbal interaction in first and third grade classrooms, under natural conditions.

Teacher participation was based upon school officials' recommendations and teachers' willingness to participate. In order to qualify for selection, teachers were required to use a basal reading approach in a self contained classroom, with pupils in three ability groups.

Classes were each visited four times over a ten week period. Audio-tapes were collected and FIAS was used to categorize teacher-pupil verbal interaction recorded on these tapes.

Findings from Browne's study pertinent to the present study

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[4]In the Frizzi (1971) study, effectiveness was determined from pupil scores on the McKee Inventory of Phonetic Skills test.

indicated that: there were significant differences in teacher verbal behavior among groups of different ability levels; group membership influenced peer social relationships; teachers talked over 50 percent of the time; teacher behavior tended to remain stable over the observational period.

This investigation led to further analysis of the taped verbal interaction, which was categorized according to a comprehensive, investigator-constructed observational system, the Focused Interaction Episode in Reading (FIER).

Analysis of the data by means of the FIER lead Browne to conclude that the teachers in her study controlled much of the verbal behavior in the classroom, treated different group levels differentially, and tended to seek preconceived "correct" responses. A synthesis of her experiences with FIAS and FIER resulted in the development of OSAPRL by Browne.

An interesting series of studies by Jansen which influenced interpretation of OSAPRL data should be mentioned to complete this section.

Beginning in 1966, and still in progress, Jansen has been, and is experimenting with a 76 category system applicable to the teaching of the Danish native language -- parallel to reading instruction here. (personal correspondence, 1972) The sample consisted of grade three, four and six pupils in seventeen different schools, drawn from urban, suburban, or rural environments. No information in the available literature indicated teacher selection procedures. In comprehensiveness, Jansen's System resembled FIER, but several categories were

comparable to those of FIAS. It was intended for use in grades 3 to 7, but is presently being revised to observe grades 1 - 10.

Although classified by Simon and Boyer (1970) as an affective system, it contained several potentially cognitive categories including problem solving (category 20).

One purpose for which Jansen used this instrument was to determine whether the form and incidence of classroom activities depended upon the individual teacher, or the school.

One conclusion reached by Jansen as a result of data analysis was that the individual teacher is so important as to be considered "an institution" in some instances. The individual school was also a decisive factor in verbal interaction.

Summary. A review of primary reading research revealed seven instruments which have been devised specifically for the observation of the teaching of primary reading: ROR; Classroom Observation Inventory; OScAR-R; Bogener's modified FIAS; FIER; OSAPRL; Jansen's System. In most studies, participating teachers volunteered. It was not clear whether such teachers were representative of all teachers.

Direct comparisons of results cannot be made because of the differences in pupil samples, instruments, purposes, programs bearing similar labels but containing different materials, methods, and other unknown variables.

Many of the results of reading research were inconclusive and contradictory, but agreement was apparent in the importance attached to the teacher's role in classroom verbal interaction. There was

general agreement that not all children learn equally well by any one program at all stages of their reading development. Less structured programs made greater demands on the teacher, and she required time to become proficient in them. Certain groups may be differentially treated by some teachers, with the result that social status as well as reading behaviors may be influenced by classroom verbal interaction. While there was variation between teachers, the verbal behavior of the individual teacher tended to remain stable over a given observational period.

SUMMARY

This chapter has offered a rationale for interaction study, and a conceptual framework through which classroom interaction may be viewed.

Selected examples of early interaction research were reviewed, and their relevance to the present study noted.

The present state of interaction research was sketched.

Representative samples of reading research dealing with aspects of this study were discussed.

CHAPTER 3

THE DESIGN OF THE RESEARCH

INTRODUCTION

This chapter will describe the steps taken to carry out the study and answer the research questions. The sampling procedures, instrumentation, pilot study, data collection, and data analyses are discussed in this chapter.

Using the Observational System for the Analysis of Primary Reading Lessons (OSAPRL), data were collected under natural conditions in three Grade One classrooms, all using the Gage Language Experience Reading (LER) approach.

This was the initial use of the OSAPRL both under natural classroom conditions, and in the LER classroom. Browne (1971) recommended the study of teacher-pupil verbal interaction during the teaching of reading, under conditions different from those in basal reading classrooms.

THE SAMPLE

Selection of Teacher-Classroom Units

Primary reading classes using the LER approach were required in order to test the OSAPRL and answer the research questions. It was learned that this approach was being used in classrooms in St. Albert Protestant Separate School Division, Number Six. As a result of personal contact with the school authorities, a meeting was held in

February, 1972, to which all primary LER teachers and school board officials were invited. The purposes of the study were outlined, and an attempt made to interest teachers.

Upon consultation with school board office personnel, it was found that four Grade One teachers using the Gage LER approach had also at least one year of experience prior to this term, using this method. In grades two and three, fewer teachers were as familiar with the program. Arrangements were made, through school board officials, to allow the investigator access to each of the four classrooms for preliminary observations and to discuss the requirements of the research with teachers in order to determine whether they would participate. All four agreed to do so.

Unfortunately, after the first preliminary visit, one class was eliminated from the study because of teacher illness. The final sample consisted of three classrooms which were located in different schools.

All teachers were female and lived in or near St. Albert. Teaching experience ranged from three to thirteen years. Teacher education varied from one to three years. Recency of courses varied from one year of training taken over ten years ago to the equivalent of three years acquired over the past ten years.

The pupils included in the sample were those who had previously been assigned to the teachers in the study.

St. Albert is a semi-urban town with a population over 12,000

(January 1, 1972), and above-average socio-economically.[1] It is located about four miles from Edmonton, where most of the adult working population is employed.

The sample selection procedures were biased, but the nature of the study, which required observations in classrooms implementing a program not widely used, precluded random selection. As well, language experience approaches vary, but all of the teachers in the sample were using the Gage Language Experience Reading (LER) approach.

Overview of the Observational Schedule

It was planned that the preliminary visits would be made early in April, prior to the pilot study, to familiarize the investigator and the teachers with the requirements of the investigation, the adequacy of the facilities available, and to verify which teachers would participate.

A pilot study was scheduled for two mornings in each of the classrooms in order to further familiarize the investigator, teachers, pupils, and to test equipment and materials.

The collection of data was scheduled over a four week period, from May 2, to May 30, 1972. However, the unexpected presence of student internes in two of the classrooms necessitated alterations in the observation schedule.

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[1] Information from telephone conversation May 29, 1972, with town office personnel. Socio-economic status based on value of homes and N.H.A. mortgage requirements.

Preliminary Visits

Each classroom was visited as planned before the pilot study took place. It was possible during these visits, to audio-tape teacher-pupil verbal interaction in the reading class, in anticipation of the need for training materials.

Equipment

Two tape recorders, a Sony TC110, and a Webcor 242 were set up to collect teacher-pupil verbal interaction in order to verify coded and anecdotal data. The tape recorders were about nine by five inches, rectangular, black, and were operated optionally with batteries or with electrical power.

Findings Resulting from Preliminary Visits Affecting Investigation Procedures

As a result of prelimiary visits, it was found that all teachers grouped pupils on the basis of an evaluation made after completion by the pupils of the first thirteen lessons in the LER program, and administration of the Metropolitan Reading Readiness Test, Form A. Teachers stated that grouping facilitated differentiation of instruction. When asked specifically how instruction was differentiated, they explained that teaching proceeded at a slower rate with the less able pupils, and that more detail was provided, ostensibly to give these pupils more associational clues and practice. Grouping in LER had not been anticipated and this required alterations in data collection plans.

LER was scheduled almost exclusively by all teachers for morning hours, from the beginning of school activities until about eleven

o'clock. Reading lessons were planned on a six day basis, with days designated as "Day One", etc. On occasion, part of an afternoon might be utilized for LER. In one classroom, timetabling of other subjects shortened the LER period twice each week. The acquisition of this information prior to the study proper was useful in planning the pilot study, and later data collection procedures.

INSTRUMENTATION

The OSAPRL

The OSAPRL categories. The category system is summarized in Figure 3.1. There are sixteen categories in the system. Nine are assigned to teacher, six to pupil, and one to teacher and/or pupil talk. The nine teacher talk categories include solicitations, statements, reactions. Categories one through four represent three kinds of solicitations common to reading lessons: word perception; comprehension; oral (silent) reading. The "other" category is provided for solicitations which do not qualify under categories one to three.

Categories five and six record reading and nonreading statements, respectively. These are used to structure classroom reading activities and to deal with nonreading administrative matters, respectively.

Categories seven, eight, and nine, describe teachers' reactions to pupils' responses. They record praise, extension of pupil response, and corrective reactions, respectively.

Categories ten through fourteen allow for the coding of these

Category 1, Word perception solicitations: directions or questions involving phonics, structural analysis, dictionary usage, or any other specific word recognition skills.

Category 2, Comprehension solicitations: questions or directions requiring literal interpretive, or integrative information from the reading-centered content of the lesson.

Category 3, Oral (silent) reading solicitations: oral or silent reading requests without reason(s) being given for the request(s).

Category 4, "Other" solicitations: any solicitation which does not fit the requirements of the other three solicitation categories.

Category 5, Nonsoliciting teacher statements: reading-related lecturing and other teacher behavior not requiring an immediate pupil response.

Category 6, Nonreading teacher statements: behaviors not related to reading, including general announcements, collection and distribution of materials, disciplining of pupils.

Category 7, Confirming reactions: all positive teacher reactions to pupil behavior.

Category 8, Extending reactions: teacher attempts to help pupil(s) develop further a response given.

Category 9, Corrective reactions: any question, directive, or information aimed at changing a pupil's response in a desired direction.

Category 10, Content responses: pupil response(s) on the basis of school-learned skills, or information.

Category 11, Self-expression responses: pupil response(s) based on pupil knowledge-opinion or information.

Category 12, Oral reading responses: all oral reading response(s), regardless of the initiating solicitation.

Category 13, Silent reading responses: any silent reading response(s) when no verbal behavior is observed, including the examination of pictures, and pauses during oral reading.

Category 14, Unison responses: vocal pupil behavior by more than one pupil, either spontaneous or solicited.

Category 15, Pupil initiating behaviors: verbal interaction initiated by a pupil, and directed toward the teacher or another pupil, whether the interaction was reading-centered or not.

Category 16, Silence or confusion: periods of silence (non-silent reading) and/or periods of activities so generalized that categorization in terms of verbal interaction was impossible; the beginning and ending of each recording session; changes of pupil-speaker if no teacher verbal interaction intervened.

Figure 3.1. Summary of OSAPRL categories

pupil responses: content; content-based self-expression; oral reading from prepared materials; silent reading or pauses in oral reading responses; simultaneous responses by more than one pupil respectively.

Category fifteen indicates any pupil unsolicited verbal behavior directed either to the teacher or to another pupil.

Category sixteen records periods of silence or confusion in which pupils and/or the teacher may participate, separation of speakers when pupils engage in verbal interchange without the intervention of the teacher, and the beginning and ending of any interaction matrix.

Ground rules, designed to meet some of the anticipated problems arising from categorization procedures are provided. These are included in Appendix C.

OSAPRL coding procedures and format. OSAPRL coding procedures are similar to those utilized by the Flanders' System. The observer indicates a number for each three-second interval or change of behavior observed, always beginning and ending a series of observations with a 16 (similar to Flanders' category 10).

A verbal interchange might begin, for example, with a comprehension question which would be recorded 2. If the question were followed by a pupil response based on the content of the lesson, a 10 would be recorded. If the teacher confirmed the answer, a 7 would be recorded. If another pupil voluntarily contributed a response a 15 would be recorded. Thus, a dialogue might be coded as follows:

Teacher: "On what kind of building would you expect to find a door like this?" (2)

Pupil: "A church." (10)

Teacher: "That's right." (7)

Second pupil: "I saw a door like that on a museum once." (15)

The sequence of numbers used to record this verbal interaction according to OSAPRL would be: 16; 2; 10; 7; 15. . . 16. This particular series of interactions is recorded on an optical score sheet in Appendix D. The actual matrices generated by this study are included in Appendix E.

Training Schedule

Overview. In order to conduct the pilot study with greater insight, tapes were collected in LER classrooms during preliminary visits, because it was foreseen that training materials would be necessary. A training routine was also planned.

Further measures were necessary in order to facilitate data analysis. While Test 13[2] is capable of handling a 20 by 20 matrix, it had not previously been used for a 16 by 16 matrix, and no documentation specific to a matrix of this particular capacity was available. Therefore, alterations in the procedures outlined in the documentation of Test 13 were required.

Training procedures. Tapes collected during preliminary observations in LER classes were typescripted. By playing tapes against typescriptions, three-second intervals or behavior changes were marked

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[2]Test 13 is a University of Alberta computer program documented by D. Burnett, D. Flathman, and M. Westrom. It is designed to accommodate Flanders interaction analysis. It is capable of handling up to 20 cell matrices. Automatic comparisons are made between all matrices, and special comparisons may be requested.

off. In cooperation with an assistant, each interval was classified according to OSAPRL categories, and a "key" was prepared for representative behaviors. A sample typescript is included in Appendix F.

Together with the assistant, and following memorization of categories and ground rules, practice coding took place. When both assistant and investigator had reached a working understanding of the categories, and an even coding pace, a Scott's coefficient was calculated using an unfamiliar portion of taped classroom verbal interaction (See section on reliability, to follow). The procedures used to calculate Scott's coefficient in this study are included in Appendix G.

Optical score sheets, coded in the classroom, eliminated a time-consuming step from data collection. Each score sheet provided numbered identification for school, teacher, sequence-number of visit, and group observed. Each score sheet was itself numbered, and numerical order maintained, since the sequence of behaviors is important in the Markov chain theory upon which statistical analysis was based (Kemeny and Snell, 1950).

The computer print-out yielded 16 by 16 matrices from which the following information could be abstracted: total behavior frequencies; frequencies within each category; percent of total behavior represented by each category; percent of any behavior which followed any other behavior; percent of any behavior which preceded any other behavior; repetitious behavior (steady state cells), its frequency and percent of repetition when compared with total frequency of that behavior, or when compared with total behavior frequency.

As well, two or more matrices could be compared in total, using

the chi-square, or the Darwin chi-square. Matrices could be compared across cells, that is, frequency or percent of any one behavior, or any group of behaviors could be compared. Grouping of behaviors also yielded proportions of particular matrix areas, but these were not used in this study.

Reliability Measures

After approximately ten hours practice coding and discussion an unfamiliar section of tape was selected from one of those collected in LER Grade one classrooms during preliminary observations. This selection consisted of eight minutes teacher-pupil verbal interaction. A Scott's coefficient of .906 was calculated (See Appendix G).

Towards the end of the observational period, a brief reliability check was made from classroom tapes. The Scott's coefficient was calculated at .765. The second observer had not had the continuous practice which the investigator had undergone and the tape was one collected by the investigator, with which the second observer was unfamiliar, so some fall-off in reliability was expected (Flanders, 1963).

Anecdotal Data

While on-going verbal behavior was being categorized by the investigator, and tape recordings were being collected, anecdotal records were made whenever possible, to indicate significant information not revealed by the categories, including lesson type, special materials used, page numbers of reading materials, references to apparent goals of the lesson, blackboard exercises given by the teacher, language

experience chart content. Specific non-verbal behavior of teacher and pupils was sometimes noted as well. When time would not permit lengthy explication in situ, an asterisk was made, and tapes replayed later in the day. A log book was provided for a summary of the day's activities, including anecdotal data.

Teacher Questionnaire

Toward the end of the observational period teachers were asked to complete a questionnaire which was designed to fathom the teacher sample with greater accuracy. This was not utilized in the present study, but the rationale upon which it was based is included in Appendix H, together with a copy of the Questionnaire. These may have influenced the conduct of the study.

Pupil Information

In order to describe the pupil sample in detail, if necessary, each teacher was requested to submit information. Further pupil data were gleaned from anecdotal notes and teacher questionnaires. A rank-ordered list of each pupil's standing in relation to other pupils in the class, based upon the teacher's perception of his general ability and achievement, the reading group to which each pupil belonged, and the scores achieved by each pupil on the Metropolitan Reading Readiness Test (MRT) Form A, administered and scored by each teacher at the beginning of the fall school term (September, 1971). These data were not directly used in this study.

Other Data

Candid snap shots of pupils in the reading groups, displays,

interest centers, and of the classroom as a whole were taken to assist the investigator in the interpretation of data, and to psychologically orient her to the situation while analyzing data.

Compilation of Data

In order to provide convenient access to data for later analysis, separate looseleaf binders were kept for each class, containing data collected during preliminary visits, the pilot study, and the study proper. Data sheets, anecdotal record summaries, pictures of reading groups, completed teacher questionnaires, rank-ordered class lists, group membership lists, scores received by pupils on MRT were filed. Tapes were also labelled and stored according to teacher, and day of visit.

PILOT STUDY

Overview

Following preliminary visits and prior to the study proper, a pilot study was conducted in classrooms which agreed to participate in the investigation. It was believed that more relevant insights would be gained if these classrooms were used. Each classroom was visited twice.

The purpose of the pilot study was to determine modifications in data collection which might result in the most complete and accurate data possible.

The pilot study served as orientation, providing opportunities for teachers and pupils to become accustomed to the presence of the

investigator and equipment in the classrooms.

The investigator became familiar with the physical arrangements and routine of the classrooms, timetabling of reading lessons, general organization of classes, and was able to experiment with recording equipment and coding procedures. Pictures of classroom groups were taken as Browne (1971) had done. Opportunities were afforded to discuss the LER program and collect anecdotal data to supplement that acquired in the classroom and in the teacher questionnaires. During this period teachers prepared rank-ordered lists of pupils and made records available to the investigator. Coding was practised for short periods.

As a result of this pilot study, several observations were made resulting in modifications in coding procedures, anecdotal note-taking, and use of equipment. Possible limitations of OSAPRL were perceived. These are discussed in the following sections.

Observations

At the commencement of the pilot study all classes were organized into groups ranging from three to five in number, and including up to eleven members in a single group.

Progress made at this point in terms of the LER program varied across classrooms. In one classroom all groups were already working in Level Three books, the highest grade one level. In another classroom, only the most able group was working in Level Three books.

Teachers' emphases varied. Some were concerned that each pupil show some evidence of a degree of mastery of a skill before proceeding to the next skill. Another teacher might adopt a more relaxed attitude

toward skill mastery and emphasize the enjoyment of the reading task.

Organization of classrooms varied from the highly-structured task-oriented classroom to loosely-organized units where the task might not always be clearly delineated.

Most pupils appeared to disregard the presence of the investigator and equipment after the initial visits, although some pupils were vocally curious throughout the study.

All classrooms appeared well-equipped with audio-visual aids and showed evidence of teacher-pupil activities attractively displayed. "Interest centers" were set up in all classrooms.

Anecdotal note-taking in a separate book proved cumbersome, especially within the limitations of the three-second interval. Steps were taken to implement more effective procedures.

There was little time during coding periods for routine tasks such as filling in identification numbers, labelling tapes, etc., which could be done in advance. A method of recording which would partially alleviate this problem was sought.

The microphones on the tape recorders did not produce sufficiently clear tapes, especially in classrooms where teacher-pupil verbal interaction took place very quietly. A solution for this problem was necessary.

Since classes were organized into groups, a method of incorporating this information into data identification was sought. For later reference, classes were designated by the numbers 1, 2, and 3. Classes 1 and 2 each were divided by their teachers into three ability groups: High; Average; Low. Class 3 was divided by the teacher into two ability

groups: combined High-Average; Low.

Modifications Resulting from Pilot Study

Anecdotal data. When making anecdotal records on the spot, and concurrently coding teacher-pupil verbal interaction on data sheets, a separate notebook was inconvenient, although it was useful for notes made prior to, and following lessons. It was found that IBM score sheets were more convenient for brief notes which could be written with felt pen, to which the optical scorer was not sensitive. The most fortuitous time to collect much of these data was before the lesson began, at recess after completion of the lesson, or during extended classroom interruptions.

Routine tasks. It was found that time could be utilized to better advantage in the classroom if as much routine labelling as possible were done prior to classroom visits. To this end, tapes were labelled and score sheets identified with school, teacher and day, in advance of each visit. Group and sheet numbers were necessarily delayed until in situ coding took place.

Equipment. In order to produce clearer tapes, a sensitive, directional microphone with separate batteries was substituted for the one accompanying the Sony TC110. This microphone had the additional convenience of a long cord, which enabled the investigator to hang it from the high points in the classroom and otherwise position it fortuitously, according to anticipated classroom activity. The most effective place for this microphone was the neckline of the teacher's apparel. If it were clipped here, both teacher and pupil verbal interaction was clearly recorded. While this may have enhanced the teacher's

awareness of the presence of the tape recorder, it permitted her greater mobility. The batteries for the microphone were usually kept in the teacher's pocket and the Sony tape recorder, when battery operated, was transported by her. This arrangement appeared to be convenient for teachers. If they anticipated remaining in one place for the lesson, electrical attachments were used for the tape recorders.

Grouping. Since all teachers grouped pupils, equipment was so arranged to collect teacher-group behavior, primarily. Peripheral group activities might be recorded anecdotally, but it would be physically impossible to attend to total classroom behavior as well as teacher-group behavior on a three-second interval basis, and at the same time collect data which could be interpreted intelligently. Therefore, it was decided to focus attention on the teacher-group unit. However, when the teacher-group unit was addressed by persons outside the group, and when the teacher addressed persons outside the group, these verbal interactions were recorded.

Possible Limitations of OSAPRL Categories

As a result of the pilot study, it was anticipated that certain categories might include anomalous or incongruent behaviors, which could unduly overload those categories, and distort the interpretation of data. That this might be particularly true of category four, the "other" category, was anticipated, since all requests to listen would be classified here. One of the major skills to be taught in the LER program is "listening". Again, when a child was asked to make a response requiring movement, while this may require interpretive aspects of

comprehension, if the request did not call for a verbal response, it was categorized 4. It occurred that a "convertible category" 4 might help to solve this problem. If the lesson were a listening lesson, category 4 could be appropriated to listening. If the lesson had a different emphasis, frequenting a behavior not made explicit by OSAPRL, category 4 could be designated as an ad hoc category for that behavior, for that lesson. The value of this use for category 4 would necessarily be weighted against the lost advantage of an all-inclusive set of solicitations.

Categories 5 and 6 as well, could be used to record data which might be misinterpreted in the analysis. Both might be used to direct activities of peripheral groups. These data would be included with that of a specific group. During the pilot study it became clear that anecdotal notes should distinguish these instances in so far as possible.

Extending (Cat. 8) reaction might be confused, on occasion, with Corrective (Cat. 9) reaction or with one of the solicitation categories. While Extending (Cat. 8) a pupil's behavior, the teacher may in fact, be directing him from an incomplete, partially incorrect answer, to a correct (Cat. 9) one, or she may ask questions of the types in Categories 1, 2, 3, or 4, to extend behavior. It was anticipated that some confusion might arise in dealing with these categories.

Oral reading (Cat. 12) responses often became Unison (Cat. 14), but it appeared, during preliminary observations, that the unison behavior was empathetic, not corrective, and that more information about teacher behavior could be abstracted from a Cat. 12, than a Cat. 14, since "oral reading response" was most often the correct response to

the solicitation. When teachers and pupils read aloud together, this too, was coded 12, although one might argue that this was Unison (Cat. 14) response.

Silent reading (Cat. 13) responses frequently were, or became, vocalized. This is common in beginning readers, and was noticed most often in less able groups. However, such responses were coded Cat. 13, since this was the response requested.

A 15 was recorded not only for Pupil initiating (Cat. 15) behaviors relating to the content of the lesson, but also for procedural queries like "whose turn is it?" and for outbursts not related to the lesson. The qualitative character of these behaviors was thus obscured.

Silence or Confusion (Cat. 16) marked the beginning and ending of lessons, but it also designated changes of speaker and short pauses in Oral reading (Cat. 13) responses. A preponderance of pupil talk might be broken down during analysis to find that there were very many Cat. 16's. It was felt that one must be cautious about quality as opposed to quantity of pupil talk. The Silence or Confusion (Cat. 16) classification tended to confuse these different kinds of behaviors by lumping them together.

On occasion, a variety of behaviors occurred concurrently. Only the response related to the solicitation was recorded, but where possible, anecdotal notes were made to record other behaviors. It was realized that coded behaviors might present an incomplete representation of actual behaviors which took place.

While the pilot study offered insights into some categories which might cause problems, it was decided that the data were too

limited at this time to make any major changes in the system.

COLLECTION OF DATA

Description of Procedures Using OSAPRL

The raw data for this study consisted of coded IBM 5056 optical scoring sheets, anecdotal notations, teacher questionnaires, pupil information from teachers, photographs of classroom activities in progress, audio-taped recordings of teacher-pupil verbal interaction collected as planned, incorporating necessary modifications.

Coding procedures. Coding procedures described earlier were followed. The observer usually sat behind the group with whom the teacher was interacting, and recorded in pencil (or felt pen for anecdotal notes) on IBM sheets, using a clip board for convenience. A copy of the OSAPRL categories and the LER program materials were close at hand.

Recording of Teacher-Pupil Verbal Interaction

The equipment described earlier was set up for recording teacher-pupil verbal interaction.

The directional microphone substituted as a result of the findings of the pilot study, captured quite clearly both teacher and pupil (group) talk. It was attached to the Sony tape recorder. The Webcor tape recorder was positioned to collect pupil (group) talk, but was sufficiently sensitive to record teacher talk as well in most instances, and recorded some peripheral group verbal behavior. Together, the two tape recorders eliminated gaps in teacher-pupil verbal behavior and served to verify each other. The Webcor was set up first, recording

verbal interaction from the beginning of the class period. The Sony was turned on a few minutes later. This provided overlap in verbatim data collection in the event that tapes required changing during the course of a lesson.

About one and one half to two hours of continuous recording generally took place during each observational period. Where several minutes were obviously to be spent at seat work, or for administrative purposes, the tape recorder was turned off, and anecdotal notes were made to indicate the lapse.

Coding proceeded as outlined, with modifications in equipment, anecdotal note-taking, use of data sheets, and allowances for grouping. A daily log book was kept by the investigator. Data sheets were processed and analyzed. Other data collected during the study were reviewed, and interrelationships sought.

DATA ANALYSIS AND DISPLAY

Data analysis and display were carried out according to procedures outlined earlier in this chapter, and statistical procedures, described later in this chapter, were implemented.

The Flanders system contains 10 categories, or 100 cells. Flanders advised that 20 minutes, or about 400 observations were necessary for the construction of a matrix (Flanders, 1971). The Browne system contains 16 categories, or 256 cells. It was obvious that the data collected would necessarily be spread over a larger number of categories, and that, unless data were voluminous and varied, frequencies in some cells could be low, with resultant zero cells. Zero cells

may also be a function of the kinds of lessons taught, since, for example, a lesson teaching listening skills would not be expected to include pupil response categories of Oral reading (Cat. 12), or Silent reading (Cat. 13). Therefore, it was accepted that zero cells would occur.

Flanders utilized the Darwin chi-square for comparisons between two or more matrices. The Darwin chi-square test required the assumption that interaction sequences are one-dependent. It produced a more accurate approximation than the zero-assumption of the chi-square, which is insensitive to sequence (Flanders, 1966; Darwin, 1959). However communication events may be, in fact, more than one-dependent (Flanders, 1966). Both the chi-square, and the Darwin chi-square depend upon random sampling and a large quantity of data. Neither of these requirements were satisfied by this study. It seemed, therefore, that the results of these procedures should be interpreted in the light of these limitations. Further explanation of the Darwin chi-square test is included in Appendix I.

In this study the Q and Z-tests were applied to determine whether proportions of each category differed significantly at the .01 level, either across classrooms, or among intra-classroom groups. Where three groups were compared, the Q-test was used. Where two groups were compared, the Z-test was applied. If Q were > 4.12 or $Z > 2.32$, the difference between proportions was statistically significant at the .01 level. University of Alberta Computer Program DEST08 was used to accomplish these procedures.

It seemed likely that the most valuable statistical procedures

would be those which would make more immediately apparent to the researcher and the teacher, the kinds of interactions taking place in the classroom, and the kinds of stimuli which may produce different behaviors. It was also believed that tables and well-known mathematical procedures (frequencies, percents, ratios) would be of greater value to the reader, than more sophisticated procedures which may not be as well-adapted to interaction research of this kind.

In the interests of simplifying the complex processes of interaction so that they might be better understood by the teacher as well as the theoretician (Research Question 1) and in order to describe as well, the similarities and differences between classroom and intra-class groups using the same LER approach (Research Questions 2 and 3), procedures were undertaken to produce the following:

1. a 16 x 16 matrix for each classroom.
2. a 16 x 16 matrix for each intra-class group.
3. frequencies for each individual cell.
4. percent of total frequencies represented by each cell.
5. percent of column frequencies represented by each cell.
6. percent of row frequencies represented by each cell.
7. total column frequencies for each category.
8. percent of total behaviors for each category.
9. total frequencies of all 16 categories.
10. percent of total talk recorded as teacher talk: 1-9/1-12, 14, 15 (the remaining portion therefore represents pupil talk: 10, 11, 12, 14, 15/1-12, 14, 15).
11. percent of teacher talk comprised of teacher solicitations: 1-4/1-9.
12. percent of teacher talk comprised of teacher reactions: 7-9/1-9.
13. percent of teacher talk utilized by each of the teacher talk categories:
    - 1/1-9
    - 2/1-9
    - 3/1-9
    - 4/1-9
    - 5/1-9
    - 6/1-9
    - 7/1-9

8/1-9
9/1-9

14. percent of pupil talk utilized by each pupil talk category:
10/10-12, 14-15
11/10-12, 14-15
12/10-12, 14-15
14/10-12, 14-15
15/10-12, 14-15

15. percent of silence categories utilized by silent reading:
13/13-16

16. percent of total behaviors utilized by teacher Nonreading (Cat. 6) statements, and Silence or Confusion (Cat. 16):
6, 16/1-16

17. Darwin chi-square comparisons between the three classrooms, between each of the three classrooms, and between each intra-class group within each classroom.

18. comparisons of proportions of each category across intra-class groups, and between each intra-class group within each classroom, using the Q- and Z-tests.

Items 10 to 16 were not directly used in this study.

SUMMARY

This chapter described the selection of teacher-classroom units, reviewed the observational schedule, outlined preliminary visits and findings resulting from them.

The instruments and procedures necessary to collect data were described, including the OSAPRL categories, coding procedures, training schedule, reliability measures, anecdotal data, teacher questionnaire, pupil information, other data, and compilation of data.

The pilot study was described, together with modifications resulting from it and possible limitations in OSAPRL categories which appeared likely.

Collection of data using OSAPRL and procedures for analysis of data were described.

CHAPTER 4

FINDINGS AND INTERPRETATIONS RESULTING FROM THE APPLICATION OF THE OBSERVATIONAL SYSTEM FOR ANALYSIS OF PRIMARY READING LESSONS (OSAPRL)

OVERVIEW

Classes using LER were observed and data analyzed by means of OSAPRL categories to show how the OSAPRL could be applied in reading classes to generate information about reading behaviors, and to provide a practical basis for modification and revision of the instrument. From the application of the OSAPRL in LER classes, findings about differences across classes and intra-class groups resulted. These findings and any generalizations based upon them should be only tentatively accepted, in view of the present restrictions on the instrument.

Selected data were drawn from the original matrices and compiled into tables where necessary to highlight the analyses. Should the reader wish to pursue other questions, the original matrices from this study are included in Appendix E.

The major purpose of this chapter is to report and discuss the findings related to the second research question, which was a restatement of Null hypothesis 1.1:

> does the teacher-pupil verbal interaction vary among classes taught by different teachers using the same language experience reading approach?

Since grouping was practised in all classes, a question which could not be ignored and a restatement of Null hypothesis 1.2 was:

does the teacher-pupil verbal interaction vary among reading groups in the same classroom when reading is taught by the same language experience reading approach?

Further analyses were related to questions about the specific nature of the differences, if any, across the classes and across the reading groups. This was accomplished by examining the patterns of behavior which could be discriminated from a scrutiny of the matrices, and by applying the Q- and Z-tests for significance of differences in proportions for the three classes and the intra-class groups. These results are also reported in this chapter.

COMPARISONS OF THE COMPOSITE CLASS AND INTRA-CLASS GROUP OSAPRL MATRICES

Analysis of Differences Between Classrooms

Matrices for each of the three classes were compared. Darwin chi-square results clearly supported rejection of Null hypothesis 1.1 at the .001 level of significance.[1] The verbal interaction patterns across the three classrooms were significantly different. Because this difference could reflect deviance in a single class, individual classes were further compared pairwise. Table 4.1 reports the results of these comparisons and lends further support for the rejection of Null hypothesis 1.1.

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[1] Darwin chi-square = 1689.48; d.f. = 480; significance $<$ .001.

Table 4.1. Levels of Significance of Differences (Darwin Chi-Square) When Individual Classes Were Compared

Classes Compared	Darwin chi-square	Significance
I with II	807.27	< .001
I with III	838.33	< .001
II with III	763.82	< .001

d.f. = 240

Analysis of Patterns of the Differences Between Groups Within Classrooms

Because patterns of verbal interaction varied significantly across classes, it was logical to examine verbal interaction across groups within the same class. Composite matrices for each of the three groups in each of Classes 1 and 2, and the two groups in Class 3 were prepared and compared. Results of the Darwin chi-square tests among intra-class groups are reported in Table 4.2. These results supported rejection of Null hypothesis 1.2.

Table 4.2. Levels of Significance of Differences (Darwin Chi-Square) When Intra-class Groups Were Compared

Class	Groups*	Darwin chi-square	d.f.	Significance
I	H,A,L	1062.00	480	< .001
II	H,A,L	633.44	480	< .001
III	H-A,L	377.92	240	< .001

*Throughout all tables in this study, the following legend applies to all groups:

H : High ability group
A : Average ability group
H-A: Combined High-Average ability group
L : Low ability group

Significant differences across groups within classes could reflect deviance in a single group, therefore pairwise comparisons were made between each intra-class group. Results of these comparisons are reported in Table 4.3.

Table 4.3. Levels of Significance of Differences (Darwin Chi-Square) Among Pairwise Comparisons of Intra-Class Groups

Class	Groups compared	Darwin chi-square	Significance
I	H with A	519.40	< .001
	H with L	510.76	< .001
	A with L	510.75	< .001
II	H with A	319.70	< .001
	H with L	259.75	> .01
	A with L	295.64	< .01
III	H-A with L	385.91	< .001

d.f. = 240

Results of the Darwin chi-square tests, when intra-class groups were compared, substantiated rejection of Null hypothesis 1.2 and satisfied the requirements of Research question two, applied to intra-class groups in each of Classes 1 and 3.

Null hypothesis 1.2 could not be rejected in the case of Class 2, when High and Low groups were compared.

In five of the seven group comparisons, Null hypothesis 1.2 was rejected at the .001 level. One group rejected Null hypothesis 1.2 at the .01 level, and one group did not reject Null hypothesis 1.2 at these levels or at the .05 level.

Having found significant differences across all classes, between each class, and between intra-class groups at the .01 level compared pairwise, except for the High and Low groups, Class 2, attention was directed to the major areas of the OSAPRL matrix. Proportions of categories comprising the major areas were analyzed, using Computer Program DEST08 (see Chapter 3), and group analyses were undertaken. Significant differences between three proportions were identified by the Q-test, and between two proportions, by the Z-test. The Q-test applied to comparisons of the three classrooms, and of the three intra-class groups in Classes 1 and 2. The Z-test applied to the two groups in Class 3.[2]

Examination of categories, while revealing pertinent information about utilization of OSAPRL behaviors, does not delineate sequences of interaction. To accomplish this, cells in the matrix were considered in relation to one another. Where a relationship was suggested, linear models of interdependent behaviors were described in terms of behaviors

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[2] In Chapter 3 it was noted that a $Q > 4.12$ and a $Z > 2.32$ were statistically significant at the .01 level.

which preceded and succeeded each behavior.

Analysis of Matrix Areas Relating to Teacher Solicitations

The solicitation area of the matrix included teacher behaviors intended to initiate pupil response. There are four subcategories in this area, three of which are reading-specific. The fourth is a "catch-all" category. The three reading-specific categories are: Word perception (Cat. 1); Comprehension (Cat. 2); Oral (silent) reading (Cat. 3). The fourth category is designated Other (Cat. 4).

No distinct patterns emerged in the proportions of total solicitations addressed to each intra-class group, and solicitation categories were used in different amounts by the three classes.

In Classes 1 and 3, High and High-Average groups were targets of the greatest proportions of solicitations. In Class 2, the Low group received the most of these behaviors. This suggested that neither the program, the number of groups in the classroom, nor the ability level of the group were important factors governing proportions of solicitations received by a group.

Proportions of each of the solicitation categories were examined across classes and among groups. Proportions of each of the four solicitation categories among intra-class groups are reported in Table 4.4.

The proportions reported in Table 4.4. indicated that Comprehension (Cat. 2) solicitations were the most frequent of the four solicitation categories across the two three-group classes. In Class 3, where there were only two groups, proportions of Comprehension

solicitations were exceeded by Word perception (Cat. 1) and Other (Cat. 4) solicitations.

Table 4.4. Proportions of Solicitation Categories Utilized by Classes and by Intra-Class Groups

Class	Group	1 Word perception	2 Compre-hension	3 Oral (silent) reading	4 Other
I	H	8.0	10.6	0.8	3.6
	A	7.3	4.8	2.4	4.2
	L	6.3	8.1	2.7	0.8
	Average	7.2	8.2	1.9	2.7
II	H	0.7	8.1	2.2	1.6
	A	1.2	3.9	1.4	4.3
	L	6.7	4.7	3.2	1.0
	Average	1.8	5.5	1.9	2.9
III	H-A	7.0	5.9	1.9	5.6
	L	4.1	2.5	1.8	5.4
	Average	5.8	4.5	1.9	5.5

Category 1: Word perception solicitations. These solicitations were aimed at word perception skills including the pronunciation and meaning of words in isolation. Nonverbal directives which were apparently-understood communications between teacher and pupil(s) were also considered to be Word perception (Cat. 1) if they were aimed at

word perception skills.

Among the solicitation categories, Word perception (Cat. 1) was the second most frequently used (Table 4.4), accounting for 5.7 percent of reading group behavior. This would indicate that Word perception solicitations constituted a recognized teaching technique. Across classes, utilization of Word perception solicitations ranged from an average of 1.8 to 7.2 percent in Classes 2 and 1 respectively.

Across the three classes, a statistically significant difference at the .01 level[3] was reported between Class 2 and each of Classes 1 and 3 ($Q = 15.811$, and 11.712). This substantiated a pedagogical difference between Class 2, where Cat. 1 was little-used, and the other two classes where it was used more frequently.

Across intra-class groups, differences in proportions of Cat. 1 ranged from 0.7 to 8.0 percent in the High groups in Classes 2 and 1, respectively. Since both extremes occurred in High ability groups, group level alone did not seem to be a factor in utilization of this category.

In Classes 2 and 3, differences in proportions of Word perception solicitations reported by intra-class groups reached significance. In Class 2, the High group was deviant, with the fewest of these solicitations, compared to Average and Low groups ($Q = 8.991$ and 9.808 respectively). This was in contrast to Class 3 intra-class groups, where the High-Average group received a statistically significantly

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[3]Throughout the discussion of the categories in this chapter the level of significance referred to where proportions are discussed, is .01.

greater proportion of these solicitations than the Low group ($Z = 3.924$). These data indicated that classes used Word perception (Cat. 1) solicitations without specific regard to the ability level of the group. While in Class 2, the High group read fluently, and therefore Word perception solicitations may not have been an instructional goal during the observational period, no explanation is offered for the great number of these solicitations recorded in the combined High-Average group in Class 3 and in High group in Class 1.

Word perception solicitations were most frequently followed by Content (Cat. 10) responses (27.6, 52.8, 42.9 percent respectively in Classes 1, 2, and 3). When responses to Word perception (Cat. 1) solicitations among ability groups were examined, it was found that Content (Cat. 10) responses predominated except in isolated instances.

Category 2: Comprehension solicitations. This category identified teacher behavior calling for pupil response(s) which indicated understanding, interpretation, or integration of lesson content.

Comprehension (Cat. 2) solicitations were the most frequently used of the solicitation categories, suggesting that a "meaning" emphasis was operational in the LER program. They accounted for about 6 percent of the observed behaviors. Across classes, utili ation of Comprehension solicitations ranged from 4.5 to 8.2 percent in Classes 3 and 1.

Statistically significant differences in proportions reported from comparisons of Class 1 and each of Classes 2 and 3 ($Q = 7.147$ and 9.794, respectively) indicated that Class 1 was the deviant class, with the highest number of Comprehension (Cat. 2) solicitations.

In each of the three classes, the High group received more Comprehension (Cat. 2) solicitations than any other group, affirming Browne's findings (1971, p. 349) that teachers tended to address more comprehension questions to high ability groups. One other observation was contrary to Browne's findings: Low groups in both LER Classes 1 and 2 were asked more Comprehension questions than Average groups. In Class 3, where the activities of the combined High-Average group made impossible a parallel comparison, respecting the Low group, a statistically significant difference was reported between the proportions of Cat. 2 solicitations registered by the combined High-Average and Low groups ($Z = 5.189$). Within classes, it was found that the group receiving the most Comprehension solicitations, received at least twice as much of this behavior, as the group receiving the least.

Responses to Comprehension (Cat. 2) solicitations by High and Low group members in the two three-group classes were chiefly Content (Cat. 10). Average group members utilized Self-expression (Cat. 11) responses most frequently. In the two-group class, the combined High-Average group reported a higher proportion of Self-expression responses following Cat. 2 solicitations, suggesting that, if kinds of responses were dependent upon group level, the combination of these two ability groups may have affected the kinds of responses given to Cat. 2 solicitations. It is possible also, that the Cat. 2 solicitations in this case allowed for pupil extrapolation.

Category 3: Oral (silent) reading solicitations. This category was recorded whenever a teacher requested that a pupil or pupils read orally or silently, but no reason was given for the reading

other than to determine "what was said".

Although Oral (silent) reading (Cat. 3) solicitations appeared to be the least utilized of the OSAPRL categories, accounting for only 1.8 percent of reading group behavior, this may be misleading. A high proportion of Oral reading (Cat. 12) responses occurred in all classes. It seemed likely that the solicitation possessed characteristics which did not result in a Cat. 3 being recorded. Frequently, for example, the solicitation was nonverbal -- a teacher's gesture, or the pupils' knowledge of class procedures. As well, the command "Read" was brief, requiring less than three seconds, and no explanation, as, for example, a Comprehension (Cat. 2) solicitation may require.

Examination of the 3-12 and 3-13 cells in the matrices indicated which solicitation was actually used: oral, or silent reading. While oral reading responses were more frequently elicited than silent reading responses, among intra-class groups this was not always the case. In Class 1, in particular, the High group read silently more frequently than they read orally. In this class there was a higher incidence of 3-13 sequences than in any other class, and this pattern occurred across the three intra-class groups, although 3-12 sequences did predominate. In Classes 2 and 3 the 3-12 sequence was frequent, and there were few 3-13 sequences.

When proportions of Cat. 3 solicitations were compared, only Class 1 reported significant differences between intra-class groups. The High group deviated from each of the Average and Low groups ($Q = 4.932$ and 5.857, respectively).

Comparisons of proportions of Cat. 3 solicitations across the

three classes reported no statistically significant differences between them, however, within classes, the proportions of responses recorded as Oral reading (Cat. 12) and Silent reading (Cat. 13) may be more informative regarding actual Cat. 3 solicitations.

Category 4: Other solicitations. In order to account for solicitation behaviors which fell outside the definitions stated for Categories 1, 2, and 3, the Other (Cat. 4) was devised. It was meant to be a "catch-all" category, and to render the solicitations all-inclusive. Unconventional questioning strategies, and the command "Listen" were recorded here.

The Other (Cat. 4) category was among the least used of the OSAPRL categories (Table 4.4). Since these solicitations often required explanations, each generally exceeded three seconds, shown by a build-up in the steady state cell (4-4). Classes 1 and 2 reported trends similar to one another when intra-class group utilization of this category was examined: the Average groups reported the highest proportions, the High groups, the second highest proportions, and the Low groups, the least proportions of this behavior.

There were statistically significant differences in proportional utilization of this category by Class 3 and each of Classes 1 and 2 ($Q = 9.375$ and 8.705, respectively). Within classes, the Low group consistently reported the fewest of Cat. 4 solicitations, although in Class 3 the difference was small. Intra-class group proportions in Classes 1 and 2 were statistically significantly different. In Class 1 the Low group was deviant, with the lowest proportion, differing from the High and Average groups ($Q = 7.197$ and 8.740). In Class 2,

the Average group was deviant, with the highest amount of this Cat. 4 behavior resulting in a statistically significant difference when proportions were compared with the High and Low groups ($Q = 4.870$ and 5.952). Because of the variety of solicitations which might be classified as Other (Cat. 4) it was not possible to determine whether such statistically significant differences constituted pedagogical differences.

The limited number of Other (Cat. 4) solicitations reported by the Low group in the two three-group classes suggested that the more conventional strategies were used for Low groups in these classes.

Data abstracted from actual matrices indicated that Other (Cat. 4) like Comprehension (Cat. 2) solicitations were frequently followed by Self-expression (Cat. 11) or Content (Cat. 10) responses. In Class 2, Other solicitations were followed, in Low group interaction, by Comprehension (Cat. 2) solicitations, in many instances. It appeared that Other solicitations may have been used to "lead into" these solicitations, or that Other solicitations were unsuccessful, and the questioning strategy was changed. Had "wait time"[4] been calculated, it might be found that there was insufficient time for children to interpret and answer the Other (Cat. 4) solicitation, before they were given the option of a Comprehension solicitation.

Summary of solicitation categories. Solicitations were frequently used to probe pupil perceptions and to direct pupil responses.

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[4]Rowe (1972) has described "wait time" as that amount of uninterrupted time which is allowed a child to respond to a solicitation.

Comprehension (Cat. 2) solicitations were the most frequently utilized, according to statistical data, but it was recognized that these data could be misleading where nonverbal commands constituted all or part of a solicitation, as in Oral reading (Cat. 3) solicitations.

Comprehension (Cat. 2) solicitations occurred most frequently in High group teacher-pupil interaction. Other (Cat. 4) solicitations occurred most frequently in Average group teacher-pupil interaction. Word perception (Cat. 1) and Oral reading (Cat. 3) did not appear to be group-linked, on the basis of the data collected in this study. As well, no ability group received the greatest proportion of total solicitations.

Analysis of Matrix Areas Relating to Noninteractive Reading-centered Teacher Statements

Category 5: Teacher reading-centered lecture type behaviors. Teacher statements intended to enhance pupil knowledge, or behaviors which required that teachers read aloud or dictate, but to which an immediate response was not expected, were coded as Category 5.

Teacher reading-centered (Cat. 5) statements were the most frequently occurring OSAPRL behavior, across all classes, accounting for about 14.3 percent of total reading group behaviors. This would indicate that the "telling" strategy is an important reading teaching technique in these LER classes. Proportions of Reading-centered (Cat. 5) statements are summarized according to classes and groups in Table 4.5. The range of utilization, 5.8 to 16.7 percent in Classes 2 and 3 respectively, indicated that there were variations in the utilization of this behavior across classes.

Pairwise comparisons of proportions of Cat. 5 statements in the individual classrooms reported statistically significant differences between Classrooms 1 and 2 ($Q = 15.801$); Classrooms 1 and 3 ($Q = 5.462$); Classrooms 2 and 3 ($Q = 21.263$).

Table 4.5 Proportions of Teacher Noninteractive Reading-Centered (Cat. 5) Statements Utilized by Intra-Class Groups and by Classes

Classroom	I			II			III	
Group	H	A	L	H	A	L	H-A	L
Percent	14.8	8.2	16.8	8.4	3.7	6.2	17.8	15.0
Classroom	I			II			III	
Average Percent	13.9			5.8			16.7	

An inverse relationship appeared to exist between Reading-centered (Cat. 5) statements and Oral reading (Cat. 12) responses in the reading classes observed -- either one or the other behavior predominated. While Classes 1 and 3 registered the highest proportions for any single category in Reading-centered (Cat. 5) statements, 13.9 and 16.7 percent, respectively, with 11.0 and 10.4 percent respectively, reported in Oral reading (Cat. 12) response, Class 2 presented an opposite configuration: here, 5.8 percent of reading group behaviors were Reading-centered (Cat. 5) statements, while 27.7 percent of reading group behaviors were Oral reading (Cat. 12) responses.

Teachers who read to the class frequently, or who taught lessons specifically designed to develop listening skills in pupils,

reported higher proportions of Reading-centered (Cat. 5) statements.

Comparisons of proportions of Cat. 5 statements among intra-class groups in Classes 1 and 2 indicated a statistically significant difference between High and Average groups ($Q = 8.362$ and 5.303 respectively). In Class 1, a statistically significant difference was also reported between Low and Average groups ($Q = 10.896$). In Class 3, the combined High-Average and Low groups reported a statistically significant difference in this category also ($Z = 2.378$). While this category was highly-used, it was not equally used among groups. Average groups, where they existed, reported less of this category than other groups.

Although High and Low groups reported more Reading-centered statements than Average groups, the reasons may have been different for the different group levels. It was noted that High groups were progressing rapidly, requiring explanatory lectures prior to approaching new skills. Low groups were progressing slowly, and received lectures designed to assist them in overcoming errors.

Summary of noninteractive reading-centered teacher statements. This matrix area, composed of Reading-centered (Cat. 5) statements, and designed to enhance pupil knowledge, took precedence among the OSAPRL categories used in the two classes where Oral reading (Cat. 12) response was not the most-utilized behavior. Group utilization proportions varied significantly in all classes, with the Average group the deviant group, receiving the fewest Reading-centered (Cat. 5) statements.

Analysis of Matrix Areas Relating to Nonreading Teacher Statements

Category 6: Teacher nonreading behaviors. In most lessons a portion of time was spent on activities not relating to reading, but essential to general classroom organization. A Cat. 6 was recorded during these periods. This category also recorded interruptions, including school-wide announcements, visits to the class from school or auxiliary personnel, and pupils from other classes. It also included teacher statements designed to redirect errant pupils. Cat. 6 helped to provide for continuous coding.

While generally a category of low utilization, variation between classes was noted when individual class matrices were compared. Proportions of Nonreading (Cat. 6) statements utilized by classes and groups are reported in Table 4.6.

Table 4.6. Proportions of Nonreading Teacher Statements Utilized by Intra-Class Groups and by Classes

Classroom	I			II			III	
Group	H	A	L	H	A	L	H-A	L
Percent	2.7	5.4	0.8	3.7	1.3	1.2	7.2	7.2
Classroom	I			II			III	
Average Percent	2.7			2.2			7.2	

Classroom 3 reported more than twice as much Nonreading (Cat. 6) behavior as either of the other two classes. Class 3 was the deviant class when proportions of Cat. 6 behavior were compared. Comparisons indicated statistically significant differences in proportions for

Class 3 and each of Classes 1 and 2 (Q = 14.517 and 16.130).

Among groups in Classes 1 and 2, the High group differed in statistically significant amounts from each of the Average and Low groups (Q = 6.841 and 4.814 in Class 1, and 4.470 and 4.745, in Class 2). Average and Low groups in Class 1 also reported statistically significant differences (Q = 11.656). While statistically significant differences between the proportions of Cat. 6 statements of the combined High-Average and Low groups in Class 3 were not reported, both of these groups reported higher levels of this activity than any group in any other class. In this class, anecdotal notes indicated that a number of nonreading interruptions originating outside the class, resulted in Cat. 6 tallies. This class also recorded the highest level of Silence or Confusion (Cat. 16).

In Classes 1 and 2, Nonreading statements were most often followed by Silence or Confusion (Cat. 16), suggesting that Nonreading (Cat. 6) may have immediately disruptive effects. In Class 3, Cat. 6 was most often immediately followed by Reading-centered (Cat. 5) statements, suggesting that the teacher intervened to re-focus attention on the lesson.

Low groups in the three-group classes were interrupted less frequently than High and Average groups. They may have been interrupted less by higher ability pupils because those pupils were able to attend to their tasks for longer periods. It was noted in Chapter 4 that this category recorded peripheral group behavior which interrupted the interaction of the group with whom the teacher was working, thereby contaminating teacher-reading group data.

There was a suggestion that both classroom and institutional organization may have a bearing on Nonreading (Cat. 6) behaviors. In Classes 1 and 2, where the day's activities were explained either at the beginning of the day, or were announced prior to the activity of each group, and where there were relatively few (one or two during the entire observation period) announcements from school administrators, less Cat. 6 and Cat. 16 behaviors were recorded. As well, it was noted that much of this behavior was directed to a few very active pupils, who appeared to be important factors either as catalysts or direct causes of the amount of Cat. 6 statements directed to their groups.

Summary of nonreading teacher statements. Nonreading (Cat. 6) statements appeared to be influenced by pupil behavior, institutional and classroom organization, teaching strategies, and the "climate" surrounding the group. Nonreading behaviors occurred more frequently in High and Average groups. They represented time lost to the reading lesson.

Analysis of Matrix Areas Relating to Teacher Reaction Categories

This classification of teacher behavior was intended to follow pupil responses. Included in Teacher Reactions are three categories: Confirming (Cat. 7); Extending (Cat. 8); Corrective (Cat. 9). Proportions of behavior in each of these categories indicate teacher approval, encouragement of pupil elaboration of response, or disapproval of the response, respectively. Proportions of these teacher reactions reported in each intra-class group are shown in Table 4.7.

While all teachers in this study Confirmed pupil responses more than they Corrected them, proportions in Table 4.7 indicated that higher ability groups received more Confirmation (Cat. 7) and Extension (Cat. 8) but less Corrective (Cat. 9) reactions than low groups.

Table 4.7. Proportions of Teacher Reaction Categories Utilized by Classes and by Intra-Class Groups

Classroom	Group	7 Confirming	8 Extending	9 Corrective	7+8+9 Total
I	H	11.2	4.2	2.9	18.3
	A	11.1	3.4	2.6	17.1
	L	8.3	0.9	3.0	12.2
	Average	10.1	2.8	2.9	15.8
II	H	4.0	3.2	1.9	9.1
	A	3.9	3.1	4.1	11.1
	L	2.2	0.0	5.4	7.6
	Average	3.7	2.7	3.5	8.8
III	H-A	6.4	1.6	2.4	10.4
	L	3.2	1.5	2.7	7.4
	Average	5.1	1.6	2.5	9.2

Category 7: Teacher confirming reactions. This category recorded any teacher statement which indicated that a pupil response

was acceptable. Such responses might be monosyllabic, or a repetition of a pupil's answer.

Confirming (Cat. 7) was one of two OSAPRL categories in which extended behavior, or behavior enduring longer than three seconds was not often realized, according to steady state cell data. This indicated that minimal praise was usual: "good"; "O.K."; "yes".

Across classes, the Q-statistic indicated that there were significant differences between proportions of Cat. 7 behavior registered in Class 1 and in each of Classes 2 and 3 (Q = 16.716 and 13.060 respectively). Class 1 reported more Confirming (Cat. 7) reactions than the other two.

Within classes, the amounts of Confirming reactions appeared to be group-linked. High groups received the most, Average groups received a medium amount compared to the other two groups, and Low groups consistently received the least. In Class 3, the combined High-Average group received about twice as much of this reaction as the Low group (Table 4.7). It was only in this class that the difference between groups reached statistical significance.

Categories following Confirming (Cat. 7) may suggest the direction Cat. 7 motivation takes. Most often Cat. 7 was followed by Word perception (Cat. 1) or Comprehension (Cat. 2) solicitations. In these instances, it would seem that the confirmation functioned to terminate previous discussion, and was not a definite motivating technique.

Categories preceding Confirmation, suggest the kinds of behaviors which were rewarded by this affirmation. Most frequently, these were

Content (Cat. 10) in High and Low groups, particularly, and Self-expression (Cat. 11) responses, in Average groups, particularly.

Category 8: Teacher extending reactions. This category identified teacher reactions to pupil responses when the teacher encouraged the pupil to extend or clarify his answer, but did not correct the answer.

Across all classes, utilization of the Extending (Cat. 8) reaction was uniformly low (Table 4.7). A particularly low (1.6 percent) proportion of this reaction in Class 3 was responsible for the statistically significant difference reported between Class 3 and each of Classes 1 and 2, in this category. Among groups, the range extended from 0.0 to 4.2 percent in the Low group, Class 2, and the High group, Class 1, respectively. The low ability groups were less likely to receive Extending (Cat. 8) behavior than High or Average groups, in Classes 1 and 2. In Class 3 both groups reported similar amounts of Extending reactions. In both of the Classes 1 and 2, statistically significant differences were reported in proportions of Cat. 8 behavior when Low group proportions were compared with those of High and Average groups (Class 1, $Q = 8.528$ and 6.460; Class 2, $Q = 6.039$ and 5.850).

Category 9: Teacher corrective reactions. Any teacher behavior which indicated that a pupil response, or lack of it, was not acceptable, was recorded in the Corrective (Cat. 9) category.

Corrective reactions were not extensively used. Differences in utilization by classes were not sufficient to register a statistically significant difference. Among intra-class groups, only the

High and Low groups in Class 2 reported comparative differences which were statistically significant (Q = 4.941). It was in this class that the highest and lowest proportions of Corrective reactions occurred.

In all classes, Low groups received more Corrective (Cat. 9) reactions than High, Average, or combined High-Average groups. In Classes 2 and 3, the Low groups contained fewer members than the other groups, possibly resulting in a higher allocation of this reaction per pupil, if these reactions were equally distributed.

Corrective reactions were followed by different behaviors in each of the three classes: Reading (Cat. 5) statements, in Class 1; Oral reading (Cat 12) responses, in Class 2; Comprehension (Cat. 2) solicitations, in Class 3. These behaviors may indicate what teacher strategies were used to redirect behavior, or to reinforce redirection.

Behaviors preceding Corrective (Cat. 9) reactions, in all classes, and which may have elicited them were Content (Cat. 10) and Self-expression (Cat. 11) responses in Class 1, Content (Cat. 10) and Oral reading (Cat. 12) responses, in Class 2, and Pupil initiation (Cat. 15) and Self-expression (Cat. 11) behaviors in Class 3. These response categories were not necessarily the most heavily-used in each of the classrooms, but were frequent, and common to all.

Summary of teacher reaction categories. Confirming (Cat. 7) was the most highly-utilized of the reaction categories, indicating that teachers praised more than they extended or corrected pupil behavior. Proportions varied among classes, but the High groups received the most Confirmation and Extension, and the least Corrective reactions. Confirmation was generally brief, but Extension and Correc-

tive reactions exceeded the three-second interval, in most cases. Content and Self-expression responses usually preceded Confirmation and Extension. These two response categories and Oral reading often preceded Corrective reactions.

Analysis of Matrix Areas Relating to Pupil Response Categories

This classification of pupil behavior reports, by definition, pupil behaviors following teacher or pupil talk. Pupil responses are comprised of five categories: Content (Cat. 10); Self-expression (Cat. 11); Oral reading (Cat. 12); Silent reading (Cat. 13); Unison (Cat. 14).

Patterns of verbal behavior which suggested where the emphasis in the reading lesson was placed in the different classes emerged from the data. A content and oral reading orientation was suggested by the data from Class 1; a strong oral reading orientation was suggested by the data from Class 2; a pupil initiating and oral reading orientation was suggested by the data from Class 3.

Average groups across the classes where they existed, contributed more response behaviors than other groups. Table 4.8 reports proportions of pupil response categories among intra-class groups and classes.

Table 4.8. Proportions of Pupil Response Categories Utilized by Classes and by Intra-Class Groups

Class	Group	10 Content	11 Self-expression	12 Oral reading	13 Silent reading	14 Unison
I	H	15.9	7.5	0.7	7.2	1.2
	A	1.7	16.3	13.9	6.2	3.4
	L	7.8	2.2	19.9	8.9	4.6
	Average	9.4	7.7	11.0	7.6	3.0
II	H	13.5	11.1	16.6	10.0	1.6
	A	6.1	10.6	30.4	3.2	1.0
	L	7.9	0.0	47.0	9.7	0.2
	Average	9.0	9.3	27.7	6.5	1.1
III	H-A	8.0	7.7	7.7	0.7	3.1
	L	3.2	8.9	14.4	5.3	1.1
	Average	6.0	8.2	10.4	2.6	2.3

Category 10: Pupil content responses. If a pupil response were based upon information acquired in the reading class, it was categorized as a 10.

Across classes, Content (Cat. 10) utilization ranged from 6.0 to 9.4 percent in Classes 3 and 1 respectively (Table 4.8). Differences in proportions of utilization reached statistical significance when Class 3 was compared with Classes 1 and 2 (Q = 7.855 and 6.931, respec-

tively). Class 3 was the deviant class, reporting the least of Content (Cat. 10) responses (Table 4.8).

Intra-class groups reported proportions ranging from 1.7 to 15.9 percent in the Average group, Class 1, and the High group, Class 1, respectively -- both extremes occurring in the same class. In all classes, statistically significant differences were reported in comparisons of proportions of this response among intra-class groups. In Class 1, all group comparisons reported statistically significant differences: High and Average, High and Low, and Average and Low ($Q = 13.658$, 12.712, and 9.573, respectively). In Class 2 the High group when compared with each of the Average and Low groups reported statistically significant differences ($Q = 6.944$ and 5.255, respectively). In Class 3, the comparison of the two groups yielded a Z of 6.383.

In all classes, High and High-Average groups responded most frequently in Cat. 10, and, Low groups responded least in Cat. 10. Where the High and High-Average groups received more Comprehension (Cat. 2) solicitations than Average groups, these solicitations may have governed the kinds of responses received. However it was reported in the discussion of the solicitation categories that the High and Low groups both received more Comprehension (Cat. 2) solicitations than the Average groups -- yet Low groups did not exceed Average groups in Content responses (Table 4.8).

Categories which preceded, and perhaps elicited Content (Cat. 10) responses were examined. Solicitations, particularly Comprehension and Word perception (Cat. 1) were followed by Content (Cat. 10)

responses in High and Average group interaction in all classes. No definite group-linked data emerged from an examination of categories preceding Content responses.

One unusual set of data occurred in the Low group, Class 2. Here, Content responses were frequently (15.6 percent) preceded by Corrective (Cat. 9) reactions, indicating that some nonverbal signal may have elicited the Content response. This group reported a relatively low (7.9 percent) of Content response.

In order to determine how Content responses were received, the categories which followed these responses were examined. In the discussion of Teacher Reaction categories, it was found that a frequent behavior to follow Content (Cat. 10) response was Confirmation (Cat. 7) reaction, suggesting that a high proportion of Content responses were satisfactory, and that the solicitations which elicited them were within the ability of the group.

A deviation from the use of Confirmation (Cat. 7) following Content (Cat. 10) was found in the Low group, Class 2, where solicitations occurred more frequently than Confirmation. In the combined High-Average group, Class 3, Word perception (Cat. 1) solicitations frequently followed Content responses, suggesting that the responses may have been ignored, or nonverbally acknowledged, or that the teacher chose to question the internal features of the response.

The pattern consisting of solicitations (mostly Cat. 1 or 2), Content (Cat. 10) responses, Confirmation (Cat. 7) reactions, was the

most frequent sequence[5] involving Content responses in High and Average groups. The Content response was a means of winning Confirmation in all classes, although the Low group in Class 2 received twice as much Corrective (Cat. 9) reaction as Confirmation for their Content response efforts.

Category 11: Pupil self-expression responses. Whenever a pupil orally presented an opinion, a synthesis of a situation, or an original composition, as a result of teacher solicitations, the response was categorized 11.

This response utilized from 7.7 to 9.3 percent of classroom reading behaviors, indicating little variation between classes. Pupil self-expression was a frequent response (Table 4.8), with proportions varying from 0.0 to 16.3 percent in the Low group, Class 2, and the Average group, Class 1, but this range indicated that the distribution among groups varied. High and Average, High and Low, and Low and Average group comparisons reported values of 13.658, 8.226, and 21.884, for Q in Class 1, respectively. In Class 2, the Low group varied with each of the High and Average groups with these values for Q: 11.765 and 11.235, which indicated that Self-expression, while highly-used across all classes, was not a mode of response practised by all groups. No particular ability group consistently used this category more than any other, but Low groups in the three-group classes reported low

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[5]While space did not permit inclusion here, possible linear relationships between preceding and succeeding behaviors were worked out for each category on the basis of the data in this study.

proportions: 2.2 and 0.0 percent in Classes 1 and 2 respectively. Only in the two-group class did the Low group exceed the other group in proportion of this category utilized.

In all three classes, Comprehension (Cat. 2) solicitations were among the most frequent behaviors preceding Self-expression Cat. 11) response, and Word perception (Cat. 1). Other (Cat. 4) solicitations were also reported in substantial amounts preceding Cat. 11.

Following Self-expression (Cat. 11) responses, Confirmation (Cat. 7) and Extending (Cat. 8) categories were frequent behaviors in most groups where much Cat. 11 response was reported, but the Low group in Class 3 also received much Corrective (Cat. 9) reaction following Self-expression.

Category 12: Pupil oral reading responses. If a pupil read aloud a response to a teacher solicitation, and the response was not one which he composed himself, a 12 was recorded.

Utilization of Oral reading (Cat. 12) response varied among classes, from 10.4 to 27.7 percent, in Classes 3 and 2, respectively (Table 4.8). This range represented a statistically significant difference between comparative proportions of Oral reading (Cat. 12) response. When Class 2 was compared with Classes 1 and 3 respectively, Q = 29.154 and 30.202, the largest values for Q in any of the across-class comparisons in any category.

Across intra-class groups, proportions of Oral reading (Cat. 12) responses ranged from 0.7 to 47.0 percent in the High group Class 1 and the Low group, Class 2, respectively. All groups in Class 2 recorded

higher proportions of Oral reading (Cat. 12) response than the same ability groups in other classes, suggesting that a pedagogical difference could have existed in the implementation of the LER program in this class, with regard to the use of Oral reading (Cat. 12) response.

In each of the three classes, intra-class group comparisons indicated that there were significant differences between each pair of groups. In Classes 1 and 2, when groups High and Average, High and Low, and Average and Low were compared, Q = 18.264, 26.566, and 8.302, in Class 1, and 8.311, 18.309, and 9.998, in Class 2 respectively. In Class 3, Z = 5.664.

Data from the steady state cell indicated that Oral reading responses (Cat. 12) were most often a continuous behavior, continuing through several three-second intervals without interruption. All of the solicitation categories did precede Oral reading responses, but Oral (silent) reading (Cat. 3) solicitations were the most frequent preceding behaviors, except in Class 3, where Comprehension (Cat. 2) solicitations preceded Oral reading (Cat. 12) responses more frequently than did Oral reading (Cat. 3) solicitations. It was of interest that the class in which the most Oral reading (Cat. 12) responses were registered, also registered the fewest Oral reading (Cat. 3) solicitations, substantiating the earlier suggestion that Cat. 3 solicitations may not adequately represent all requests to oral read. Teacher confirmations were a frequent behavior preceding Oral reading (Cat. 12) responses across all intra-class groups. Comprehension (Cat. 2) solicitations were utilized in all Class 1 groups, preceding Oral reading (Cat. 12) responses and suggesting that oral reading was a

purposeful activity. The Low group in Class 2, which oral read more than any other group in the study, received the greatest proportion of Corrective (Cat. 9) reactions of any group in the study, following oral reading. The Low group in Class 3, which very often read in unison, was never corrected following oral reading, at any time during the observational period.

Category 13: Pupil silent reading responses. Whenever a pupil, or a group of pupils, read silently or paused during oral reading, a 13 was recorded.

Silent reading was used infrequently in the group teaching context. Across classes, proportions of utilization varied from 2.6 to 7.6 percent in Classes 3 and 1 respectively (Table 4.8). Statistically significant differences were reported when comparisons of proportions of this behavior were made between Class 3 and each of Classes 1 and 2. Class 3 reported much less of this behavior than the other two.

Across intra-class groups, proportions of Silent reading (Cat. 13) response ranged from 0.7 to 10.0 percent in the High-Average group, Class 3, and the High group in Class 2, respectively. These data suggested that ability group placement was not the crucial factor in the utilization of this category.

In both Classes 2 and 3, statistically significant differences were reported in comparisons of proportions of Cat. 13 response among all groups. In Class 2, High and Average, High and Low, and Average and Low groups reported values of Q = 8.311, 18.309, and 9.998. In Class 3, Z = 9.156.

Silent reading did not materialize as a reading teaching tech-

nique in all classes, but it was noted, particularly in Class 1, that Silent reading was often followed by questions about the passage.

Behaviors which preceded Silent reading (Cat. 13) responses varied among classes but no significant patterns emerged. When categories following Silent reading (Cat. 13) were examined, some stability was indicated in all three High and High-Average group classes. Silent reading was followed by Comprehension solicitations and Pupil initiating behaviors in greater proportions than most other categories. However, the High-Average groups in Class 3 reported as well, equal proportions of Reading (Cat. 5) statements and Corrective (Cat. 9) reactions.

Category 14: Pupil unison responses. Where more than one pupil responded, either as a result of a solicitation, or as a matter of usual behavior, the group response was recorded as Unison (Cat. 14) response.

This category was seldom used. Across the classes, utilization ranged from 1.1 to 3.0 percent in Classes 2 and 1, respectively. A significant difference was reported between the proportions utilized by Class 2 and Classes 1 and 3, respectively. When proportions of this response among intra-class groups were compared, no group consistently reported the most or the least of this response. Proportions reported by groups ranged from 0.2 to 4.6 percent in the Low group, Class 2, and Class 1, respectively (Table 4.8).

Statistically significant differences were reported when the High group, Class 1, was compared with each of the Average and Low groups in that class ($Q = 5.470$, and 8.453). In Class 3, $Z = 4.243$, indicating a statistically significant difference between the High-

Average, and the Low groups in that class.

Unison (Cat. 14) responses were usually succeeded by solicitations.

Summary of pupil response categories. Across all classes, Oral reading (Cat. 12) was the most highly utilized response category. Unison was least used.

From the data collected during these observations, High ability groups produced Content (Cat. 10) responses most frequently. Self-expression (Cat. 11) response was used least by Low groups, and in one class, the Low group was never requested to respond in this category. High groups responded in the Oral reading (Cat. 12) response least, and Low groups, most. Silent reading, especially in Classes 2 and 3 was not highly utilized. A pattern of 12-13-12 occurred in Low groups, indicating pauses while decoding passages. Unison (Cat. 14) did not appear to be group-linked.

Analysis of Matrix Areas Relating to Pupil Initiating Behaviors

Behavior initiated by a pupil, including questions, or unsolicited information, was categorized as a 15. This category lent itself to the recording of spontaneous pupil discussion, and pupil peer-correction.

Across classes, proportions varied from 6.2 to 14.0 percent in Classes 1 and 2 respectively (Table 4.9). Proportional differences reached statistical significance when Class 2 was compared pairwise with each of Classes 1 and 3 ($Q = 16.414$ and 8.207) and when Class 2 was compared with Class 3 ($Q = 8.207$). Class 1 reported the least

of this Cat. 15 behavior.

Table 4.9. Proportions of Pupil Initiating Behaviors Utilized by Classes and by Intra-Class Groups

Class	Group	15 Pupil initiating
I	H	5.9
	A	6.7
	L	6.2
	Average	6.2
II	H	11.5
	A	18.9
	L	2.5
	Average	14.0
III	H-A	7.9
	L	13.3
	Average	10.1

Across intra-class groups, utilization of Pupil initiating (Cat. 15) behavior ranged from 2.5 to 18.9 percent, in the Low and Average groups, Class 2, respectively. In the two classes where Average groups existed, they contributed more of this Pupil initiating (Cat. 15) behavior than the other groups. While no statistically significant differences were found between the groups in Class 1, in the other two classes statistically significant differences were reported between

each of the intra-class groups. In Class 2, comparisons of proportions of High and Average, High and Low, and Average and Low groups, reported values for Q of 6.526, 7.937, 14.463. As Table 4.9 indicates, the Low group seldom recorded this behavior. In Class 3, the value for Z when the two groups were compared was 5.664. While in Class 2, the low (2.5 percent) proportion of Cat. 15 tended to substantiate anecdotal notes which observed that the Low group was almost "invisible" compared to the other two groups, in Class 3, the Low group contributed almost twice as much Cat. 15 behavior as the combined High-Average group. The category included, however, both relevant and irrelevant pupil initiated behaviors. It was previously noted that there was some irrelevant behavior in Low group, Class 3 interaction, specifically related to the activities of a few pupils.

Across all classes, no single category consistently preceded Pupil initiating (Cat. 15) behavior.

How Pupil initiating (Cat. 15) behaviors were received may be revealed by the behaviors which succeeded them. In Class 1, the most frequent succeeding behavior was Confirmation (Cat. 7), while in Class 2 Reading (Cat. 5) and Silence or Confusion (Cat. 16) predominated, and in Class 3, Silence or Confusion (Cat. 16) was most frequent. This 15-16 sequence might not only indicate pupil discussion, but pupil talk interspersed with Silence or Confusion, and to which no one paid attention. No clearly defined trend appeared when group behaviors following Pupil initiated (Cat. 15) behaviors were examined across all classes, however, within classes some sequences of interest were noted.

High and Average groups in Class 1 tended to develop Pupil

initiating behaviors from Confirmation, and received further Confirmation from them. These Confirmation (Cat. 7) reactions may also have marked the end of a behavior sequence. In Class 1, the Low group produced Pupil initiating behaviors from Reading-centered (Cat. 5) statements, and followed Pupil initiating statements with Reading-centered statements as well. Cat. 5 statements may have stimulated pupil discussion, marked teacher efforts to redirect behavior, or to answer pupils' questions. The High group in Class 2, produced Cat. 15 behavior from Reading-centered statements like the Low group, Class 1, but also from periods of Silence or Confusion (Cat. 16), and Content (Cat. 10) responses.

A less flexible pattern emerged when Average groups in Class 2 were examined with respect to Pupil initiated (Cat. 15) behavior. The most frequent pattern was a 15-16-15 sequence. The Low group in Class 2, spent much time in the Oral reading (Cat. 12) response category. This category both preceded and followed Pupil initiating (Cat. 15) behaviors frequently.

Summary of pupil initiating behavior category. Pupil initiating (Cat. 15) behavior was a frequent occurrence in teacher-pupil verbal interaction, and was often an adjacent behavior to Silence or Confusion (Cat. 16). This could indicate pupil discussion took place, or that pupils spoke but were not recognized. Other behaviors which appeared adjacent to Pupil initiating (Cat. 15) were Confirmation (Cat. 7), Reading (Cat. 5) statements, and Oral

reading (Cat. 12) response. There was some suggestion that Pupil initiating (Cat. 15) behaviors were classroom dependent. In this study, it was not possible to identify the quality of the pupil initiating behaviors.

Pupil initiating (Cat. 15) behaviors varied in proportions among classes with Class 2 reporting the least. Great deviation in proportions of this behavior were reported across intra-class groups but no definite group-dependent trend was evident. The amount of this behavior reported may indicate the "risk" pupils were willing to take in revealing their thoughts.

Analysis of Matrix Areas Related to Silence or Confusion

This matrix area included the category designated Silence or Confusion (Cat. 16). This category was designed to include periods of silence or confusion, pauses longer than three-seconds which occurred during Oral reading (Cat. 12) response, changes of speakers during Oral reading response, or during Pupil initiating (Cat. 15) behavior, and to mark the beginning and ending of lessons.

Across classes, proportions of utilization of Silence or Confusion (Cat. 16) ranged from 2.4 to 9.7 percent in Classes 2 and 3, respectively. Table 4.10 reports proportions of utilization of this category for each class and each group. Class comparisons indicated that a statistically significant difference existed between propor-

tions of Silence and Confusion in Class 3, and each of Classes 1 and 2. Anecdotal notes substantiated that a discernible difference in lengths of periods categorized 16 was evident to the observer when Class 3 was compared with Classes 1 and 2.

Table 4.10. Proportions of Silence or Confusion Utilized by Classes and by Intra-Class Groups

Class	Group	16 Silence or Confusion
I	H	3.1
	A	2.3
	L	2.6
	Average	2.7
II	H	2.0
	A	2.8
	L	2.0
	Average	2.4
III	H-A	9.2
	L	10.5
	Average	9.7

No particular group, across all classes, consistently accounted for the most, or the least, proportion of Silence or Confusion. When intra-class groups were examined pairwise, no statistically significant differences were found.

Examination of behaviors preceding Cat. 16 revealed no significant information, however at least two groups in each class reported the same behaviors predominant among those following Silence or Confusion, suggesting that there may be a tendency for particular sequences to occur in association with Silence or Confusion in any given class.

The 16-15-16-15- sequences occurred in connection with this category. These were discussed in the previous section.

Summary of matrix areas relating to silence or confusion. Category 16, which comprised the Silence or Confusion area, was composed of varying behaviors. It was generally not highly used, and proportions of utilization within classes did not vary in statistically significant amounts, although its use across classes did vary significantly. It often marked the routine occurrences in classroom verbal interaction -- the divisions between speakers, etc. It may also have stimulated pupil discussion.

SUMMARY

In this chapter, the results of data analyses have been reported, to determine whether there were differences in teacher-pupil verbal interaction among classes and across intra-class groups.

When differences existed, the analyses described wherein these differences lay, in terms of patterns of verbal behavior, identified by the Darwin chi-square. The OSAPRL specified the reading behaviors which characterized these differences. Test DEST08 reported the significance of these differences.

Categories were treated in terms of the areas of the matrix

with which they were associated, individual utilization, as well as intra-category relationships.

CHAPTER 5

FINDINGS RELATED TO RESEARCH QUESTION ONE

OVERVIEW

> Interaction analysis systems are neither neat nor elegant . . . are rough and in many cases require a great deal of training for those who use them . . . A system is fruitful if it leads to research that establishes relationships between the variables of the system and other variables not in the system (Smith, 1967, p. 68).

This chapter reports the results of the investigation related to Research Question One:

> is the Observational System for the Analysis of Primary Reading Lessons (OSAPRL) a viable instrument to describe teacher-pupil verbal interaction in the Language Experience Reading (LER) classroom?

Inherent in this question is the need for a critical analysis of the system, according to criteria particularly applicable to such a specific observational instrument.

While it was concluded, on the basis of training experience, and the use of the instrument in the classroom context, that the OSAPRL was a viable instrument, there were problems in its implementation which suggested that the prototype instrument devised by Browne was in need of modifications and refinements.

The rationale for these modifications and refinements is the subject of this chapter, in that reference is made to information gleaned about the instrument through its application in the LER classroom, and subsequent analysis of the observed behavior.

Criteria for Appraisal of the Observational System for the Analysis of Primary Reading Lessons(OSAPRL)

The categories. An observational system consisting of categories must provide specific definitions for each category, and behavior must be recorded in one category only. In terms of OSAPRL, this presented problems when several behaviors took place simultaneously. Consider a combination of these behaviors: the teacher is lecturing about reading (Cat. 5), but some pupils are listening (no specific category), some are Silent reading (Cat. 13), some are acting in a confused manner (Cat. 16), and some are initiating nonreading behaviors (Cat. 15). Since the teacher was considered by this observer, to be the central focus, all this behavior was categorized under nonsoliciting statements (Cat. 5). How much does this categorization tell us about what was going on in the classroom?

Admittedly, interaction systems are rough classifications, and verbal behavior a complex phenomenon. Some distortion must be tolerated if communication events are to be selected from all the on-going behavior, and classified according to their components. In order to select the most appropriate category, inference was sometimes required. Inference was guided by ground rules: Browne emphasized that the observer should view the situation as it would appear to the child (p. 331). In later discussion, she suggested that the child might well interpret the situation in terms of the teacher's behavior. The teacher behavior in the situation outlined was Reading-centered (Cat. 5).

In order to achieve mutual exclusivity in categorization, categories must be precisely and unambiguously defined. They must

describe completely the behaviors to be coded under each label. Inference should be minimal.

However, lest a category label represent dissimilar behaviors and lose precision, some consistency must be present among behaviors categorized by each label. Anomalous, or incongruent behaviors within the same category should be avoided.

The categories, as a system, should completely account for all the behaviors observed, and no observed behavior should remain outside the system.

Criteria specific to these considerations were devised, and are stated in the form of questions.

1. Are the categories descriptive of LER behaviors?
2. Are the categories inclusive of all LER behaviors?
3. Are the categories precisely and unambiguously defined?
4. Are the categories exclusive of anomalous or incongruent behaviors?
5. Do the categories distort statistical data?

The ground rules. In order to facilitate coding in situations not accounted for by categorical definitions, ground rules were provided. Ground rules should help allow for special circumstances which interfere with categorization, and should not be contradictory. As well, they should agree with the best knowledge of the day. Criteria developed to assess the OSAPRL ground rules gave rise to the following questions:

6. Are the ground rules specifically defined to include all contingencies of the LER classes observed?
7. Are the ground rules consistent with each other?
8. Are the inferences upon which the ground rules are based acceptable according to the best knowledge of the day?
9. Do the ground rules distort statistical data?

Validity and reliability. In order to assure that the instrument actually measures what it set out to measure, and that such measurements may be replicated, given the same conditions, validity and reliability should be inherent in the instrument. These considerations gave rise to two questions:

10. How was the validity established for OSAPRL?
11. Is the instrument reliable?

Auxiliary criteria. Certain features of observational instruments in general, and the OSAPRL in particular, were questioned:

12. What are the practical features of the system which contribute to, or detract from the usefulness of the system?
13. What are the features of the system which contribute to, or detract from adequate representation of teacher-pupil verbal interaction?

Critical Analysis of the Observational System for the Analysis of Primary Reading Lessons (OSAPRL) Categories

Categories 1, 4, 5, 7, 8, 13, 15 and 16 presented no significant problems in relation to the criteria outlined and will not be discussed in the immediately following section. Problems relating to these categories could be best alleviated through alterations in other categorical definitions, ground rules, or possible subscription[1] and addition of a category.

A verbatim description of each category which is discussed (Browne, pp. 326-330) is recorded, along with the specific references to problems encountered while using that category for in-classroom obser-

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[1] Subscripting, as defined by Flanders (1970) means "dividing a single category into additional subcategories (p. 126)."

vations at three-second intervals. Since all categories were utilized, it was apparent that all were useful, to describe LER behaviors. Continuous coding was practised, in the observed classrooms, indicating that the OSAPRL was inclusive of all behaviors which occurred.

> Category 2: Comprehension solicitations. Any question or directive aimed at soliciting a response from pupils which calls for an understanding of or ability to interpret or integrate information from the context of the written materials would be recorded as a Category 2 behavior. If the written materials are exercise materials aimed at developing these abilities then a question or directive that pupils complete such exercises verbally would be accounted for by this category. If a lesson should depend primarily on these types of materials a note should be made to this effect, following Flanders' procedures for explaining the specific nature of any lesson (p. 326).

The category definition for Comprehension (Cat. 2) solicitations, and the anomalous behaviors which were intended to be included, caused some coding problems. Although these did not occur often, that they should occur at all deserves mention.

Comprehension (Cat. 2) solicitations were open to coding misrepresentation when solicitations might be used as Extending (Cat. 8) reactions or when they indicated that a motor or affective response was required. No mention was made of procedures to follow in these instances. Motor and affective responses were categorized 4, although later discussion with Browne indicated that it was intended such solicitations be categorized 2. Some inference was required to distinguish between Comprehension solicitations and Extending reactions when solicitations were used to help pupils develop responses. It is therefore suggested that the definition of Comprehension (Cat. 2) solicitations specify that those comprehension solicitations which request a motor or an affective response, and those which are clearly not Extending (Cat. 8)

be categorized 2.

Nonverbal directives were used to solicit pupil Comprehension responses, as when solicitations appeared on the blackboard, and the teacher gestured to indicate the solicitation. As well, if a pupil failed to answer a solicitation of the Comprehension type, the teacher sometimes gestured to another pupil to respond, without repeating the original question.

Neither the present category definition nor the ground rules allow for nonverbal solicitations in this category. Redefinition of Cat. 2 or a change in ground rules is needed to account for the anomalous behaviors which Browne intended should be categorized here, and to include nonverbal Comprehension solicitations.

> Category 3: Oral reading solicitations. Any solicitation which calls for a reading response, except for those identified as Category 1 and 2 solicitation behaviors would be recorded as Category 3. That is, the oral reading category is used only when the oral reading is called for without any emphasis on a purpose for reading aloud except for its own sake or to generally determine "what was said." Audience situations or emphasis on expression in the solicitation would therefore require that the behavior be recorded as a 3. A specific directive that pupils read silently would also be classified here, if no purpose was set for the reading except that the pupils find out what was said in the passage. If the silent reading is prompted by a specific question then one of the other solicitation categories should be used (p. 326).

While this category was clearly defined, the definition did not extend to all behaviors which occurred when the definition was implemented in situ. Nonverbal oral reading solicitations were much more frequent than verbal oral reading solicitations. One verbal solicitation to the first pupil in the reading group was often sufficient signal for each pupil to know when his "turn" to read would occur. Cell 3 tallies in the matrix did not adequately represent the number

of oral reading solicitations because of the nonverbal signals.

It is suggested that the definition of Category 3 be extended to include these nonverbal solicitations to read aloud. If this refinement in the coding procedures were implemented, a 3 would appear in the matrix to separate consecutive oral reading responses by different pupils, thus differentiating between the situation where one pupil reads at length, and that where different pupils read consecutively.

> Category 6: Non-reading-centered teacher behavior. Any teacher verbal behavior which is not specifically aimed at reading would be identified in Category 6. In any reading class, not all the observed behavior would be specific to the reading content of the lesson. Teachers may make general announcements; they may discipline pupils for their general behavior; they may direct pupils to do other activities such as the collection and distribution of materials and so on. By recording a 6 at three second intervals, a record of the proportion of class time taken up by the non-reading behavior would be available. In some classes this behavior may account for a significant part of the interaction and therefore needs to be accounted for in an all inclusive system (pp. 327-328).

Some inference was frequently required to separate Cat. 6 from Cat. 9 behaviors since both could be corrective -- the one, corrective of general behavior, the other, corrective of reading behavior. For example, a teacher directed her attention to a pupil who was making an undue amount of noise at an "interest center" where reading materials were displayed. She redirected his activity during the following conversation with him, while still seated with the reading group around her:

"Russell, are you being responsible?" (9? 4? 6?)

"No." (11? 10?)

"Russell, how should you act back there?" (9? 4? 6?)

"Be responsible." (10? 11?)

Because the child had no choice in making his response "No," the teacher statement preceding it might be considered the disciplinary subcategory of 6. (The underlined categories were those used to record this interchange.) Such decisions required inference, and coding might vary depending upon the observer's orientation, and perceptions of the nuances of the situation.

In discussion with Browne, following this incident, Browne suggested that the entire interchange be classified as 6.

It is possible that anomalous behaviors might be included under this categorical definition, since the definition provides that all nonreading behaviors be included here. While this stipulation increases the all-inclusiveness of the category system, it allows for incongruity within this category. However, all behaviors represented by Cat. 6 are of a nonreading nature. This common relationship between the behaviors coded here, may justify their inclusion under the same label.

Again, some means of identifying behavior directed to peripheral groups would be of help in the interpretation of data, since much of the nonreading behavior originated outside the immediate reading group. As well, much of this behavior was initiated by persons outside the classroom -- staff, other school personnel. Therefore, this category was not strictly "teacher behavior". In one classroom, interruptions were sufficiently frequent to detract considerably from the reading lesson time. Therefore an explicit

category may be useful, to release this category from solely "teacher" orientation.

Cat. 6 allowed for continuous coding, and therefore the all-inclusiveness of the system. However, it did not supply differentiated information about the kinds of behavior subsumed under this label. If this behavior category were re-defined to include all peripheral group and extra-class interruptions, the behaviors represented by it could be subtracted from the matrix and the resulting behaviors would represent teacher-reading group interaction. This would produce a matrix more truly representative of the kinds of interaction which take place in the reading lesson. However, some provision would then be required for nonreading corrective behavior within the reading group. It is possible that this corrective behavior, since it would include only such behavior within the immediate reading group, could be classified under Cat. 9, for while it may appear to be nonreading, it took place within the context of the reading lesson. It may require very fine discrimination indeed, to distinguish reading-corrective from nonreading-corrective behavior if more than a superficial definition is sought.

In discussion with Browne there was disagreement regarding this categorization because nonreading corrective behavior should not properly be classified 9. However, the observer continued to be convinced that the nominal inclusion of this nonreading behavior within the context of the reading group lesson would be more appropriate

riate than any other immediately apparent categorization.

> Category 9: Teacher corrective reactions. Any reaction which indicates to a pupil that his response or lack of response is not acceptable should be recorded as a Category 9. This would include those instances where the teacher provides information to the pupil so that he may continue with his response, such as saying the next word in the oral reading sequence. If a teacher calls upon another pupil to provide the correct or acceptable response for the pupil then that behavior would be recorded as a corrective behavior, and the pupil's response as one of the response categories (10, 11, 12, 14 below) (p. 328).

Categories which infringed upon Cat. 9 have been discussed in previous sections. It will be appreciated that Reading-centered (Cat. 5), Nonreading (Cat. 6) statements, and Extending (Cat. 8) reactions at times had to be distinguished from Cat. 9. In the three-second, and/or behavior change interval, there was not ample time to reflect upon all the implications of any given verbal statement. Therefore, clear-cut definitions had to be delineated. In practice, disciplinary remarks of a general nature were coded 6. Criticism of reading was coded 9. Extensions which appeared to be corrective rather than those which could lead pupils to higher levels or greater breadth of thought were coded 9. It is possible that a deeper analysis of some of these behaviors may have resulted in revision of codes in some instances.

This category also, like Cat's. 5 and 6, tended to become contaminated with behaviors directed toward pupils who were not in the immediate reading group, particularly those who were at their desks, but who were not following the procedures laid down by the teacher for completion of their reading.

If the category suggested earlier, to deal with all peripheral group behavior, regardless of where it originated, were developed, this contaminating behavior could be eliminated from the reading group matrix. Then, the 9's which appear on the matrix would refer only to reading corrective reactions directed to the immediate reading group.

> Category 10: Pupil content responses. Any response which requires that a pupil use information from the written materials used in the lesson, or information specifically disseminated in that lesson (or a previous lesson if this is known -- such as word analysis principles) should be identified as content-centered responses and recorded as a Category 10 (p. 329).

The observer recorded this category when a response was clearly based upon a reading selection, class discussion, or school-taught skill. Since the observer could only assume that the previous LER lessons in the guidebook had been learned, some inference was necessary. The teacher would be in a better position to code this category than the observer. Therefore, some provision should be made in the category definition, which would assist the observer, in making the decision whether to code a 10. Further, the assumption upon which a ground rule influencing the observer to code a 10 when in doubt about the source of the pupil's knowledge was based, was unacceptable to the observer, on the basis of research (Jersild, 1946) and the observer's experience: so much of what children know is learned in an out-of-school context -- especially the knowledge of a grade one pupil who has attended school for only a few months of his life, and who is influenced by the mass media,

his home, his peers.

In order to clarify this category definition and reduce ambiguity, it is suggested that a Cat. 10 be recorded only if it is clearly indicated either from the content of the lesson, or from teacher or pupil statement(s) that the response was based on school-learned knowledge. In all other instances, the evidence would indicate that a Cat. 11 should be recorded.

> Category 11: Pupil self-expression responses. Whenever the pupil is allowed to present his own opinions or to draw upon his store of general information and personal experiences in responding to a solicitation the response should be categorized as a Category 10 [11] . If the pupil is called upon to respond to some non-reading centered behavior from the teacher then that response would be recorded in this category too if the teacher behavior was very general (p. 329).

A more specific definition of the category to determine which behaviors should be included here, depends in part upon the definition for Cat. 10. If the definition for Cat. 10 suggested in the previous section were implemented, then all behaviors which were not specifically stated to be dependent upon classroom learning, or which did not directly result from the lesson observed, would be included in Cat. 11. This would eliminate ambiguity when using this category.

> Category 12: Pupil oral-reading responses. If the pupil reads aloud his response to the teacher's solicitation, then the response should be recorded as a Category 12, except where the materials being read have been composed by the pupil himself. Where the materials were written by the pupil then the response should be categorized as an 11 (Self-expression) if the ideas are essentially his own and as a content response (Category 10) if the response has been written

> as an answer to a comprehension question requiring an answer based on the materials in a selection (p. 329).

Problems relating to this category were concerned with the restricted nature of the present definition. This definition did not provide for the possibility that Oral reading (Cat. 12) might frequently be a Unison (Cat. 14) response. In the present investigation this combination of behaviors occurred. A decision was made, unilaterally, at the outset, on the basis of ground rule 1, to code such combined responses as Cat. 12, for it was felt that this would provide the most information about teaching strategies and the content of the lesson. Anecdotal notes indicated the unison characteristic. Had such responses been coded Unison (Cat. 14), only by an examination of the audio-tapes, original data sheets, or anecdotal notes, could it be known that oral reading took place.

As well, it seemed reasonable that Cat. 12 assume greater importance than the concurrent Unison (Cat. 14) response, since Browne provided for Unison Cat. 13 responses to be categorized as 13 (p. 330) in the case of Silent reading and when Silence or Confusion occurred in unison it was coded 16.

> Category 14: Pupil unison responses. Where more than one pupil responds, either at the teacher's invitation or as a matter of usual behavior, the group response, whether read or expressed in the pupils' own words would be recorded as a Category 14 (p. 330).

While the observer was aware of the definition of this category before commencing the study, it was not expected that oral reading in unison would recur so often as to obscure the amount of oral reading

which actually took place, and that it would occur in spite of the solicitation to read alone.

Unison (Cat. 14) responses described behaviors which frequently occurred concurrently with other behaviors (Cat. 13 and Cat. 16) in the classroom but were disregarded in favor of the other concurrent behaviors. In this study, Unison (Cat. 14) was recorded chiefly for group spontaneous outbursts (Cat. 15) and for simultaneous Content (Cat. 10) responses, which were often responses to solicitations well within the ability of the pupils.

It was felt that, while this category was used to describe some LER behaviors it was of lesser utility than other categories, since a unison response could often be classified as the response with which it occurred (Silent reading, Oral reading, Silence or Confusion, Pupil content responses). In the present investigation it was considered a dispensable category. However, an observer wishing to determine how much individual and how much unison interaction took place between teacher and pupils may wish to use this category in preference to the concurrent behavior.

The suggested changes in categories 2, 3, 6, 9, 10, 11, 12 and 14, discussed above, could assist future investigators using OSAPRL.

Critical Analysis of Observational System for the Analysis of Primary Reading Lessons (OSAPRL) Ground Rules

Guiding this analysis were these questions: Are the ground rules specifically defined to include all the contingencies of the reading

lesson? Are they consistent with each other? Are they based upon the best knowledge of the day? The nine OSAPRL ground rules are included in Appendix C. They served to structure observer inference and clarify coding. Only those ground rules which seemed to be disqualified by the above criteria are discussed. Ground rule number five was implemented as defined, and is not discussed here.

Ground rule number one required that the observer choose the category which provided the greatest amount of information. Since the focus of the system was on teacher behavior, it was reasonable to assume that the observer should seek information closely related to teacher strategies, rather than pupil behaviors. However, ground rule number three required the observer to empathize with the child, and consider how he might interpret teacher reactions. There seemed some conflict here, regarding the directives implied by the two ground rules since teacher and pupil may not regard the same situation congruently. As well, a short term observer does not have the intimate knowledge of each child which is required to accurately interpret how a child receives solicitations, directives, or teacher reactions -- and it is possible that many teachers are in the same position.

Ground rule two stated that Oral reading (Cat. 3) solicitations be used if there were any doubt about the purpose for the oral reading request. The implicit, though not explicit reasons for individual oral reading appeared to be to allow the teacher to diagnose reading difficulty, and/or to help the child become visible within the group. Implicit reasons were, therefore, disregarded in order to apply this ground rule. Some insights may have been lost. That Oral reading

(Cat. 12) response does not often have a stated purpose, was indicated when this ground rule was applied, for the 3-12 sequence was predominant where 12 was a following behavior in the matrix.

Ground rule number four, which stated "if there is any doubt regarding the content-centered responses compared with the self-expression response, the content-centered category should be used (Browne, p. 332)", implied that primary pupils have a broader base of experience in the classroom than from all other sources. The observer could not agree with this ground rule, and felt that the reverse was true, especially at the primary level. Where 2-11 cells appeared, it was evident that the child's own experience was used.

Ground rule number six was implemented. Each change of behavior was recorded regardless of the three-second interval. However, an interval of different duration might have been used and/or the behavior change stipulation disregarded. If only a three-second interval were used, uniformity of coding, from one investigation to another would be enhanced. Special circumstances or contingencies in classrooms, which resulted in behavior changes, would be eliminated as a variable in coding.

Ground rule number seven implied that pupil initiated behaviors which are corrective of a peer are meant to do just that. It does not allow for cooperative, or helping behavior. This may be an unwarranted assumption. While it is possible that some pupil initiated behavior indicates impatience with peer rate of progress, it is also possible that one child may empathize with, and try to help another. More

important, this ground rule allowed for the combination of teacher and pupil behavior, and the classification of it as pupil behavior. This could distort the statistical results, by shifting the weight of pupil-talk ratios in favor of the pupils. This may partially account for heavy "pupil-talk" frequencies, as compared with the results of Flanders and Browne, using the Flanders Analysis.

In the three classrooms observed, teachers talked .583, .495, and .578 percent of the time, respectively. In no case did teacher talk utilize as much as two thirds of the time, as Flanders' study indicated. Application of ground rule number seven may have influenced this result.

Ground rule number eight was observed with reservations. The Silent reading (Cat. 13) response was recorded for pauses in oral reading, although extended pauses were recorded 16. It was felt that pauses coded as silent reading may be presumptuous. The classroom teacher with an intimate knowledge of the pupils should be in a better position to judge whether oral reading pauses were silent reading activity or confusion. As well, how might one justify the assumption that, after a three second pause, this extended pause was not also silent reading? It is possible that a rational solution is the development of a new category. However, should one of the present categories be considered dispensable, it might be utilized for mediation, which may more adequately describe these pauses.

Ground rule nine, which allowed a 16 to be recorded for instances when the teacher ignored a pupil's attempts to initiate activity was applied. It was felt that a Corrective (Cat. 9) reaction might have applied equally. It is possible that ignoring a pupil attempt to

initiate activity may be a negative reaction on the part of the teacher.

Since unison oral reading and unison content responses occurred in the observed classrooms, it is possible that a ground rule to deal with it might be formulated which would guide the observer in dealing with concurrent behaviors. It is possible that, depending upon the purposes of the observations, in some cases the unison response would give more information, while in others, the concurrent response would be more valuable.

It was noted during observations that "round robin" reading took place. Pupils read consecutively with no verbal interruptions for the Oral reading (Cat. 3) solicitation. Occasionally, a nonverbal cue was given to designate that pupils were expected to respond to a written Comprehension (Cat. 2) or Word perception (Cat. 1) solicitation. A generalized ground rule which would allow for the insertion of the appropriate category which was nonverbally transmitted would reflect more accurately the verbal interaction in the classroom.

In summary, some inconsistencies and some possibly unwarranted implications appeared to be present in the ground rules. As well, all the contingencies which occurred in the classrooms observed were not provided for in the ground rules. Suggestions for revision of the ground rules are included in Chapter 6.

Critical Analysis of Validity and Reliability of the Observational System for the Analysis of Primary Reading Lessons (OSAPRL)

These two criteria are related, because high validity may militate against high reliability.

Validity has been defined by Kerlinger (1964) in terms of the degree of correspondence between what is being measured and what one believes is being measured. Brown'e OSAPRL was designed to measure reading behaviors. It does so using categories which are themselves reading behaviors, observed in the basal reading classroom. These are arranged in a format similar to that of FIAS, which has been defended by previous researchers as a valid classroom observation system. OSAPRL evolved from the FIER, and the FIAS. Some validity may have been transferred to OSAPRL from these prior instruments.

Cronbach (cited by Anderson, 1972) stated, "construct validity is established through a long-continued interplay between observation, reasoning, and imagination." Because OSAPRL categories developed from observation in basal reading classes (observation) and were regrouped to form a logical system, (reasoning, imagination) the OSAPRL would seem to have construct validity. The use of inference would also seem to be condoned by Cronbach's statement, for what is inference if it is not interplay between observation, reasoning and imagination?

Kerlinger (1964) has stated, "Independent measures of the same variable are rare (pp. 506-7)." Browne has documented the same verbal behaviors in terms of instruments which had different emphases. This constituted a measure of the validity of OSAPRL.

The present study considered criteria used by Anderson (1972) in his comparison of Bales' System and FIAS. They are related to the validity of the instrument.

- does the instrument enable the investigator to identify variability in classroom behavior?

- does the instrument enable the investigator to compare the instructor's performance with predetermined criteria? If so, how?
- does the instrument enable the investigator to describe small group instructional processes? If so, how?

OSAPRL identified variability within and across classrooms, enabled the investigator to compare the instructor's performances according to predetermined criteria, and enabled the investigator to describe small group processes. These topics are discussed at greater length in Chapter 5, together with the data generated by the observations.

Kerlinger (1964) stated: "Reliability is usually defined as the agreement among observers (p. 507)." This is comparable to objectivity. Kerlinger suggests that reliability is increased if little interpretative burden is placed on the observer.

Reliability should, therefore, be enhanced if category definitions are clearly and unambiguously stated, if ground rules are well defined, and if the practical features of the system are easily attained by observers. Here, there was some difficulty as outlined previously, between Browne's intent and the observer's interpretation.

Since OSAPRL was based on FIER and FIAS, the reliability of these prior instruments should lend credibility to the reliability of OSAPRL.

Inter-observer reliability has been demonstrated in the use of FIAS by various investigators including Browne and her co-worker, who achieved a reliability coefficient of 0.92 before commencing classroom observations. Information regarding the reliability of FIER is docu-

mented by Browne (pp. 190-2).

Kerlinger (1964) discussed inference in relation to reliability. He recommended a medium degree of inference. Molecular systems require little inference and are highly reliable, but may so dissect behavior that it has little meaning. Molar systems retain meaning, and enhance validity, but lack reliability. Validity and reliability in observational systems appear to vary inversely. OSAPRL was molecular in the use of the three-second and/or behavior change interval, but incorporated the features of molar systems by the use of anecdotal notes and inference.

Critical Analysis of Observational System for the Analysis of Primary Reading Lessons (OSAPRL) Using Auxiliary Criteria

The OSAPRL, if it is to be widely used, should not impose an unreasonable burden on the memory of the teacher or researcher.

Approximately ten hours of concentrated coding and discussion were spent before the reliability check was made for this study. This did not include time spent in reading, collecting practice tapes, discussion, and practice coding in the live classroom. It is possible that a longer period of concentrated training time would have been advantageous.

The classroom teacher may find fewer hours adequate if the instrument is to be used as a self-analysis device. The researcher will require additional time in order to become acquainted with the theoretical bases and applications of the system. Given the variability between individuals, estimates of time required can not be specified

accurately. Flanders (1966) suggested that the teacher spend four hours to learn his system (p. 20), and that the researcher should allow twelve.

The Flanders System has the advantage of practice tapes and manuals to assist the observer. The present investigation had only the documentation in the original study to assist in using the OSAPRL.

Cognizance must be taken of the auxiliary equipment and materials useful to implement the system, as well as less tangible but more important theoretical aspects of manageability.

A teacher, working alone, could tape during class periods, and code at a later time. Chapter 2 outlined the equipment used in this study. Minimal operational skills are required to implement OSAPRL. Equipment is unsophisticated and relatively inexpensive.

Usefulness of the system depends upon the questions to be explored. Each category could become the basis for a question, for example: "Do I (or does the teacher) criticize more than I (or the teacher) praise?" "Do I (or does the teacher) receive pupil initiated behaviors with different reactions, depending upon the ability group level to which the pupil belongs?" Lessons may be compared in terms of behaviors which occurred and their congruence with the behavioral goals of the lesson.

Teacher supervisors may supplant rating scales with OSAPRL descriptions, and shift from the role of evaluator to collaborator. The value of OSAPRL to the researcher or theoretician is primarily its utility as an observational instrument in a subject area where none as specific to reading previously existed. It serves to mirror the

reading-teaching process -- both what (cognitive) and how (affective) teaching took place.

SUMMARY

OSAPRL was not considered difficult to learn, or to apply. Equipment was minimal. The uses of the system will depend upon the orientation of the observer. To the individual teacher it is an aid in conceptualizing actual teaching behaviors over which the teacher has some control. To the researcher, it is a reflection, in behavioral terms, of what actually happens in the reading classroom. To teachers working in cooperation with each other, or to a researcher, it is an instrument which has the potential to promote professional growth. Both teacher and researcher using OSAPRL must realize the limitations of the instrument. Suggestions for revision of OSAPRL, based upon analyses in this chapter, are reported in the final chapter of this study.

CHAPTER 6

SUMMARY OF THE FINDINGS, CONCLUSIONS, AND IMPLICATIONS OF THIS STUDY

OVERVIEW

The major purpose of this study was to use the Observational System for the Analysis of Primary Reading Lessons (OSAPRL) in grade one language experience classes in order to determine its viability and to make recommendations for its modification and refinement. Further, the data from the three language experience classes observed were analyzed in order to determine the differences, if any, in the patterns of teacher-pupil interaction taking place in those classes.

Section one will discuss the OSAPRL instrument in terms of findings, conclusions, and implications, which resulted from its use in LER classrooms.

Section two will discuss teacher-pupil verbal interaction in LER classes. The findings, conclusions, and implications which resulted will be discussed in terms of individual classrooms and intra-class groups.

Section three will present suggestions for further research.

THE OBSERVATIONAL SYSTEM FOR THE ANALYSIS OF PRIMARY READING LESSONS(OSAPRL)

Findings

The OSAPRL was found to be a viable system for use in the LER classes observed. While there were other limitations in the system,

modifications focused on the definition of categories and ground rules.

Problems relating to the original definitions of the categories and ground rules were concerned with these features of the OSAPRL:

1. the "catch-all" nature of some categories;
2. the incidence of behaviors recorded in some categories;
3. the failure of the system to account for nonverbal behaviors;
4. the failure of the system to account for important LER behaviors;
5. the failure of the system to account for nonreading group behaviors;
6. the difficulties inherent in "behavior change" as a component of the coding interval;
7. the difficulties in defining ground rules which would not only account for the general, but the unique features of the system;
8. the difficulties in defining precisely and unambiguously the categories and ground rules.

Categorical definitions of categories 1, 4, 5, 7, 8, 13, 15 and 16 were acceptable as Browne defined them. Categories 2, 10, 11, 13 and 15 required changes which could be implemented through the ground rules. Categories 3, 6, 9, and 12 required extension. A subscription of Category 4 (4a) to record specific LER behaviors would be useful in the system. The former Category 14 could be redefined to fulfill a more useful purpose. Ground rules 5 and 9 remained unchanged. Some ground rules were added.

The specific findings of this study which are concerned with

the OSAPRL follow.

1. The OSAPRL categories were all-inclusive of LER behaviors, allowing for continuous coding. While in some cases (e.g. Cat. 5) categories were found to be too broad for precise delineation of LER behaviors, it was this breadth which accounted for the capacity of the OSAPRL to describe all the behaviors in the observed LER classrooms.

2. The proportion of behaviors was a useful descriptor of classroom and group interaction. Both Extending (Cat. 8) and Unison (Cat. 14) behaviors (according to the interpretation of Unison used by this investigator) each occupied a category, but occurred infrequently. At the same time, the failure of the OSAPRL to account for frequent nonverbal behaviors was a weakness in the system. These behaviors occurred not only in Word perception (Cat. 1) solicitations, where Browne did recognize them, but in other categories as well (e.g. Cat's. 2, 3, and others).

3. Although the Other (Cat. 4) solicitation allows for solicitations to "listen" and to "write," among other behaviors, and the Teacher Reading-centered (Cat. 5) statement category allows for teacher procedural directives which may cause pupils to listen and to write, there is no specific distinction made for solicitations to listen and to write. These are two major goals of LER. As the categorical definitions now stand, these two important LER behaviors are not differentiated from other topographically similar behaviors.

4. Although Browne developed the OSAPRL in classes where pupils were grouped, no provision was made for separating teacher-immediate reading group interaction from interaction outside the immediate group in which the teacher must sometimes participate.

5. The coding unit composed of the behavior change combined with the three-second interval does not constitute a definite time interval. This poses potential problems when comparisons are made.

6. In attempting to apply ground rules to deal with both general and unique classroom conditions, the investigator found inconsistencies between ground rules 1 and 3, because of the difficulty in relating the statements "greatest amount of information" (ground rule 1) and "how the pupil might perceive the reaction" (ground rule 3).

This observer found that she could not agree with the underlying principle behind ground rule 4, which advised that the Content (Cat. 10) rather than the Self-expression (Cat. 11) response be used when in doubt about the source of a pupil's knowledge.

Ground rule 7, which allowed peer-correction reactions to be coded in preference to teacher-corrective reactions when they occurred concurrently, was found to be a possible cause of statistical distortion. Minor changes were also suggested in other ground rules, and additional ground rules were suggested.

7. In defining specific categories, it was sometimes difficult to clearly delineate each category so that categories which might be closely allied were differentiated, for example, Nonreading (Cat. 6) statements and Corrective (Cat. 9) reactions.

These were the main findings which caused conflict in the application of the OSAPRL categories and ground rules to LER classes.

The validity and reliability of the instrument were considered by this observer to be adequate, in view of the criteria used to assess them, and the problems inherent in creating a prototype observational

instrument.

The instrument was found to be convenient to use, and did not impose a great burden on the memory of the observer.

Conclusions

It was concluded that the OSAPRL was a useful instrument for observation in the LER classroom. The general problems, enumerated in the previous section, are discussed and guidelines for possible solutions follow.

1. The breadth of some categories, particularly category 4, lead to the conclusion that subscription of this category may be advisable in LER classes.

2. Frequency of tallies in a category may result from the number of behaviors included in the category definition. Frequency or infrequency of tallies may not directly relate to the importance of a category in the system. However, it was concluded that the Unison (Cat. 14) category could be more economically utilized. This is discussed in connection with revisions in the system, and with ground rule 8, concerning pauses during oral reading.

3. Nonverbal behaviors which substitute for solicitations should be accounted for by the appropriate category number of the solicitation.

4. Since listening and writing are important LER behaviors, it was considered that special provisions should be made for recording teacher solicitations to listen or to write. This could be done by subscripting category 4 and creating a category 4a.

5. Nonreading (Cat. 6) statements as well as all behaviors

which interrupt the on-going reading group-teacher interaction, should be separated from bona fide reading behaviors by utilization of a separate category for all such behaviors (Cat. 6).

6. Consideration should be given to the exclusion of the behavior change as an integral part of the interval used for coding.

7. The changes suggested in the categories and ground rules are discussed separately and at greater length in the section to follow. One conclusion reached, however, was that the focus of the OSAPRL (teacher, pupil, or interaction) should have been more clearly stated, and this would have provided more specific direction for application of the definitions. It is possible that such guidelines would have ameliorated the inconsistencies between ground rules 1 and 3, and those within ground rule 7.

The substitution of the Category 14 definition for one which would distinguish mediational periods would appear to describe more accurately some of the activities now categorized as 16, under ground rule 8, specifically, those periods of silence which exceed three-seconds and occur during Oral reading (Cat. 12) response.

8. Definitions of categories 3, 4a, 6, 9, 12, and 14 are discussed in the section to follow, in order to clarify the intentions of each category.

Implications

The findings and conclusions of this study implied that changes were required in the original OSAPRL categories and ground rules. These changes, including extensions to original categories, the introduction

of two new categories, and recommendations are described following.

1. Category 3, Oral (silent) reading solicitations: that the definition by Browne (p. 326) be extended to include the provision that where pupils read consecutively without teacher verbal intervention, a 3 should be recorded to differentiate the situation where one pupil reads at length, from that where different pupils read consecutively.

2. Category 4a, Listening and writing solicitations: that this category be a subscripted category of Cat. 4 and include specific solicitations which request that pupils listen, or write.

3. Category 6, Nonreading-centered teacher statements: that this category designation read "Nonreading statements" in order to include teacher, pupil, or other persons, and that it record all nonreading activities as well as interruptions of the teacher-immediate reading group, even if these interruptions deal with reading matters.

4. Category 9, Teacher corrective reactions: that this definition be extended to include those disciplinary acts of a general nature formerly included in category 6. Therefore, if a teacher reproves a pupil in the immediate reading group, this behavior would be coded 9.

5. Category 12, Pupil oral reading responses: that this definition be extended to include pupil oral reading responses which become unison. Ground rule 1 is cited as authority for this redefinition.

6. Category 14, Pupil mediating responses: that this category be used to code pupil hesitations which exceed three seconds while a pupil is oral reading, making a response, or completing a pupil

initiating activity. This category was formerly that which designated pupil Unison responses.

The findings and conclusions further implied that the original ground rules required modification, redefinition, and additions, as follows:

Rule 1. When in doubt about the category corresponding to the observed behavior, the observer should choose the category which will provide the greatest information about the teacher, unless some other focus is specified.[2]

Rule 2. The Oral (silent) reading (Cat. 3) solicitation should be used only when the teacher does not explicitely state the reason for the oral or silent reading.

Rule 3. In deciding upon a Confirming (7), Extending (8), or Corrective (9) reaction, the observer, while not trying to second guess the teacher's intentions, should categorize from the point of view of the teacher, according to the observer's knowledge of the teacher and the situation, unless another orientation is specifically identified.

Rule 4. If there is some doubt about the Content (Cat. 10) centered, compared with the Self-expression (Cat. 11) responses, the observer should code the Self-expression response.

Rule 5. Some responses may occur in unison. If the responses are identical, and in unison, they should be coded according to their

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[2]Revisions and additions to the original ground rules are underlined.

cognitive content. If the responses are different, or confused, but concurrent, Silence or Confusion (Cat. 16) should be coded.

Rule 6. While the three second coding interval should be retained, some thought should be given to the elimination of the behavior change factor, which reduces accuracy when comparisons of studies are made.

Rule 7. Pupil initiating behaviors which are corrective of a peer should be recorded as a 15. Where a teacher and a pupil respond concurrently and correctively to another pupil, the teacher behavior should be recorded. The remainder of the original ground rule stands unchanged.

Because of the new category 14, defined to record pupil mediation, the original ground rule 8, which advised that a Cat. 13 (Silent reading) be recorded for pauses in Oral reading (Cat. 12) response, is deleted from the ground rules.

Rule 8 (Formerly Rule 9). This rule remains as Browne defined it, except for correction: "the build up in the 14 [15] - 16 cell".

Three new ground rules have been added:

Rule 9. In cases other than that of Word perception (Cat. 1), where nonverbal behavior may substitute for verbal behavior (e.g. Cat. 2) notation of the appropriate category should be made for the nonverbal substitute behavior.

Rule 10. Solicitations which request a motor or affective response should be coded according to the cognitive type of solicitation (e.g. Word perception, Comprehension) rather than Other (Cat. 4) even when these solicitations occur infrequently.

Rule 11. When data are analyzed, proportions of the behaviors in terms of the (now) 17 categories should be calculated. However, the proportions of behavior categorized as 6, Nonreading group behavior, should be subtracted from the total behaviors to determine the total Reading behaviors in the matrix.

These modifications, refinements, and additions to the original OSAPRL categories and ground rules are not expected to provide for all the contingencies of the reading lesson in the LER class, but they do provide for those which arose during the course of this study. Much more research is needed, using the instrument under different circumstances, and in different programs. At the same time, a parallel study in LER classes would be useful for comparative purposes, using the original instrument, or the modified instrument.

TEACHER-PUPIL VERBAL INTERACTION IN LANGUAGE EXPERIENCE READING (LER) INTRA-CLASS GROUPS

Overview

All LER classes reported a statistically significant difference at the .01 level, when across and pairwise class comparisons were made. This difference indicated that different verbal interaction patterns were practised among the LER classes.

In order to best describe the verbal interaction patterns which evolved within each class, the group data, which combined the verbal interactions of a few individuals, and which dealt with a unique organizational unit which exists in many classes, appeared to contain the most clearly delineated data. Group data did not necessarily

reflect class trends: the predominant classroom behavior was not the predominant behavior in each intra-class group. For example, Teacher Reading-centered (Cat. 5) statements which were the predominant behaviors in Classes 1 and 3, were not the predominant behaviors in all of the intra-class groups in both Classes 1 and 3. Therefore, it appeared that the examination of the verbal behavior in the intra-class groups should reveal verbal interaction which might be obscured by the combination of the behaviors of all intra-class groups. The micro-cosmic group approach was selected in preference to the more nebulous class unit approach in discussion of verbal patterns in the LER classes. However, in order to discuss comments made by Thorn (Appendix A) in relation to the use of OSAPRL in LER classes, some classroom data has been included in the discussion.

Findings

The validation of the OSAPRL as a classroom observational instrument was the main concern of this study. The wealth of data generated by the instrument provided the following selected findings in terms of the OSAPRL behavior categories and the intra-class groups.

1. All intra-class groups in the LER classes reported a statistically significant difference at the .01 level when across and pairwise intra-class group comparisons were made, with the exception of one pair of groups in one class: the High group and the Low group in Class 2. This difference indicated that different verbal interaction patterns were practised within the intra-class groups.

2. High ability groups recorded higher proportions of

Comprehension (Cat. 2) solicitations, Content (Cat. 10) responses, and Confirmation (Cat. 7) reactions, when compared to other ability groups.

3. Average ability groups recorded higher proportions of Other (Cat. 4) solicitations, Self-expression (Cat. 11) responses, and Pupil initiating (Cat. 15) behaviors, when compared with other groups.

4. Low ability groups reported a higher proportion of Oral reading (Cat. 12) responses, and Corrective (Cat. 9) reactions when compared with other groups.

5. Nonreading (Cat. 6) statements, including peripheral group interruptions, particularly in the two-group class, constituted a higher proportion of reading group behaviors (7.2 percent) than was recorded by many of the reading categories.

6. The incidence of Extending (Cat. 8) reactions was not high, according to data from this study. When Extending reactions were used they were frequently followed by responses in the Content (Cat. 10) and Self-expression (Cat. 11) categories, and by Pupil initiating (Cat. 15) behaviors. The Extending category was more often used in High and Average group-teacher interaction.

7. Unison (Cat. 14) responses were infrequent, except when they occurred concurrently with Oral reading (Cat. 12) responses.

8. Silent reading (Cat. 13) responses occurred frequently across all intra-class groups in Class 1, but were not consistently used by any particular ability group in the other two classes.

9. The 15-16-15 sequence, which could signify either a period of pupil discussion, or one of pupil talk followed by silence or

confusion, occurred in both groups in Class 3, but this sequence did not occur often in other groups.

Conclusions

1. The verbal interaction used to implement the LER program in the LER intra-class groups varied significantly between groups, suggesting that there was little similarity in the verbal presentation of this program.

2. High proportions of the verbal behaviors Comprehension (Cat. 2) solicitations, and Content (Cat. 10) responses were reported in High ability group interaction, suggesting that the "meaning" emphasis of the LER program may be implemented in this group.

3. The higher proportion of Other (Cat. 4) solicitations associated with Average groups compared to the proportions of Cat. 4 directed to High and Low groups, indicated that nonconventional questioning techniques were used in verbal interaction with this group. That these solicitations were followed frequently by Self-expression (Cat. 11) responses and Pupil initiating (Cat. 15) behaviors suggested that nonconventional questioning techniques may encourage nonconventional pupil verbal behaviors.

4. That Low ability groups in all classes reported the highest proportions of Oral reading (Cat. 12) responses suggested that Oral reading may be perceived by teachers as a reading teaching technique, suited to the less able or beginning reader.

That Oral reading responses in Low ability groups frequently preceded Corrective (Cat. 9) reactions, and that Corrective reactions

directed to Low groups always exceeded in proportion those directed to other ability groups, suggested that: oral reading exercises in Low groups may be too difficult for the pupils in these groups; teachers may be highly sensitive to Low group miscues in oral reading; Low groups may, for various reasons, be the objects of more corrective reactions than are desirable in the ideal learning situation.

5. When Nonreading (Cat. 6) statements occupy as much or greater proportions of total reading behaviors as do important reading-related categories, there may be some cause for concern that valuable reading lesson time is being unduly pre-empted.

6. Extending (Cat. 8) reactions appeared to play a role in eliciting pupil responses, but were not widely used by the observed teachers. Low group interaction, where the Extending reaction was seldom used, might have been encouraged by this technique. Thorn suggested that Extending reactions could be used to advantage to help pupils respond from their own experiences, an area of response not widely used in Low groups.

7. Unison (Cat. 14) responses, which occurred concurrently with Oral reading (Cat. 12) responses, were not specifically discussed although Thorn did suggest that Unison responses should be minimal. Unison responses occurring with other OSAPRL behaviors were rare.

8. High proportions of Silent reading (Cat. 13) responses occurred in one class; they were not group-linked across classes, leading to the conclusion that the use of Silent reading response may depend upon the teacher, and her repertoire of reading teaching techniques. Thorn expected this response to be one of major importance

in LER.

9. The 15-16-15 sequence presented by matrix data could be subject to misinterpretation. It is suggested that the distinction between such a sequence which signified (1) pupil discussion and a sequence which signified (2) pupil talk and confusion, could be made by labelling the pupil discussion type of interchange 15-13-15. Because this type of interchange occurred mainly in one class, it might be concluded that the classroom environment may have been a factor in the stimulation of such exchanges.

Implications

1. The findings and conclusions of this study implied that each teacher-classroom group interpreted the LER program according to specific conditions which influenced the behaviors of the teacher and the group members, including group levels, classroom organization, and other factors not studied in this investigation.

2. The similarity of behaviors in ability groups of the same level implied that teachers may have preconceived expectations about these groups. It is possible that teachers "teach to" these expectations. If this is so, the potential of some pupils may be obscured by the label of the group in which they may be placed, and their potentials may not be developed because they are not recognized.

3. It is possible that the differences in verbal behavior patterns used with different ability groups may indicate that the program as conceived by its authors, is more adequately implemented in High and Average groups. The program, as conceived, or as imple-

mented, may be inadequate to fulfill the needs of Low ability group members.

4. Oral reading (Cat. 12) responses may be overutilized as a reading teaching technique in some groups. It is possible that a broader repertoire of teaching techniques, using some of the other OSAPRL behaviors -- more Silent reading (Cat. 13) followed by solicitations, or more Extending (Cat. 8) reactions and more Other (Cat. 4) solicitations, as well as solicitations calling for motor and affective responses, could substitute for large blocks of Oral reading (Cat. 12) responses, which so often resulted in Corrective (Cat. 9) reactions. Such techniques might allow group members more physical and emotional mobility than was generally observed in these groups.

5. In the two-group classes, a relatively larger proportion of the reading period was used for nonreading activities; here also, there was a high level of Silence or Confusion (Cat. 16) in both groups. It is possible that these group behaviors were affected by other factors not accounted for in this study, including school organization and deviant pupils.

Implications related to selected comments made by Thorn follow.

6. Extending (Cat. 8) reactions, encouraged by Thorn, may require a particular effort on the part of teachers to tolerate "wait time", as defined by Rowe (1971) and to allow for tangential remarks. Extending (Cat. 8) reactions, like Other (Cat. 4) solicitations, may also require creativity on the part of teachers, in their efforts to induce pupils to reach higher cognitive levels. Such qualities in teachers may not be common, and may require special effort

to develop. Successful extending reactions may also require that the teacher have more than a superficial knowledge of her pupils.

7. While Thorn expressed the preference for low use of the Unison (Cat. 14) category, it appeared that some teachers felt the need to deploy it concurrently with Oral reading (Cat. 12) or to allow it to occur with Oral reading. If this is done, such oral reading can not easily be used for diagnostic purposes if this is the intention of the teacher. Unison responses, as interpreted in this study, occurred mainly with Content (Cat. 10) responses.

8. Silent reading (Cat. 13) responses could have been used more often as a guided reading technique in some groups. This may have provided variety in techniques, and exposed miscues of less able readers in a more tactful way.

9. Pupil talk which was not re-routed through the teacher, a behavior which Thorn supported, may require that teachers help pupils develop the skills necessary to carry on independent group discussion. At the grade one level, this may require special teacher and pupil training.

SUGGESTIONS FOR FUTURE RESEARCH

Much more testing is needed, using OSAPRL in basal, LER and other reading programs, in many classrooms, and under different conditions. Some of these projects might implement the revisions to the original instrument, as suggested in this study. In particular, the substitution of the three-second interval for the three-second interval and/or behavior change might be particularly useful when comparative

studies are made.

Parallel studies undertaken in similar programs and under similar conditions could prove as reliability checks on OSAPRL.

Because of the possible long term, and even negative effects of certain verbal behavior patterns which recurred in particular groups, some thought should be given to the investigation of mobility of members between different ability groups, and to the emphasis that group membership need not be permanent.

It is possible that certain teachers interact differently with different ability groups. Study in this area could lead to more compatible matching of teachers and pupils.

The organizational pattern of the school as well as the intra-class grouping patterns may affect verbal interaction. This possibility might be explored.

A study parallel to this one, in LER classrooms, could follow up the implication of this study that the present LER program as implemented may not meet the needs of Low group pupils. Such a study may provide insight into ways to meet the needs of these pupils. Further, while a highly calibrated classroom may not be desirable, it is possible that further research using OSAPRL in LER classrooms may uncover relationships between categories which may help to refine teaching strategies designed to elicit those behaviors which the LER program encourages.

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APPENDICES

APPENDIX A

THE LANGUAGE EXPERIENCE APPROACH TO READING

THE LANGUAGE EXPERIENCE APPROACH TO READING

OVERVIEW

The language experience approach to reading is not a new method. Lamoureaux and Lee (1943) considered experience the core to words which could be related and made meaningful. In particular, they advocated the use of experience charts, composed by children.

Physical, mental, social, and emotional preconditions as well as the interaction of all of these may combine to individualize the experiences received so that the program articulated by the teacher may be interpreted by each child in his own terms.

The concept of an experience-base to learning is not confined to the western world. Chauncey (Ed., 1969) and Michael and Sheila Cole (1967) described activities in Soviet nurseries, in which teachers actively intervened to make verbal symbols meaningful to children as young as five months.

The language experience approach to reading is premised in the belief that reading is active, and interactive; a "thought-getting" process (Huey, 1908). The reading skills developed in language experience are linked together by psychologists (Luria, 1959), as interactive components which facilitate the development of each other, through the interrelationship between organism and environment. The word "locks a complex system of connections in the child's cortex and becomes a tool (p. 13)."

The language experience reading approach attempts to integrate four channels of communication through which words travel, by linking listening, speaking, writing, and reading. While not specifically emphasized, expression is also encouraged through painting and dramatization (Gage LER Teacher's Source Book, Level 2, 1966). Motivation is believed to be inherent in the content because it originates in the experiences of the children, and they report their experiences in their own words. The approach is synthesized by Allen (1966):

> What I can think about I can say.
> What I can say, I can write.
> What I can write, I can read.
> I can read what I write and what other
> people have written for me to read.

Language experience programs vary from the loosely-structured, to highly-structured programs. Teachers must individually interpret programs. Browne (1971) found variation idiosyncratic to teachers.

The Gage Language Experience Reading program (Thorn, McCreary-Juhasz, Smith, Munroe, and Richmond, is a highly-structured, balanced, total language arts program, designed to operate in a small group context.

The Gage Language Experience Reading (LER) Program

This approach emphasizes the interrelatedness of listening,

speaking, reading, and writing. The authors of the program, like Huey, define reading as "thought-getting" (LER Teacher's Source Book, Level 2, 1966). Listening and speaking skills receive initial attention because these are partially developed when most children enter first grade. Reading and writing are introduced as natural extensions of the child's early language development. Children are encouraged to listen, react, and build skills on previously learned patterns. The classroom should provide a wealth of experience to "stretch" the child's language and experience. The presence of peers who react, and with whom the child reacts, provides incentive. Ideas are clarified by developing oral language facility - the first step towards reading and writing.

Expected teaching procedures. The teacher at first acts as "secretary", as children organize and dictate their thoughts. Children recognize the relationship between the written and spoken word, and participate in the writing of compositions. These are read by the children, discussed, revised.

At the same time, the teacher directs the development of word recognition skills, so that the children can use them independently.

This introduction to reading develops positive attitudes - that reading is meaningful, interesting, and that it may be questioned. It serves two functions: to enrich and extend each pupil's experience, and to promote the use of oral and written language.

The program. Materials supplied for the Gage LER program provide much of the experiential content. They include the following:

Level One:	My Practice Book
	Teacher's Source Book
Level Two:	Just For Me, Stream A
	My Practice Book, Stream A
	For Me, Stream B
	My Practice Book, Stream B
	Teacher's Source Book
	24 reading unit pictures
Level Three:	Follow Me
	My Practice Book
	Teacher's Source Book

There are materials and books for Levels Four and Five, to be used in Grades Two and Three. Charts, pictures and related aids are also available.

Classroom organization. The Gage LER approach requires subdivision of classrooms after the first thirteen lessons into homogeneous groups based on sex, interests, or other criteria. Three, four, or more groups are recommended. Group membership may alter from lesson to lesson. It is recommended that instruction be differentiated between groups, by the materials used, and time allotted.

One problem associated with grouping is the tendency to

assume that the instructional needs of each group member are the same. The differentiated materials supplied by the Gage LER method do not alleviate this problem so it may become a procedural challenge for the individual teacher.

More able pupils progress quickly through the materials provided, or may omit entirely a particular level, or stream within a level.

Expected OSAPRL behaviors. The following comments were made by Elizabeth Thorn (personal communication, May, 1972) when asked to discuss the Gage LER program in terms of expected teacher-pupil OSAPRL categories:

> "It seems to me that the categories Dr. Browne has described are sufficiently broad to cover most situations which would arise in a reading lesson but I would expect a different emphasis in a language experience classroom.
>
> (i) Word perception solicitations: Since LER does not advocate teaching sight words before reading but suggests teachers direct pupils in the application of word perception skills as they read silently, you might expect a good deal of teacher direction of this kind.
>
> (ii) Extending reactions: Since the program stresses the importance of having children react to the ideas in terms of their own experiences, a good deal of teacher-pupil interaction directed to the development of ideas might be expected.
>
> (iii) Content response: I would expect many comments in which pupils use information from the selection as a starting point but apply it in developing their own ideas. (inferring, forming judgements, etc.) Would you categorize these contributions here?
>
> (iv) I would hope there would be no unison responses (or a minimum of these).
>
> (v) I would expect a good deal of silent reading.
>
> (vi) If the program is being used successfully, there should be a good deal of pupil-pupil interaction without each contribution being channelled through the teacher. For example, a teacher question may solicit a pupil response, a second pupil may extend that response, a third may offer an opposing view, a fourth may offer support for the first view and so on. The pupil reactions (except for the first) are not really unsolicited, but are not in response to a specific solicitation. Would these be categorized as #14? I think perhaps there is a difference between this behavior and the intent of #14."

Thorn et al. sums up the principles of the Gage LER:

1. Language is the symbolization (either oral or written) of ideas and the interpretation of these symbols.
2. Since ideas result from experience, language growth and conceptual

growth are concomitant.

3. Language is a single process with four closely related and interdependent facets - listening, speaking, writing, and reading.

   Because language is a unitary process it seems logical to develop an instructional program that recognizes this unity. To ensure that written language will be equally meaningful, opportunity must be provided for children to express their ideas orally, to observe the teacher as she records these ideas, and then to listen as she reads them (and eventually, of course, to read for themselves). In this way children may come to regard writing and reading as means of expressing and receiving ideas, just as earlier they learned to use speaking and listening for this purpose.

   It follows that the child with many ideas to express will develop greater skill. (Teacher's Source Book)

The Gage LER and OSAPRL categories. The sixteen categories of OSAPRL, and the activities anticipated in the Gage LER approach are discussed following.

Word perception (category 1), while taught as a technique in "thought getting", should be utilized as children learn left-to-right eye movement, build vocabulary, and are taught how to use context clues, structural analysis, and phonetic analysis. While children oral read, or when they interpret what they have read silently, the teacher may direct their attention to word perception skills.

Since the Gage LER program emphasizes a "meaning" approach to reading, comprehension (category 2) solicitations would be expected to occur frequently.

Thorn (personal correspondence) anticipated a high degree of Silent reading (category 13) response to Silent reading (category 3) solicitations. Whether this takes place frequently at the grade one level may depend upon prior reading accomplishments of pupils, and time of school year.

Oral reading (also category 3), a conventional activity in reading classes might be expected to occur frequently since teachers use this procedure for diagnostic purposes. Depending upon the established practices in the classroom, this may be a unison, or an individual activity.

The "Other" (category 4) solicitation could include such requests as "listen", "draw", "act out", which skills indirectly reflect reading comprehension, but do not require verbal response. Therefore, some entries in this category should be expected.

Non-soliciting (category 5) statements, which give pupils general directions in reading, form a necessary part of the structuring of most lessons. Examples are suggested in the Teacher's Source Book for initiating a topic.

Non-reading (category 6) statements are a necessary part of classroom organization and may occur during a reading lesson. These may consist of directives from school administrators, health services, etc. It is expected that such non-reading activities be minimal in a well-organized school.

Because of the importance of "feedback" to the pupil, Confir-

mation (category 7), Extension (category 8), and Corrective (category 9) - categories assume great importance. Thorn (1969) remarked on the necessity of teacher direction, and the selection of passages which are not beyond the capacity of the children. Therefore, it would be expected that categories 7 and 8 should be well-utilized in the clearly interpreted Gage LER program, and that entries in category 9 would be minimal and of a constructive nature. Suggestions are made throughout the Teacher's Source Book which may help teachers structure activities promoting pupil extension of ideas, for example, the "open-ended" sentence for the pupil to complete. On the other hand, teachers are cautioned against pushing the child into reading more than he can do readily since this would result in frustration.

Among the response categories, Content (category 10) should be well-utilized since children will be expected to extract meaning from the content of the reader. Reproduction of content, verbatim, may precede pupil Self-expression (category 11). Thorn states that "reading experience should frequently be a stimulus to further language activity." Language experience charts, produced by the children, provide opportunities for pupil Self-expression (category 11), Content (category 10), Oral reading (category 12), Silent reading (category 13). Pupil initiating (category 15) behavior occurring frequently may indicate a particular classroom climate in which pupils are allowed delegated authority, and feel free to reveal themselves.

Silence or confusion (category 16) covers diverse activities including activity-changes, group activity - which may appear to be confusion, and the silence of mediation. It might be expected to be a well-utilized category requiring additional clarification with anecdotal notes.

It is anticipated that the Gage LER program will utilize all OSAPRL categories, but that the degree of individual category utilization may be dependent upon other variables including lesson type, institutional and classroom organization, teacher and pupil idiosyncracies.

APPENDIX B

THE FLANDERS INTERACTION

CATEGORIES

THE FLANDERS INTERACTION ANALYSIS SYSTEM CATEGORIES

Teacher 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 and 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 "uh huh?" or "go on" are included.
		3. Accepts or uses ideas of student: clarifying building, or developing ideas or suggestions by a student. As teacher brings more of his own ideas into play, shift to category five.
		4. Asks questions: asking a question about content or procedure with the intent that a student answer.
	Direct influence	5. Lectures: giving facts or opinions about content or procedure; expressing his own idea; asking rhetorical questions.
		6. Gives directions: directions, commands, or orders with which a student is expected to comply.
		7. Criticizes or justifies authority: statements, intended to change student behavior from non-acceptable to acceptable pattern; bawling someone out; stating why the teacher is doing what he is doing, extreme self-reference.
Student talk		8. Student talk-response: talk by students in response to teacher. Teacher initiates the contact or solicits student statement.
		9. Student talk-initiation: talk by students, which they initiate. If "calling on" student is only to indicate who may talk next, observer must decide whether student wanted to talk. If he did, use this category.
		10. Silence or confusion: pauses, short periods of silence, and periods of confusion in which communication cannot be understood by the observer.

APPENDIX C

THE OBSERVATIONAL SYSTEM FOR THE ANALYSIS OF PRIMARY READING LESSONS (OSAPRL) GROUND RULES

THE OBSERVATIONAL SYSTEM FOR THE ANALYSIS OF PRIMARY READING LESSONS(OSAPRL)*

Rule 1. When in doubt about the category corresponding to the observed behavior, the observer should choose the category which will provide the greatest amount of information. In terms of the solicitations for example, the "other" category (4) should only be used when the behavior is clearly not in the areas of Word perception (1) Comprehension (2) or Oral reading (3). The oral reading category should be used only when it is clear that the intention of the oral reading is not clear.

Rule 2. If there is any doubt about the purpose of the oral reading solicitation being made explicit, the oral reading solicitation category (3) should be used. The rationale here is that if the observer is unsure of the purpose of the solicitation calling for an oral reading response, then it would not be unlikely that the pupils may be uncertain as well.

Rule 3. In deciding upon a confirming reaction (7), an extending reaction (8), or the corrective reaction (9), the observer, while not attempting to second guess the teacher's intentions, should consider how the pupil might perceive the reaction, and categorize it from that point of view.

Rule 4. If there is doubt regarding the content-centered responses compared with the self-expression response, the content-centered category should be used.

Rule 5. Some unison responses may be close to confusion in that a number of pupils seem to be calling out different answers. If the different responses are clearly audible and relate to the solicitation then the unison response category (14) should be recorded and not a category 16 for silence and confusion.

Rule 6. Each change in behavior should be recorded regardless of the three second interval.

Rule 7. Pupil initiated behaviors which are corrective of a peer should be recorded as a 15 (Pupil initiating behavior). Where the teacher and a pupil respond correctively to the reader at the same time, the pupil behavior should be recorded. If the teacher extends the corrective reaction beyond the first behavior a Category 16 should be inserted between the pupil corrective behavior and the teacher's extended reaction. The following sequence shows this more clearly.

	Observed behavior	Category
(1)	pupil is reading aloud and makes a miscue	12
(2)	peer and teacher correct	15
(3)	conventional 16	16
(4)	teacher continues to correct (3 sec.)	9

Rule 8. If a pupil hesitates in reading orally for longer than three seconds before he self-corrects or is corrected, a Category 13 (Silent reading) should be recorded. The rationale for this is that the pupil may be reading silently in order to correct himself.

Rule 9. If a pupil's initiating behavior is ignored by the teacher in that the teacher launches into another behavior, a Category 16 should b recorded between the pupil's initiating attempts and the teacher's next observed behavior. By inserting the 16, the build up in the 14-16 cell in the matrix will show how pupils' unsolicited contributions are received.

*Ground rules

APPENDIX D

AN OPTICAL SCORE SHEET

NAME ..... TODAY'S DATE ..... 196 .....
Last First Middle Day Mo. Yr

A-2

SCHOOL ..... GRADE .....

STUDENT NUMBER

NAME OF TEST .....

Indicate answer by placing a mark between the guidelines as shown in the example. Use HB pencil.

Example

AGE.....(Yrs.) MALE FEMALE

A I B 2 C 3 D 4 E 5

PART 1

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70	71	72	73	74	75
76	77	78	79	80	81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100	101	102	103	104	105
106	107	108	109	110	111	112	113	114	115	116	117	118	119	120
121	122	123	124	125	126	127	128	129	130	131	132	133	134	135
136	137	138	139	140										

PART 2

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15					

A I B 2 C 3 D 4 E 5 F 6 G 7 H 8 I 9 J 10

DEPARTMENT OF EDUCATION GENERAL PURPOSE ANSWER SHEET I

201214

IBM 5056

CAUTION — AVOID PLACING ANY MARKS AMONG THE BLACK TIMING LINES

APPENDIX E

ACTUAL MATRICES USED IN THIS STUDY

Class 1-Total Sample

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	SUM
1-	184	1	1	8	19	2	0	1	5	113	51	21	5	34	2	3	410
T	2.5	0.0	0.0	0.1	0.3	0.0	0.0	0.0	0.1	2.0	0.9	0.4	0.1	0.6	0.0	0.1	7.2
C	35.1	0.2	0.9	5.2	2.4	1.3	0.0	0.6	3.0	21.0	11.6	3.3	1.2	20.0	0.6	2.0	7.2
R	35.1	0.2	0.2	2.0	4.6	0.5	0.0	0.2	1.2	27.6	12.4	5.1	1.2	8.3	0.5	0.7	100.0
2-	8	169	1	0	12	0	0	0	6	142	78	18	23	12	2	2	469
T	0.1	3.0	0.0	0.0	0.2	0.0	0.0	0.0	0.1	2.5	1.4	0.3	0.4	0.2	0.0	0.0	8.2
C	1.0	36.0	0.9	0.0	1.5	0.0	0.0	0.0	3.7	26.4	17.7	2.9	5.3	7.1	0.6	1.3	8.2
R	0.9	36.0	0.2	0.0	2.6	0.0	0.0	0.0	1.3	30.3	16.6	3.8	4.9	2.6	0.4	0.4	100.0
3-	1	0	41	1	0	0	0	0	2	4	0	35	21	2	1	0	108
T	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.6	0.4	0.0	0.0	0.0	1.9
C	0.2	0.0	38.0	0.6	0.0	0.0	0.0	0.0	1.2	0.7	0.0	5.6	4.8	1.2	0.3	0.0	1.9
R	0.9	0.0	38.0	0.9	0.0	0.0	0.0	0.0	1.9	3.7	0.0	32.4	19.4	1.9	0.9	0.0	100.0
4-	9	5	2	89	12	1	0	0	2	9	15	6	1	1	1	1	154
T	0.2	0.1	0.0	1.6	0.2	0.0	0.0	0.0	0.0	0.2	0.3	0.1	0.0	0.0	0.0	0.0	2.7
C	2.2	1.1	1.9	57.8	1.5	0.7	0.0	0.0	1.2	1.7	3.4	1.0	0.2	0.6	0.3	0.7	2.7
R	5.8	3.2	1.3	57.8	7.8	0.6	0.0	0.0	1.3	5.8	9.7	3.9	0.6	0.6	0.6	0.6	100.0
5-	52	37	13	20	548	10	2	0	13	10	15	14	13	9	22	19	793
T	0.9	0.6	0.2	0.4	9.5	0.2	0.0	0.0	0.2	0.2	0.3	0.2	0.2	0.2	0.4	0.3	13.9
C	12.7	7.9	12.0	13.0	68.6	6.6	0.3	0.0	7.9	1.9	3.4	2.2	3.0	5.3	6.2	12.4	13.9
R	6.6	4.7	1.6	2.5	68.6	1.3	0.3	0.0	1.6	1.3	1.9	1.8	1.6	1.1	2.8	2.4	100.0
6-	4	5	1	4	4	114	0	0	3	0	0	2	2	0	4	8	151
T	0.1	0.1	0.0	0.1	0.1	2.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.1	2.7
C	1.0	1.1	0.9	2.6	0.5	75.5	0.0	0.0	1.8	0.0	0.0	0.3	0.5	0.0	1.1	5.2	2.7
R	2.6	3.3	0.7	2.6	2.6	75.5	0.0	0.0	2.0	0.0	0.0	1.3	1.3	0.0	2.6	5.3	100.0
7-	127	126	20	12	66	2	99	38	3	0	32	7	1	1	40	5	575
T	2.2	2.2	0.4	0.2	1.2	0.0	1.7	0.6	0.1	0.0	0.6	0.1	0.0	0.0	0.7	0.1	10.1
C	31.0	26.9	18.5	7.8	8.3	1.3	17.2	21.7	1.8	0.0	7.3	1.1	0.2	0.6	11.3	3.3	10.1
R	22.1	21.9	3.5	2.1	11.5	0.3	17.2	5.9	0.5	0.0	5.6	1.2	0.2	0.2	7.0	0.9	100.0
8-	4	4	0	0	8	0	1	63	1	38	23	0	7	1	4	3	157
T	0.1	0.1	0.0	0.0	0.1	0.0	0.0	1.1	0.0	0.7	0.4	0.0	0.1	0.0	0.1	0.1	2.8
C	1.0	0.9	0.0	0.0	1.0	0.0	0.2	40.1	0.6	7.1	5.2	0.0	1.6	0.6	1.1	2.0	2.8
R	2.5	2.5	0.0	0.0	5.1	0.0	0.6	40.1	0.6	24.2	14.6	0.0	4.5	0.6	2.5	1.9	100.0
9-	13	13	3	0	29	4	1	1	60	6	2	9	8	2	8	5	164
T	0.2	0.2	0.1	0.0	0.5	0.1	0.0	0.0	1.1	0.1	0.0	0.2	0.1	0.0	0.1	0.1	2.9
C	3.2	2.8	2.8	0.0	3.7	2.6	0.2	0.6	36.6	1.1	0.5	1.4	1.8	1.2	2.3	3.3	2.9
R	7.9	7.9	1.8	0.0	17.7	2.4	0.6	0.6	36.6	3.7	1.2	5.5	4.9	1.2	4.9	3.0	100.0
10-	16	21	4	2	12	2	202	29	15	208	2	2	0	7	12	7	537
T	0.3	0.4	0.1	0.0	0.2	0.0	3.5	0.5	0.3	3.6	0.0	0.0	0.0	0.1	0.2	0.1	9.4
C	3.9	4.5	3.7	1.3	1.5	1.3	35.1	18.5	9.1	38.0	0.5	0.3	0.0	4.1	3.4	4.6	9.4
R	3.0	3.9	0.7	0.4	2.2	0.4	37.6	5.4	2.8	38.0	0.4	0.4	0.0	1.3	2.2	1.3	100.0
11-	10	15	3	1	8	0	130	18	10	1	217	0	1	3	16	4	440
T	0.2	0.3	0.0	0.0	0.1	0.0	2.3	0.3	0.2	0.0	3.8	0.0	0.0	0.1	0.3	0.1	7.7
C	2.4	3.2	1.9	0.6	1.0	0.0	22.6	11.5	8.5	0.2	49.3	0.0	0.2	1.8	4.5	2.6	7.7
R	2.3	3.4	0.5	0.2	1.8	0.0	29.5	4.1	3.2	0.2	49.3	0.0	0.2	0.7	3.6	0.9	100.0
12-	3	25	4	4	13	2	46	0	9	1	0	506	0	2	12	2	629
T	0.1	0.4	0.1	0.1	0.2	0.0	0.8	0.0	0.2	0.0	0.0	8.9	0.0	0.0	0.2	0.0	11.0
C	0.7	5.3	3.7	2.6	1.6	1.3	8.0	0.0	5.5	0.2	0.0	80.4	0.0	1.2	3.4	1.3	11.0
R	0.5	4.0	0.6	0.6	2.1	0.3	7.3	0.0	1.4	0.2	0.0	80.4	0.0	0.3	1.9	0.3	100.0
13-	3	21	8	2	9	5	6	3	8	2	0	2	351	1	11	2	438
T	0.1	0.4	0.1	0.0	0.2	0.1	0.1	0.1	0.1	0.0	0.0	0.0	6.2	0.0	0.2	0.0	7.6
C	0.7	4.5	7.4	1.3	1.1	3.3	1.0	1.9	4.9	0.4	0.0	0.3	80.9	0.6	3.1	1.3	7.6
R	0.7	4.8	1.8	0.5	2.1	1.2	1.4	0.7	1.8	0.5	0.0	0.5	80.9	0.2	2.5	0.5	100.0
14-	10	5	2	1	10	1	38	1	6	1	0	0	0	91	5	3	170
T	0.2	0.1	0.0	0.0	0.2	0.0	0.6	0.0	0.1	0.0	0.0	0.0	0.0	1.6	0.1	0.1	3.0
C	2.4	1.1	1.9	0.6	1.3	0.7	5.9	0.6	3.7	0.2	0.0	0.0	0.0	53.5	1.4	2.0	3.0
R	5.9	2.9	1.2	0.6	5.9	0.6	20.0	0.6	3.5	0.6	0.0	0.0	0.0	53.5	2.9	1.8	100.0
15-	3	17	5	7	28	0	51	4	10	1	2	4	0	2	202	18	354
T	0.1	0.3	0.1	0.1	0.5	0.0	0.9	0.1	0.2	0.0	0.0	0.1	0.0	0.0	3.5	0.3	6.2
C	0.7	3.6	4.6	4.5	3.5	0.0	8.9	2.5	6.1	0.2	0.5	0.6	0.0	1.2	57.1	11.8	6.2
R	0.8	4.8	1.4	2.0	7.9	0.0	14.4	1.1	2.8	0.3	0.6	1.1	0.0	0.6	57.1	5.1	100.0
16-	7	5	1	3	19	8	3	3	7	5	3	3	1	2	12	71	154
T	0.1	0.1	0.0	0.1	0.3	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.2	1.2	2.7
C	1.7	1.1	0.9	1.9	2.4	5.3	0.5	1.9	4.3	0.9	0.7	0.5	0.2	1.2	3.4	46.4	2.7
R	4.6	3.3	0.7	2.0	12.4	5.2	2.0	2.0	4.6	3.3	2.0	2.0	0.7	1.3	7.8	46.4	100.0
SUM	410	469	108	159	793	151	575	157	164	537	440	629	438	170	354	153	5698
T	7.2	8.2	1.9	2.7	13.9	2.7	10.1	2.8	2.9	9.4	7.7	11.0	7.6	3.0	6.2	2.7	100.0

Class 1-High Group

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	SUM
1-	50	0	0	7	14	0	0	1	2	89	4	1	2	2	0	2	174
T	2.3	0.0	0.0	0.3	0.6	0.0	0.0	0.0	0.1	4.1	0.2	0.0	0.1	0.1	0.0	0.1	8.0
C	28.7	0.0	0.0	9.0	4.3	0.0	0.0	1.1	3.2	25.6	2.5	6.7	1.3	7.7	0.0	3.0	8.0
R	28.7	0.0	0.0	4.0	8.0	0.0	0.0	0.6	1.1	51.1	2.3	0.6	1.1	1.1	0.0	1.1	100.0
2-	2	91	0	0	4	0	0	0	1	74	41	1	11	3	1	2	231
T	0.1	4.2	0.0	0.0	0.2	0.0	0.0	0.0	0.0	3.4	1.9	0.0	0.5	0.1	0.0	0.1	10.6
C	1.1	39.4	0.0	0.0	1.2	0.0	0.0	0.0	1.6	21.3	25.2	6.7	7.0	11.5	0.8	3.0	10.6
R	0.9	39.4	0.0	0.0	1.7	0.0	0.0	0.0	0.4	32.0	17.7	0.4	4.8	1.3	0.4	0.9	100.0
3-	1	0	9	1	0	0	0	0	0	0	0	0	5	1	0	0	17
T	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.8
C	0.6	0.0	52.9	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.2	3.8	0.0	0.0	0.8
R	5.9	0.0	52.9	5.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	29.4	5.9	0.0	0.0	100.0
4-	6	2	0	80	9	1	0	0	0	5	2	2	1	0	0	0	78
T	0.3	0.1	0.0	3.8	0.4	0.0	0.0	0.0	0.0	0.2	0.1	0.1	0.0	0.0	0.0	0.0	3.6
C	3.4	0.9	0.0	64.1	2.6	1.7	0.0	0.0	0.0	1.4	1.2	13.3	0.6	0.0	0.0	0.0	3.6
R	7.7	2.6	0.0	64.1	11.5	1.3	0.0	0.0	0.0	6.4	2.6	2.6	1.3	0.0	0.0	0.0	100.0
5-	27	16	3	7	221	6	1	0	8	8	8	0	1	1	7	9	323
T	1.2	0.7	0.1	0.3	10.1	0.3	0.0	0.0	0.4	0.4	0.4	0.0	0.0	0.0	0.3	0.4	14.8
C	15.5	6.9	17.6	9.0	68.4	10.3	0.4	0.0	12.7	2.3	4.9	0.0	0.6	3.8	5.5	13.4	14.8
R	8.4	5.0	0.9	2.2	68.4	1.9	0.3	0.0	2.5	2.5	2.5	0.0	0.3	0.3	2.2	2.8	100.0
6-	2	2	0	2	3	42	0	0	0	0	0	0	2	0	2	3	88
T	0.1	0.1	0.0	0.1	0.1	1.9	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.1	2.7
C	1.1	0.9	0.0	2.6	0.9	72.4	0.0	0.0	0.0	0.0	0.0	0.0	1.3	0.0	1.6	4.5	2.7
R	3.4	3.4	0.0	3.4	5.2	72.4	0.0	0.0	0.0	0.0	0.0	0.0	3.4	0.0	3.4	5.2	100.0
7-	58	68	1	4	28	1	33	24	0	0	14	0	0	1	18	3	244
T	2.5	3.0	0.0	0.2	1.1	0.0	1.5	1.1	0.0	0.0	0.6	0.0	0.0	0.0	0.8	0.1	11.2
C	31.6	28.1	5.9	5.1	7.7	1.7	13.5	26.4	0.0	0.0	8.6	0.0	0.0	3.8	14.1	4.5	11.2
R	22.5	26.6	0.4	1.6	10.2	0.4	13.5	9.8	0.0	0.0	5.7	0.0	0.0	0.4	7.4	1.2	100.0
8-	4	3	0	0	4	8	1	31	0	31	11	0	1	1	2	2	91
T	0.2	0.1	0.0	0.0	0.2	0.0	0.0	1.4	0.0	1.4	0.5	0.0	0.0	0.0	0.1	0.1	4.2
C	2.3	1.3	0.0	0.0	1.2	0.0	0.4	34.1	0.0	8.9	6.7	0.0	0.6	3.8	1.6	3.0	4.2
R	4.4	3.3	0.0	0.0	4.4	0.0	1.1	34.1	0.0	34.1	12.1	0.0	1.1	1.1	2.2	2.2	100.0
9-	6	4	0	0	14	1	0	0	22	4	1	0	4	0	5	2	63
T	0.3	0.2	0.0	0.0	0.6	0.0	0.0	0.0	1.0	0.2	0.0	0.0	0.2	0.0	0.2	0.1	2.9
C	3.4	1.7	0.8	0.8	4.3	1.7	0.0	0.0	34.9	1.1	0.6	0.0	2.5	0.0	3.9	3.0	2.9
R	9.5	6.3	0.0	0.0	22.2	1.6	0.0	0.0	34.9	6.3	1.6	0.0	6.3	0.0	7.9	3.2	100.0
10-	18	13	0	1	8	1	130	26	9	129	2	0	0	3	7	7	348
T	0.5	0.6	0.0	0.0	0.4	0.0	6.0	1.2	0.4	5.9	0.1	0.0	0.0	0.1	0.3	0.3	15.9
C	6.9	9.6	0.0	1.3	2.5	1.7	53.3	28.6	14.3	37.1	1.2	0.0	0.0	11.5	5.5	10.4	15.9
R	3.4	3.7	0.0	0.3	2.3	0.3	37.4	7.5	2.6	37.1	0.6	0.0	0.0	0.9	2.0	2.0	100.0
11-	0	8	1	0	0	0	52	6	10	0	79	0	1	0	5	1	163
T	0.0	0.4	0.0	0.0	0.0	0.0	2.4	0.3	0.5	0.0	3.6	0.0	0.0	0.0	0.2	0.0	7.5
C	0.0	3.8	5.9	0.0	0.0	0.0	21.3	6.6	15.9	0.0	48.5	0.0	0.6	0.0	3.9	1.5	7.5
R	0.0	4.9	0.6	0.0	0.0	0.0	31.9	3.7	6.1	0.0	48.5	0.0	0.6	0.0	3.1	0.6	100.0
12-	0	1	0	1	1	0	2	0	0	0	0	10	0	0	0	0	15
T	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.7
C	0.0	0.4	0.0	1.3	0.3	0.0	0.8	0.0	0.0	0.0	0.0	66.7	0.0	0.0	0.0	0.0	0.7
R	0.0	6.7	0.0	6.7	6.7	0.0	13.3	0.0	0.0	0.0	0.0	66.7	0.0	0.0	0.0	0.0	100.0
13-	1	10	0	2	2	3	0	0	3	1	0	0	130	0	6	0	158
T	0.0	0.5	0.0	0.1	0.1	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.3	0.0	7.2
C	0.6	4.3	0.0	2.6	0.6	5.2	0.0	0.0	4.8	0.3	0.0	0.0	82.3	0.0	4.7	0.0	7.2
R	0.6	6.3	0.0	1.3	1.3	1.9	0.0	0.0	1.9	0.6	0.0	0.0	82.3	0.0	3.8	0.0	100.0
14-	1	3	1	0	1	0	4	1	1	1	0	0	0	12	1	0	26
T	0.0	0.1	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	1.2
C	0.6	1.3	5.9	0.0	0.3	0.0	1.6	1.1	1.6	0.3	0.0	0.0	0.0	46.2	0.8	0.0	1.2
R	3.8	11.5	3.8	0.0	3.8	0.0	15.4	3.8	3.8	3.8	0.0	0.0	0.0	46.2	3.8	0.0	100.0
15-	2	10	1	1	7	0	19	1	4	1	1	1	0	2	69	9	128
T	0.1	0.5	0.0	0.0	0.3	0.0	0.9	0.0	0.2	0.0	0.0	0.0	0.0	0.1	3.2	0.4	5.9
C	1.1	4.3	5.9	1.3	2.2	0.0	7.8	1.1	6.3	0.3	0.6	6.7	0.0	7.7	53.9	13.4	5.9
R	1.6	7.8	0.8	0.8	5.5	0.0	14.8	0.8	3.1	0.8	0.8	0.8	0.0	1.6	53.9	7.0	100.0
16-	8	3	1	2	10	3	2	1	3	5	0	0	0	0	5	27	67
T	0.2	0.1	0.0	0.1	0.5	0.1	0.1	0.0	0.1	0.2	0.0	0.0	0.0	0.0	0.2	1.2	3.1
C	2.9	1.3	5.9	2.6	3.1	5.2	0.8	1.1	4.8	1.4	0.0	0.0	0.0	0.0	3.9	40.3	3.1
R	7.5	4.5	1.5	3.0	14.9	4.5	3.0	1.5	4.5	7.5	0.0	0.0	0.0	0.0	7.5	40.3	100.0
SUM	174	231	17	78	323	88	244	91	63	348	163	15	158	26	128	67	2184
T	8.0	10.6	0.8	3.6	14.8	4.0	11.2	4.2	2.9	15.9	7.5	0.7	7.2	1.2	5.9	3.1	100.0

Class 1-Average Group

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	SUM
1-	41	1	0	1	1	2	0	0	0	8	42	1	2	2	1	1	103
T	2.9	0.1	0.0	0.1	0.1	0.1	0.0	0.0	0.0	0.6	3.0	0.1	0.1	0.1	0.1	0.1	7.3
C	39.8	1.0	0.0	1.0	0.9	2.0	0.0	0.0	0.0	33.3	18.3	0.5	2.3	4.2	1.1	3.1	7.3
R	39.8	1.0	0.0	1.0	1.0	1.9	0.0	0.0	0.0	7.8	40.8	1.0	1.9	1.9	1.0	1.0	100.0
2-	1	19	1	0	3	0	0	0	1	9	24	2	2	4	1	0	67
T	0.1	1.3	0.1	0.0	0.2	0.0	0.0	0.0	0.1	0.6	1.7	0.1	0.1	0.3	0.1	0.0	4.8
C	1.0	28.4	2.9	0.0	2.6	0.0	0.0	0.0	2.7	37.5	10.4	1.0	2.3	8.3	1.1	0.0	6.8
R	1.5	28.4	1.5	0.0	4.5	0.0	0.0	0.0	1.5	13.4	35.8	3.0	3.0	6.0	1.5	0.0	100.0
3-	0	0	11	0	0	0	0	0	0	1	0	14	6	1	1	0	34
T	0.0	0.0	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	1.0	0.4	0.1	0.1	0.0	2.4
C	0.0	0.0	32.4	0.0	0.0	0.0	0.0	0.0	0.0	4.2	0.0	7.1	6.8	2.1	1.1	0.0	2.4
R	0.0	0.0	32.4	0.0	0.0	0.0	0.0	0.0	0.0	2.9	0.0	41.2	17.6	2.9	2.9	0.0	100.0
4-	2	0	2	33	3	0	0	0	2	1	13	2	0	0	1	0	59
T	0.1	0.0	0.1	2.3	0.2	0.0	0.0	0.0	0.1	0.1	0.9	0.1	0.0	0.0	0.1	0.0	4.2
C	1.9	0.0	5.9	55.9	2.6	0.0	0.0	0.0	5.4	4.2	5.7	1.0	0.0	0.0	1.1	0.0	4.2
R	3.4	0.0	3.4	55.9	5.1	0.0	0.0	0.0	3.4	1.7	22.0	3.4	0.0	0.0	1.7	0.0	100.0
5-	5	2	3	10	75	1	0	0	3	0	2	1	2	5	4	3	116
T	0.4	0.1	0.2	0.7	5.3	0.1	0.0	0.0	0.2	0.0	0.1	0.1	0.1	0.4	0.3	0.2	8.2
C	4.3	3.8	5.8	16.9	64.7	1.3	0.0	0.0	8.1	0.0	0.9	0.5	2.3	10.4	4.2	9.6	8.2
R	4.3	1.7	2.6	8.6	64.7	0.9	0.0	0.0	2.6	0.0	1.7	0.9	1.7	4.3	3.4	2.6	100.0
6-	1	0	1	1	1	64	0	0	3	0	0	1	0	0	0	4	76
T	0.1	0.0	0.1	0.1	0.1	4.5	0.0	0.0	0.2	0.0	0.0	0.1	0.0	0.0	0.0	0.3	5.4
C	1.0	0.0	2.9	1.7	0.9	84.2	0.0	0.0	8.1	0.0	0.0	0.5	0.0	0.0	0.0	12.5	5.4
R	1.3	0.0	1.3	1.3	1.3	84.2	0.0	0.0	3.9	0.0	0.0	1.3	0.0	0.0	0.0	5.3	100.0
7-	38	22	8	6	14	0	31	2	0	0	17	3	1	0	14	0	156
T	2.7	1.6	0.6	0.4	1.0	0.0	2.2	0.1	0.0	0.0	1.2	0.2	0.1	0.0	1.0	0.0	11.1
C	36.9	32.8	23.5	10.2	12.1	0.0	19.9	4.2	0.0	0.0	7.4	1.5	1.1	0.0	14.7	0.0	11.1
R	24.4	14.1	5.1	3.8	9.0	0.0	19.9	1.3	0.0	0.0	10.9	1.9	0.6	0.0	9.0	0.0	100.0
8-	0	1	0	0	2	0	0	28	1	0	12	0	1	0	2	1	48
T	0.0	0.1	0.0	0.0	0.1	0.0	0.0	2.0	0.1	0.0	0.9	0.0	0.1	0.0	0.1	0.1	3.4
C	0.0	1.5	0.0	0.0	1.7	0.0	0.0	58.3	2.7	0.0	5.2	0.0	1.1	0.0	2.1	3.1	3.4
R	0.0	2.1	0.0	0.0	4.2	0.0	0.0	58.3	2.1	0.0	25.0	0.0	2.1	0.0	4.2	2.1	100.0
9-	2	3	1	0	3	2	0	1	18	0	1	4	1	0	0	1	37
T	0.1	0.2	0.1	0.0	0.2	0.1	0.0	0.1	1.3	0.0	0.1	0.3	0.1	0.0	0.0	0.1	2.6
C	1.9	4.5	2.9	0.0	2.6	2.6	0.0	2.1	48.6	0.0	0.4	2.0	1.1	0.0	0.0	3.1	2.6
R	5.4	8.1	2.7	0.0	8.1	5.4	0.0	2.7	48.6	0.0	2.7	10.8	2.7	0.0	0.0	2.7	100.0
10-	0	0	0	0	0	0	18	1	0	5	0	0	0	0	0	0	24
T	0.0	0.0	0.0	0.0	0.0	0.0	1.3	0.1	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	1.7
C	0.0	0.0	0.0	0.0	0.0	0.0	11.5	2.1	0.0	20.8	0.0	0.0	0.0	0.0	0.0	0.0	1.7
R	0.0	0.0	0.0	0.0	0.0	0.0	75.0	4.2	0.0	20.8	0.0	0.0	0.0	0.0	0.0	0.0	100.0
11-	9	5	0	1	2	0	68	12	3	0	115	0	0	2	10	3	230
T	0.6	0.4	0.0	0.1	0.1	0.0	4.8	0.9	0.2	0.0	8.2	0.0	0.0	0.1	0.7	0.2	16.3
C	8.7	7.5	0.0	1.7	1.7	0.0	43.6	25.0	8.1	0.0	50.0	0.0	0.0	8.2	19.5	9.6	16.3
R	3.9	2.2	0.0	0.4	0.9	0.0	29.6	5.2	1.3	0.0	50.0	0.0	0.0	0.9	4.3	1.3	100.0
12-	0	6	0	1	0	1	16	0	2	0	0	164	0	1	2	1	196
T	0.0	0.4	0.0	0.1	0.0	0.1	1.1	0.0	0.1	0.0	0.0	11.8	0.0	0.1	0.1	0.1	13.9
C	0.0	9.0	0.0	1.7	0.0	1.3	10.3	0.0	5.4	0.0	0.0	84.7	0.0	2.1	2.1	3.1	13.9
R	0.0	3.1	0.0	0.5	0.0	0.5	8.2	0.0	1.0	0.0	0.0	84.7	0.0	0.5	1.0	0.5	100.0
13-	1	4	4	0	0	1	3	0	1	0	0	0	73	0	1	0	88
T	0.1	0.3	0.3	0.0	0.0	0.1	0.2	0.0	0.1	0.0	0.0	0.0	5.2	0.0	0.1	0.0	6.2
C	1.0	6.0	11.8	0.0	0.0	1.3	1.9	0.0	2.7	0.0	0.0	0.0	83.0	0.0	1.1	0.0	6.2
R	1.1	4.5	4.5	0.0	0.0	1.1	3.4	0.0	1.1	0.0	0.0	0.0	83.0	0.0	1.1	0.0	100.0
14-	2	0	0	1	6	1	2	0	2	0	0	0	0	33	1	0	48
T	0.1	0.0	0.0	0.1	0.4	0.1	0.1	0.0	0.1	0.0	0.0	0.0	0.0	2.3	0.1	0.0	3.4
C	1.9	0.0	0.0	1.7	5.2	1.3	1.3	0.0	5.4	0.0	0.0	0.0	0.0	68.8	1.1	0.0	3.4
R	4.2	0.0	0.0	2.1	12.5	2.1	4.2	0.0	4.2	0.0	0.0	0.0	0.0	68.8	2.1	0.0	100.0
15-	0	4	3	4	3	0	18	3	1	0	1	1	0	0	54	3	95
T	0.0	0.3	0.2	0.3	0.2	0.0	1.3	0.2	0.1	0.0	0.1	0.1	0.0	0.0	3.8	0.2	6.7
C	0.0	6.0	8.8	6.8	2.6	0.0	11.5	6.2	2.7	0.0	0.4	0.5	0.0	0.0	56.8	9.4	6.7
R	0.0	4.2	3.2	4.2	3.2	0.0	18.9	3.2	1.1	0.0	1.1	1.1	0.0	0.0	56.8	3.2	100.0
16-	1	0	0	1	3	4	0	1	0	0	3	1	0	0	3	15	32
T	0.1	0.0	0.0	0.1	0.2	0.3	0.0	0.1	0.0	0.0	0.2	0.1	0.0	0.0	0.2	1.1	2.3
C	1.0	0.0	0.0	1.7	2.6	5.3	0.0	2.1	0.0	0.0	1.3	0.5	0.0	0.0	3.2	46.9	2.3
R	3.1	0.0	0.0	3.1	9.4	12.5	0.0	3.1	0.0	0.0	9.4	3.1	0.0	0.0	9.4	46.9	100.0
SUM	103	67	34	59	116	76	156	48	37	24	230	196	88	48	95	32	1409
T	7.3	4.8	2.4	4.2	8.2	5.4	11.1	3.4	2.6	1.7	16.3	13.9	6.2	3.4	6.7	2.3	100.0

Class 1-Low Group

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	SUM
1-	53	0	1	0	4	0	0	0	3	16	5	19	1	30	1	0	133
T	2.5	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.1	0.8	0.2	0.9	0.0	1.4	0.0	0.0	6.3
C	39.8	0.0	1.6	0.0	1.1	0.0	0.0	0.0	4.7	9.7	10.6	4.5	0.5	31.3	0.8	0.0	6.3
R	39.8	0.0	0.8	0.0	3.0	0.0	0.0	0.0	2.3	12.0	3.8	14.3	0.8	22.6	0.8	0.0	100.0
2-	1	59	0	0	5	0	0	0	4	59	13	15	10	5	0	0	171
T	0.0	2.8	0.0	0.0	0.2	0.0	0.0	0.0	0.2	2.8	0.6	0.7	0.5	0.2	0.0	0.0	8.1
C	0.8	34.5	0.0	0.0	1.4	0.0	0.0	0.0	6.2	35.8	27.7	3.6	5.3	5.2	0.0	0.0	8.1
R	0.6	34.5	0.0	0.0	2.9	0.0	0.0	0.0	2.3	34.5	7.6	8.8	5.8	2.9	0.0	0.0	100.0
3-	0	0	21	0	0	0	0	0	2	3	0	21	10	0	0	0	57
T	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	1.0	0.5	0.0	0.0	0.0	2.7
C	0.0	0.0	36.8	0.0	0.0	0.0	0.0	0.0	3.1	1.8	0.0	5.0	5.3	0.0	0.0	0.0	2.7
R	0.0	0.0	36.8	0.0	0.0	0.0	0.0	0.0	3.5	5.3	0.0	36.8	17.5	0.0	0.0	0.0	100.0
4-	1	3	0	6	0	0	0	0	0	3	0	2	0	1	0	1	17
T	0.0	0.1	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.8
C	0.8	1.8	0.0	35.3	0.0	0.0	0.0	0.0	0.0	1.8	0.0	0.5	0.0	1.0	0.0	1.9	0.8
R	5.9	17.6	0.0	35.3	0.0	0.0	0.0	0.0	0.0	17.6	0.0	11.8	0.0	5.9	0.0	5.9	100.0
5-	20	19	7	3	248	3	1	0	2	2	5	13	10	3	11	7	354
T	1.0	0.9	0.3	0.1	11.8	0.1	0.0	0.0	0.1	0.1	0.2	0.6	0.5	0.1	0.5	0.3	16.8
C	15.0	11.1	12.3	17.6	70.1	17.6	0.6	0.0	3.1	1.2	10.6	3.1	5.3	3.1	8.4	13.0	16.8
R	5.6	5.4	2.0	0.8	70.1	0.8	0.3	0.0	0.6	0.6	1.4	3.7	2.8	0.8	3.1	2.0	100.0
6-	1	3	0	1	0	8	0	0	0	0	0	1	0	0	2	1	17
T	0.0	0.1	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.8
C	0.8	1.8	0.0	5.9	0.0	47.1	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	1.5	1.9	0.8
R	5.9	17.6	0.0	5.9	0.0	47.1	0.0	0.0	0.0	0.0	0.0	5.9	0.0	0.0	11.8	5.9	100.0
7-	38	39	11	2	27	1	35	8	3	0	1	4	0	0	8	2	175
T	1.6	1.8	0.5	0.1	1.3	0.0	1.7	0.4	0.1	0.0	0.0	0.2	0.0	0.0	0.4	0.1	8.3
C	25.6	22.8	19.3	11.8	7.6	5.9	20.0	44.4	4.7	0.0	2.1	1.0	0.0	0.0	6.1	3.7	8.3
R	19.4	22.3	6.3	1.1	15.4	0.6	20.0	4.6	1.7	0.0	0.6	2.3	0.0	0.0	4.6	1.1	100.0
8-	0	0	0	0	2	0	0	4	0	7	0	0	5	0	0	0	18
T	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.2	0.0	0.3	0.0	0.0	0.2	0.0	0.0	0.0	0.9
C	0.0	0.0	0.0	0.0	0.6	0.0	0.0	22.2	0.0	4.2	0.0	0.0	2.7	0.0	0.0	0.0	0.9
R	0.0	0.0	0.0	0.0	11.1	0.0	0.0	22.2	0.0	38.9	0.0	0.0	27.8	0.0	0.0	0.0	100.0
9-	5	6	2	0	12	1	1	0	20	2	0	5	3	2	3	2	64
T	0.2	0.3	0.1	0.0	0.6	0.0	0.0	0.0	1.0	0.1	0.0	0.2	0.1	0.1	0.1	0.1	3.0
C	3.8	3.5	3.5	0.0	3.4	5.9	0.6	0.0	31.3	1.2	0.0	1.2	1.6	2.1	2.3	3.7	3.0
R	7.8	9.4	3.1	0.0	18.8	1.6	1.6	0.0	31.3	3.1	0.0	7.8	4.7	3.1	4.7	3.1	100.0
10-	4	8	4	1	5	1	54	2	6	70	0	2	0	4	5	0	165
T	0.2	0.4	0.2	0.0	0.2	0.0	2.6	0.1	0.3	3.3	0.0	0.1	0.0	0.2	0.2	0.0	7.8
C	3.0	4.7	7.0	5.9	1.1	5.9	30.9	11.1	9.4	42.4	0.0	0.5	0.0	4.2	3.8	0.0	7.8
R	2.4	4.8	2.4	0.6	2.4	0.6	32.7	1.2	3.6	42.4	0.0	1.2	0.0	2.4	3.0	0.0	100.0
11-	1	2	1	0	6	0	10	0	1	1	23	0	0	1	1	0	47
T	0.0	0.1	0.0	0.0	0.3	0.0	0.5	0.0	0.0	0.0	1.1	0.0	0.0	0.0	0.0	0.0	2.2
C	0.8	1.2	1.8	0.0	1.7	0.0	5.7	0.0	1.6	0.6	48.9	0.0	0.0	1.0	0.8	0.0	2.2
R	2.1	4.3	2.1	0.0	12.8	0.0	21.3	0.0	2.1	2.1	48.9	0.0	0.0	2.1	2.1	0.0	100.0
12-	3	18	4	2	12	1	28	0	7	1	0	330	0	1	10	1	418
T	0.1	0.9	0.2	0.1	0.6	0.0	1.3	0.0	0.3	0.0	0.0	15.7	0.0	0.0	0.5	0.0	19.9
C	2.3	10.5	7.0	11.8	3.4	5.9	16.0	0.0	10.9	0.6	0.0	78.9	0.0	1.0	7.6	1.9	19.9
R	0.7	4.3	1.0	0.5	2.9	0.2	6.7	0.0	1.7	0.2	0.0	78.9	0.0	0.2	2.4	0.2	100.0
13-	1	7	4	0	7	1	3	3	4	1	0	2	148	1	4	2	188
T	0.0	0.3	0.2	0.0	0.3	0.0	0.1	0.1	0.2	0.0	0.0	0.1	7.0	0.0	0.2	0.1	8.9
C	0.8	4.1	7.0	0.0	2.0	5.9	1.7	16.7	6.2	0.6	0.0	0.5	78.7	1.0	3.1	3.7	8.9
R	0.5	3.7	2.1	0.0	3.7	0.5	1.6	1.6	2.1	0.5	0.0	1.1	78.7	0.5	2.1	1.1	100.0
14-	7	2	1	0	3	0	28	0	3	0	0	0	0	46	3	3	96
T	0.3	0.1	0.0	0.0	0.1	0.0	1.3	0.0	0.1	0.0	0.0	0.0	0.0	2.2	0.1	0.1	4.6
C	5.3	1.2	1.8	0.0	0.8	0.0	16.0	0.0	4.7	0.0	0.0	0.0	0.0	47.9	2.3	5.6	4.6
R	7.3	2.1	1.0	0.0	3.1	0.0	29.2	0.0	3.1	0.0	0.0	0.0	0.0	47.9	3.1	3.1	100.0
15-	1	3	1	2	18	0	16	0	5	0	0	2	0	0	79	6	131
T	0.0	0.1	0.0	0.1	0.9	0.0	0.7	0.0	0.2	0.0	0.0	0.1	0.0	0.0	3.8	0.3	6.2
C	0.8	1.8	1.8	11.8	5.1	0.0	8.0	0.0	7.8	0.0	0.0	0.5	0.0	0.0	60.3	11.1	6.2
R	0.8	2.3	0.8	1.5	13.7	0.0	10.7	0.0	3.8	0.0	0.0	1.5	0.0	0.0	60.3	4.6	100.0
16-	1	2	0	0	6	1	1	1	4	0	0	2	1	2	4	29	54
T	0.0	0.1	0.0	0.0	0.3	0.0	0.0	0.0	0.2	0.0	0.0	0.1	0.0	0.1	0.2	1.4	2.6
C	0.8	1.2	0.0	0.0	1.7	5.9	0.6	5.6	6.2	0.0	0.0	0.5	0.5	2.1	3.1	53.7	2.6
R	1.9	3.7	0.0	0.0	11.1	1.9	1.9	1.9	7.4	0.0	0.0	3.7	1.9	3.7	7.4	53.7	100.0
SUM	133	171	57	17	354	17	175	18	64	165	47	418	188	96	131	54	2105
T	6.3	8.1	2.7	0.8	16.8	0.8	8.3	0.9	3.0	7.8	2.2	19.9	8.9	4.6	6.2	2.6	100.0

Class 2-Total Sample

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	SUM
1-	17	0	0	0	0	0	0	0	0	28	2	3	1	0	2	0	53
T	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.1	0.1	0.0	0.0	0.1	0.0	1.8
C	32.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.5	0.7	0.4	0.5	0.0	0.5	0.0	1.8
R	32.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	52.8	3.8	5.7	1.9	0.0	3.8	0.0	100.0
2-	0	49	0	1	3	0	0	0	0	64	25	3	4	15	0	0	164
T	0.0	1.7	0.0	0.0	0.1	0.0	0.0	0.0	0.0	2.2	0.8	0.1	0.1	0.5	0.0	0.0	5.5
C	0.0	29.9	0.0	1.2	1.8	0.0	0.0	0.0	0.0	28.0	9.0	0.4	2.1	45.5	0.0	0.0	5.5
R	0.0	29.9	0.0	0.6	1.8	0.0	0.0	0.0	0.0	39.0	15.2	1.8	2.4	9.1	0.0	0.0	100.0
3-	0	0	9	0	0	0	0	0	1	4	2	33	4	1	3	0	57
T	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	1.1	0.1	0.0	0.1	0.0	1.9
C	0.0	0.0	15.8	0.0	0.0	0.0	0.0	0.0	1.0	1.5	0.7	4.0	2.1	3.0	0.7	0.0	1.9
R	0.0	0.0	15.8	0.0	0.0	0.0	0.0	0.0	1.8	7.0	3.5	57.9	7.0	1.8	5.3	0.0	100.0
4-	0	2	2	32	2	0	0	0	0	4	36	3	0	2	1	1	86
T	0.0	0.1	0.1	1.1	0.1	0.0	0.0	0.0	0.0	0.1	1.2	0.1	0.0	0.1	0.0	0.0	2.9
C	0.0	1.2	3.5	38.4	1.2	0.0	0.0	0.0	0.0	1.5	13.0	0.4	0.0	6.1	0.2	1.4	2.9
R	0.0	2.3	2.3	38.4	2.3	0.0	0.0	0.0	0.0	4.7	41.9	3.5	0.0	2.3	1.2	1.2	100.0
5-	1	11	6	7	116	5	0	0	0	4	2	1	2	0	16	4	171
T	0.0	0.4	0.2	0.2	3.9	0.2	0.0	0.0	0.0	0.1	0.1	0.0	0.1	0.0	0.5	0.1	5.8
C	1.9	6.7	10.5	8.1	66.7	7.8	0.0	0.0	0.0	1.5	0.7	0.1	1.0	0.0	3.4	5.6	5.8
R	0.6	6.4	3.5	4.1	66.7	2.9	0.0	0.0	0.0	2.3	1.2	0.6	1.2	0.0	8.2	2.3	100.0
6-	1	0	0	3	3	43	0	0	2	0	0	3	1	0	3	5	64
T	0.0	0.0	0.0	0.1	0.1	1.4	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.1	0.2	2.2
C	1.9	0.0	0.0	3.5	1.8	67.2	0.0	0.0	1.9	0.0	0.0	0.4	0.5	0.0	0.7	7.0	2.2
R	1.6	0.0	0.0	4.7	4.7	67.2	0.0	0.0	3.1	0.0	0.0	4.7	1.6	0.0	4.7	7.8	100.0
7-	7	28	11	9	10	0	20	8	0	1	2	2	2	0	13	1	110
T	0.2	0.8	0.4	0.3	0.3	0.0	0.7	0.3	0.0	0.0	0.1	0.1	0.1	0.0	0.4	0.0	3.7
C	13.2	14.6	19.3	10.5	5.8	0.0	18.2	10.0	0.0	0.6	0.7	0.2	1.0	0.0	3.1	1.4	3.7
R	6.4	21.8	10.0	8.2	9.1	0.0	18.2	7.3	0.0	0.9	1.8	1.8	1.8	0.0	11.8	0.9	100.0
8-	2	4	2	1	5	0	1	32	0	10	11	2	0	1	9	0	80
T	0.1	0.1	0.1	0.0	0.2	0.0	0.0	1.1	0.0	0.3	0.4	0.1	0.0	0.0	0.3	0.0	2.7
C	3.8	2.4	3.5	1.2	2.9	0.0	0.9	40.0	0.0	3.7	4.0	0.2	0.0	3.0	2.2	0.0	2.7
R	2.5	5.0	2.5	1.2	6.2	0.0	1.2	40.0	0.0	12.5	13.7	2.5	0.0	1.2	11.2	0.0	100.0
9-	6	4	2	1	3	2	0	0	43	13	2	17	1	1	8	0	103
T	0.2	0.1	0.1	0.0	0.1	0.1	0.0	0.0	1.4	0.4	0.1	0.6	0.0	0.0	0.3	0.0	3.5
C	11.3	2.4	3.5	1.2	1.8	3.1	0.0	0.0	41.7	4.9	0.7	2.1	0.5	3.0	1.9	0.0	3.5
R	5.8	3.9	1.9	1.0	2.9	1.9	0.0	0.0	41.7	12.6	1.9	16.5	1.0	1.0	7.8	0.0	100.0
10-	4	17	3	3	5	1	38	12	22	132	0	1	2	1	18	6	267
T	0.2	0.6	0.1	0.1	0.2	0.0	1.3	0.4	0.7	4.6	0.0	0.0	0.1	0.0	0.6	0.2	9.0
C	11.3	10.4	5.3	3.5	2.9	1.6	36.5	15.0	21.4	49.4	0.0	0.1	1.0	3.0	4.3	4.5	9.0
R	2.2	6.4	1.1	1.1	1.9	0.4	14.2	4.5	8.2	49.4	0.0	0.4	0.7	0.4	6.7	2.2	100.0
11-	1	8	1	11	0	0	29	11	2	0	195	0	0	1	18	0	277
T	0.0	0.3	0.0	0.4	0.0	0.0	1.0	0.4	0.1	0.0	6.6	0.0	0.0	0.0	0.6	0.0	9.3
C	1.9	4.9	1.8	12.8	0.0	0.0	26.4	13.7	1.9	0.0	70.4	0.0	0.0	3.0	4.3	0.0	9.3
R	0.4	2.9	0.4	4.0	0.0	0.0	10.5	4.0	0.7	0.0	70.4	0.0	0.0	0.4	6.5	0.0	100.0
12-	3	11	6	2	3	5	8	2	18	0	0	733	12	0	16	3	822
T	0.1	0.4	0.2	0.1	0.1	0.2	0.3	0.1	0.6	0.0	0.0	24.7	0.4	0.0	0.5	0.1	27.7
C	5.7	6.7	10.5	2.3	1.8	7.8	7.3	2.5	17.5	0.0	0.0	89.2	6.2	0.0	3.8	4.2	27.7
R	0.4	1.3	0.7	0.2	0.4	0.6	1.0	0.2	2.2	0.0	0.0	89.2	1.5	0.0	1.9	0.4	100.0
13-	2	7	3	2	1	2	0	0	2	0	0	7	159	0	9	0	194
T	0.1	0.2	0.1	0.1	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.2	5.4	0.0	0.3	0.0	6.5
C	3.8	4.3	5.3	2.3	0.6	3.1	0.0	0.0	1.9	0.0	0.0	0.9	82.0	0.0	2.2	0.0	6.5
R	1.0	3.6	1.5	1.0	0.5	1.0	0.0	0.0	1.0	0.0	0.0	3.6	82.0	0.0	4.6	0.0	100.0
14-	2	12	0	0	1	1	1	2	1	1	0	1	0	10	1	0	33
T	0.1	0.4	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	1.1
C	3.8	7.3	0.0	0.0	0.6	1.6	0.9	2.5	1.0	0.4	0.0	0.1	0.0	30.3	0.2	0.0	1.1
R	6.1	36.4	0.0	0.0	3.0	3.0	3.0	6.1	3.0	3.0	0.0	3.0	0.0	30.3	3.0	0.0	100.0
15-	1	12	9	10	18	4	12	12	12	1	0	12	5	1	260	47	416
T	0.0	0.4	0.3	0.3	0.6	0.1	0.4	0.4	0.4	0.0	0.0	0.4	0.2	0.0	8.8	1.6	14.0
C	1.9	7.3	15.8	11.6	10.5	6.2	10.9	15.0	11.7	0.4	0.0	1.5	2.6	3.0	62.5	66.2	14.0
R	0.2	2.9	2.2	2.4	4.3	1.0	2.9	2.9	2.9	0.2	0.0	2.9	1.2	0.2	62.5	11.3	100.0
16-	4	3	3	3	3	1	1	1	0	5	0	1	1	0	41	4	71
T	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	1.4	0.1	2.4
C	7.5	1.8	5.3	3.5	1.8	1.6	0.9	1.2	0.0	1.9	0.0	0.1	0.5	0.0	9.9	5.6	2.4
R	5.6	4.2	4.2	4.2	4.2	1.4	1.4	1.4	0.0	7.0	0.0	1.4	1.4	0.0	57.7	5.6	100.0
SUM	53	168	57	86	171	68	110	80	103	267	277	822	198	33	416	71	2948
T	1.8	5.7	1.9	2.9	5.8	2.2	3.7	2.7	3.5	9.0	9.3	27.7	6.5	1.1	14.0	2.4	100.0

Class 2-High Group

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	SUM
1-	0	0	0	0	0	0	0	0	0	7	0	0	0	0	1	0	8
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.1	0.0	0.7
C	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.9	0.0	0.0	0.0	0.0	0.8	0.0	0.7
R	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	87.5	0.0	0.0	0.0	0.0	12.5	0.0	100.0
2-	0	22	0	0	1	0	0	0	0	39	7	0	3	14	0	0	86
T	0.0	2.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	3.7	0.7	0.0	0.3	1.3	0.0	0.0	8.1
C	0.0	28.6	0.0	0.0	1.1	0.0	0.0	0.0	0.0	27.1	5.9	0.0	2.8	82.4	0.0	0.0	8.1
R	0.0	25.6	0.0	0.0	1.2	0.0	0.0	0.0	0.0	45.3	8.1	0.0	3.5	16.3	0.0	0.0	100.0
3-	0	0	3	0	0	0	0	0	0	1	2	13	2	1	1	0	23
T	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	1.2	0.2	0.1	0.1	0.0	2.2
C	0.0	0.0	13.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	1.7	7.3	1.9	5.9	0.8	0.0	2.2
R	0.0	0.0	13.0	0.0	0.0	0.0	0.0	0.0	0.0	4.3	8.7	56.5	8.7	4.3	4.3	0.0	100.0
4-	0	1	1	9	1	0	0	0	0	0	5	0	0	0	0	0	17
T	0.0	0.1	0.1	0.8	0.1	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	1.6
C	0.0	1.2	4.3	52.9	1.1	0.0	0.0	0.0	0.0	0.0	4.2	0.0	0.0	0.0	0.0	0.0	1.6
R	0.0	5.9	5.9	52.9	5.9	0.0	0.0	0.0	0.0	0.0	29.4	0.0	0.0	0.0	0.0	0.0	100.0
5-	0	6	2	2	62	2	0	0	0	2	1	0	1	0	10	2	90
T	0.0	0.6	0.2	0.2	5.8	0.2	0.0	0.0	0.0	0.2	0.1	0.0	0.1	0.0	0.9	0.2	8.4
C	0.0	7.0	8.7	11.8	68.9	5.1	0.0	0.0	0.0	1.4	0.8	0.0	0.9	0.0	8.1	9.5	8.5
R	0.0	6.7	2.2	2.2	68.9	2.2	0.0	0.0	0.0	2.2	1.1	0.0	1.1	0.0	11.1	2.2	100.0
6-	0	0	0	0	3	31	0	0	1	0	0	0	1	0	1	2	39
T	0.0	0.0	0.0	0.0	0.3	2.9	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.1	0.2	3.7
C	0.0	0.0	0.0	0.0	3.3	79.5	0.0	0.0	5.0	0.0	0.0	0.0	0.9	0.0	0.8	9.5	3.7
R	0.0	0.0	0.0	0.0	7.7	79.5	0.0	0.0	2.6	0.0	0.0	0.0	2.6	0.0	2.6	5.1	100.0
7-	3	13	4	2	5	0	8	3	0	1	0	0	0	0	4	0	43
T	0.3	1.2	0.4	0.2	0.5	0.0	0.7	0.3	0.0	0.1	0.0	0.0	0.0	0.0	0.4	0.0	4.0
C	37.5	18.1	17.4	11.8	5.6	0.0	18.6	8.8	0.0	0.7	0.0	0.0	0.0	0.0	3.3	0.0	4.0
R	7.0	30.2	9.3	4.7	11.6	0.0	18.6	7.0	0.0	2.3	0.0	0.0	0.0	0.0	9.3	0.0	100.0
8-	2	1	2	0	3	0	1	14	0	7	2	0	0	0	2	0	34
T	0.2	0.1	0.2	0.0	0.3	0.0	0.1	1.3	0.0	0.7	0.2	0.0	0.0	0.0	0.2	0.0	3.2
C	25.0	1.2	8.7	0.0	3.3	0.0	2.3	41.2	0.0	4.9	1.7	0.0	0.0	0.0	1.6	0.0	3.2
R	5.9	2.9	5.9	0.0	8.8	0.0	2.9	41.2	0.0	20.6	5.9	0.0	0.0	0.0	5.9	0.0	100.0
9-	0	2	1	0	0	1	0	0	7	3	1	3	1	0	1	0	20
T	0.0	0.2	0.1	0.0	0.0	0.1	0.0	0.0	0.7	0.3	0.1	0.3	0.1	0.0	0.1	0.0	1.9
C	0.0	2.3	4.3	0.0	0.0	2.6	0.0	0.0	35.0	2.1	0.8	1.7	0.9	0.0	0.8	0.0	1.9
R	0.0	10.0	5.0	0.0	0.0	5.0	0.0	0.0	35.0	15.0	5.0	15.0	5.0	0.0	5.0	0.0	100.0
10-	2	11	0	2	1	0	22	7	5	79	0	0	0	0	10	5	144
T	0.2	1.0	0.0	0.2	0.1	0.0	2.1	0.7	0.5	7.6	0.0	0.0	0.0	0.0	0.9	0.5	13.8
C	25.0	12.8	0.0	11.8	1.1	0.0	51.2	20.6	25.0	54.9	0.0	0.0	0.0	0.0	8.1	23.8	13.8
R	1.4	7.6	0.0	1.4	0.7	0.0	15.3	4.9	3.5	54.9	0.0	0.0	0.0	0.0	6.9	3.5	100.0
11-	0	2	1	1	0	0	6	1	1	0	101	0	0	0	6	0	119
T	0.0	0.2	0.1	0.1	0.0	0.0	0.6	0.1	0.1	0.0	9.5	0.0	0.0	0.0	0.6	0.0	11.1
C	0.0	2.3	4.3	5.9	0.0	0.0	14.0	2.9	5.0	0.0	84.9	0.0	0.0	0.0	4.9	0.0	11.1
R	0.0	1.7	0.8	0.8	0.0	0.0	5.0	0.8	0.8	0.0	84.9	0.0	0.0	0.0	5.0	0.0	100.0
12-	0	2	2	1	0	2	3	0	4	0	0	158	0	0	4	1	177
T	0.0	0.2	0.2	0.1	0.0	0.2	0.3	0.0	0.4	0.0	0.0	14.8	0.0	0.0	0.4	0.1	16.6
C	0.0	2.3	8.7	5.9	0.0	8.1	7.0	0.0	20.0	0.0	0.0	89.3	0.0	0.0	3.3	4.8	16.6
R	0.0	1.1	1.1	0.6	0.0	1.1	1.7	0.0	2.3	0.0	0.0	89.3	0.0	0.0	2.3	0.6	100.0
13-	0	5	0	0	0	2	0	0	1	0	0	0	97	0	2	0	107
T	0.0	0.5	0.0	0.0	0.0	0.2	0.0	0.0	0.1	0.0	0.0	0.0	9.1	0.0	0.2	0.0	10.0
C	0.0	5.8	0.0	0.0	0.0	8.1	0.0	0.0	5.0	0.0	0.0	0.0	90.7	0.0	1.6	0.0	10.0
R	0.0	4.7	0.0	0.0	0.0	1.9	0.0	0.0	0.9	0.0	0.0	0.0	90.7	0.0	1.9	0.0	100.0
14-	0	12	0	0	1	0	0	1	0	0	0	1	0	2	0	0	17
T	0.0	1.1	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.2	0.0	0.0	1.6
C	0.0	14.0	0.0	0.0	1.1	0.0	0.0	2.9	0.0	0.0	0.0	0.6	0.0	11.8	0.0	0.0	1.6
R	0.0	70.6	0.0	0.0	5.9	0.0	0.0	5.9	0.0	0.0	0.0	5.9	0.0	11.8	0.0	0.0	100.0
15-	0	8	6	0	11	0	3	8	1	1	0	2	2	0	71	10	123
T	0.0	0.7	0.6	0.0	1.0	0.0	0.3	0.7	0.1	0.1	0.0	0.2	0.2	0.0	6.6	0.9	11.5
C	0.0	9.3	26.1	0.0	12.2	0.0	7.0	23.5	5.0	0.7	0.0	1.1	1.9	0.0	57.7	47.6	11.5
R	0.0	6.5	4.9	0.0	8.9	0.0	2.4	6.5	0.8	0.8	0.0	1.6	1.6	0.0	57.7	8.1	100.0
16-	1	1	1	0	2	1	0	0	0	4	0	0	0	0	10	1	21
T	0.1	0.1	0.1	0.0	0.2	0.1	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.9	0.1	2.0
C	12.5	1.2	4.3	0.0	2.2	2.6	0.0	0.0	0.0	2.8	0.0	0.0	0.0	0.0	8.1	4.8	2.0
R	4.8	4.8	4.8	0.0	9.5	4.8	0.0	0.0	0.0	19.0	0.0	0.0	0.0	0.0	47.6	4.8	100.0
SUM	8	86	23	17	90	39	43	34	20	144	119	177	107	17	123	21	1068
T	0.7	8.1	2.2	1.6	8.4	3.7	4.0	3.2	1.9	13.5	11.1	16.6	10.0	1.6	11.5	2.0	100.0

Class 2-Average Group

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	SUM
1-	3	0	0	0	0	0	0	0	0	9	2	3	0	0	1	0	18
T	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.1	0.2	0.0	0.0	0.1	0.0	1.2
C	16.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.9	1.3	0.7	0.0	0.0	0.4	0.0	1.2
R	16.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	50.0	11.1	16.7	0.0	0.0	5.6	0.0	100.0
2-	0	21	0	1	0	0	0	0	0	16	18	1	1	1	0	0	59
T	0.0	1.4	0.0	0.1	0.0	0.0	0.0	0.0	0.0	1.1	1.2	0.1	0.1	0.1	0.0	0.0	3.9
C	0.0	35.6	0.0	1.5	0.0	0.0	0.0	0.0	0.0	17.6	11.4	0.2	2.1	6.7	0.0	0.0	3.6
R	0.0	35.6	0.0	1.7	0.0	0.0	0.0	0.0	0.0	27.1	30.5	1.7	1.7	1.7	0.0	0.0	100.0
3-	0	0	5	0	0	0	0	0	1	2	0	11	1	0	1	0	21
T	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.7	0.1	0.0	0.1	0.0	1.4
C	0.0	0.0	23.8	0.0	0.0	0.0	0.0	0.0	1.6	2.2	0.0	2.4	2.1	0.0	0.4	0.0	1.4
R	0.0	0.0	23.8	0.0	0.0	0.0	0.0	0.0	4.8	9.5	0.0	52.4	4.8	0.0	4.8	0.0	100.0
4-	0	0	1	21	1	0	0	0	0	4	31	3	0	2	1	1	65
T	0.0	0.0	0.1	1.4	0.1	0.0	0.0	0.0	0.0	0.3	2.1	0.2	0.0	0.1	0.1	0.1	4.3
C	0.0	0.0	4.8	32.3	1.8	0.0	0.0	0.0	0.0	4.4	19.6	0.7	0.0	13.3	0.4	2.4	4.3
R	0.0	0.0	1.5	32.3	1.5	0.0	0.0	0.0	0.0	6.2	47.7	4.6	0.0	3.1	1.5	1.5	100.0
5-	0	2	3	4	38	1	0	0	0	1	1	1	0	0	4	1	56
T	0.0	0.1	0.2	0.3	2.5	0.1	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.3	0.1	3.7
C	0.0	3.4	14.3	6.2	67.9	5.0	0.0	0.0	0.0	1.1	0.6	0.2	0.0	0.0	1.4	2.6	3.7
R	0.0	3.6	5.4	7.1	67.9	1.8	0.0	0.0	0.0	1.8	1.8	1.8	0.0	0.0	7.1	1.8	100.0
6-	1	0	0	3	0	10	0	0	1	0	0	2	0	0	2	1	20
T	0.1	0.0	0.0	0.2	0.0	0.7	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.1	0.1	1.3
C	5.6	0.0	0.0	4.6	0.0	50.0	0.0	0.0	1.6	0.0	0.0	0.4	0.0	0.0	0.7	2.4	1.3
R	5.0	0.0	0.0	15.0	0.0	50.0	0.0	0.0	5.0	0.0	0.0	10.0	0.0	0.0	10.0	5.0	100.0
7-	3	11	2	7	4	0	12	5	0	0	2	1	2	0	9	0	58
T	0.2	0.7	0.1	0.5	0.3	0.0	0.8	0.3	0.0	0.0	0.1	0.1	0.1	0.0	0.6	0.0	3.9
C	16.7	18.6	9.5	10.8	7.1	0.0	20.7	10.9	0.0	0.0	1.3	0.2	4.2	0.0	3.2	0.0	3.9
R	5.2	19.0	3.4	12.1	6.9	0.0	20.7	8.6	0.0	0.0	3.4	1.7	3.4	0.0	15.5	0.0	100.0
8-	0	3	0	1	2	0	0	18	0	3	0	2	0	1	7	0	46
T	0.0	0.2	0.0	0.1	0.1	0.0	0.0	1.2	0.0	0.2	0.0	0.1	0.0	0.1	0.5	0.0	3.1
C	0.0	5.1	0.0	1.5	3.6	0.0	0.0	39.1	0.0	3.3	5.7	0.4	0.0	6.7	2.5	0.0	3.1
R	0.0	6.5	0.0	2.2	4.3	0.0	0.0	39.1	0.0	6.5	19.6	4.3	0.0	2.2	15.2	0.0	100.0
9-	4	2	1	1	2	1	0	0	31	5	1	5	0	1	7	0	61
T	0.3	0.1	0.1	0.1	0.1	0.1	0.0	0.0	2.1	0.3	0.1	0.3	0.0	0.1	0.5	0.0	4.1
C	22.2	3.4	4.8	1.5	3.6	5.0	0.0	0.0	50.8	5.6	0.6	1.1	0.0	6.7	2.5	0.0	4.1
R	6.6	3.3	1.6	1.6	3.3	1.6	0.0	0.0	50.8	8.2	1.6	8.2	0.0	1.6	11.5	0.0	100.0
10-	0	1	1	1	2	1	12	5	9	49	0	1	1	0	7	1	91
T	0.0	0.1	0.1	0.1	0.1	0.1	0.8	0.3	0.6	3.3	0.0	0.1	0.1	0.0	0.5	0.1	6.1
C	0.0	1.7	4.8	1.5	3.6	5.0	20.7	10.9	14.8	53.8	0.0	0.2	2.1	0.0	2.5	2.4	6.1
R	0.0	1.1	1.1	1.1	2.2	1.1	13.2	5.5	9.9	53.8	0.0	1.1	1.1	0.0	7.7	1.1	100.0
11-	1	6	0	10	0	0	23	10	1	0	94	0	0	1	12	0	158
T	0.1	0.4	0.0	0.7	0.0	0.0	1.5	0.7	0.1	0.0	6.3	0.0	0.0	0.1	0.8	0.0	10.6
C	5.6	10.2	0.0	15.4	0.0	0.0	39.7	21.7	1.6	0.0	59.5	0.0	0.0	8.7	8.2	0.0	10.6
R	0.6	3.8	0.0	6.3	0.0	0.0	14.6	6.3	0.6	0.0	59.5	0.0	0.0	0.6	7.6	0.0	100.0
12-	3	6	1	1	0	2	1	2	6	0	0	418	4	0	10	1	455
T	0.2	0.4	0.1	0.1	0.0	0.1	0.1	0.1	0.4	0.0	0.0	27.9	0.3	0.0	0.7	0.1	30.4
C	16.7	10.2	4.8	1.5	0.0	10.0	1.7	4.3	9.8	0.0	0.0	91.9	8.3	0.0	3.5	2.4	30.4
R	0.7	1.3	0.2	0.2	0.0	0.4	0.2	0.4	1.3	0.0	0.0	91.9	0.9	0.0	2.2	0.2	100.0
13-	0	1	3	2	0	0	0	0	0	0	0	1	35	0	6	0	48
T	0.0	0.1	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	2.3	0.0	0.4	0.0	3.2
C	0.0	1.7	14.3	3.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	72.9	0.0	2.1	0.0	3.2
R	0.0	2.1	6.2	4.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.1	72.9	0.0	12.5	0.0	100.0
14-	1	0	0	0	0	1	1	1	1	1	0	0	0	8	1	0	15
T	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.5	0.1	0.0	1.0
C	5.6	0.0	0.0	0.0	0.0	5.0	1.7	2.2	1.6	1.1	0.0	0.0	0.0	53.3	0.4	0.0	1.0
R	6.7	0.0	0.0	0.0	0.0	6.7	6.7	6.7	6.7	6.7	0.0	0.0	0.0	53.3	6.7	0.0	100.0
15-	1	4	3	10	7	4	8	4	11	0	0	6	3	1	184	37	283
T	0.1	0.3	0.2	0.7	0.5	0.3	0.5	0.3	0.7	0.0	0.0	0.4	0.2	0.1	12.3	2.5	18.9
C	5.6	6.8	14.3	15.4	12.5	20.0	13.8	8.7	18.0	0.0	0.0	1.3	8.2	6.7	69.0	88.1	18.9
R	0.4	1.4	1.1	3.5	2.5	1.4	2.8	1.4	3.9	0.0	0.0	2.1	1.1	0.4	65.0	13.1	100.0
16-	1	2	1	3	0	0	1	1	0	1	0	0	1	0	31	0	42
T	0.1	0.1	0.1	0.2	0.0	0.0	0.1	0.1	0.0	0.1	0.0	0.0	0.1	0.0	2.1	0.0	2.8
C	5.6	3.4	4.8	4.6	0.0	0.0	1.7	2.2	0.0	1.1	0.0	0.0	2.1	0.0	11.0	0.0	2.8
R	2.4	4.8	2.4	7.1	0.0	0.0	2.4	2.4	0.0	2.4	0.0	0.0	2.4	0.0	73.8	0.0	100.0
SUM	18	59	21	69	56	20	58	46	61	91	158	455	48	15	283	42	1496
T	1.2	3.9	1.4	4.3	3.7	1.3	3.9	3.1	4.1	6.1	10.6	30.4	3.2	1.0	18.9	2.8	100.0

Class 2-Low Group

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	SUM
1-	14	0	0	0	0	0	0	0	0	12	0	0	1	0	0	0	27
T	3.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	0.0	0.0	0.2	0.0	0.0	0.0	6.7
C	51.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	37.5	0.0	0.0	2.6	0.0	0.0	0.0	6.7
R	51.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	44.4	0.0	0.0	3.7	0.0	0.0	0.0	100.0
2-	0	6	0	0	2	0	0	0	0	9	0	2	0	0	0	0	19
T	0.0	1.5	0.0	0.0	0.5	0.0	0.0	0.0	0.0	2.2	0.0	0.5	0.0	0.0	0.0	0.0	4.7
C	0.0	31.6	0.0	0.0	8.0	0.0	0.0	0.0	0.0	28.1	0.0	1.1	0.0	0.0	0.0	0.0	100.0
R	0.0	31.6	0.0	0.0	10.5	0.0	0.0	0.0	0.0	47.4	0.0	10.5	0.0	0.0	0.0	0.0	100.0
3-	0	0	1	0	0	0	0	0	0	1	0	9	1	0	1	0	13
T	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	2.2	0.2	0.0	0.2	0.0	3.2
C	0.0	0.0	7.7	0.0	0.0	0.0	0.0	0.0	0.0	3.1	0.0	69.2	7.7	0.0	7.7	0.0	100.0
R	0.0	0.0	7.7	0.0	0.0	0.0	0.0	0.0	0.0	7.7	0.0	69.2	7.7	0.0	7.7	0.0	100.0
4-	0	1	0	3	0	0	0	0	0	0	0	0	0	0	0	0	4
T	0.0	0.2	0.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0
C	0.0	5.3	0.0	75.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
R	0.0	25.0	0.0	75.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
5-	1	3	1	1	14	2	0	0	0	1	0	0	1	0	0	1	25
T	0.2	0.7	0.2	0.2	3.5	0.5	0.0	0.0	0.0	0.2	0.0	0.0	0.2	0.0	0.0	0.2	6.2
C	3.7	15.8	7.7	25.0	56.0	40.0	0.0	0.0	0.0	4.0	0.0	0.0	4.0	0.0	0.0	4.0	100.0
R	4.0	12.0	4.0	4.0	56.0	8.0	0.0	0.0	0.0	4.0	0.0	0.0	4.0	0.0	0.0	4.0	100.0
6-	0	0	0	0	0	2	0	0	0	0	0	1	0	0	0	2	5
T	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.5	1.2
C	0.0	0.0	0.0	0.0	0.0	40.0	0.0	0.0	0.0	0.0	0.0	20.0	0.0	0.0	0.0	40.0	100.0
R	0.0	0.0	0.0	0.0	0.0	40.0	0.0	0.0	0.0	0.0	0.0	20.0	0.0	0.0	0.0	40.0	100.0
7-	1	0	5	0	1	0	0	0	0	0	0	1	0	0	0	1	9
T	0.2	0.0	1.2	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.2	2.2
C	3.7	0.0	38.5	0.0	4.0	0.0	0.0	0.0	0.0	0.0	0.0	11.1	0.0	0.0	0.0	12.5	2.2
R	11.1	0.0	55.6	0.0	11.1	0.0	0.0	0.0	0.0	0.0	0.0	11.1	0.0	0.0	0.0	11.1	100.0
8-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
C	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
R	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9-	2	0	0	0	1	0	0	0	5	5	0	9	0	0	0	0	22
T	0.5	0.0	0.0	0.0	0.2	0.0	0.0	0.0	1.2	1.2	0.0	2.2	0.0	0.0	0.0	0.0	5.4
C	7.4	0.0	0.0	0.0	4.0	0.0	0.0	0.0	22.7	15.6	0.0	40.9	0.0	0.0	0.0	0.0	100.0
R	9.1	0.0	0.0	0.0	4.5	0.0	0.0	0.0	22.7	22.7	0.0	40.9	0.0	0.0	0.0	0.0	100.0
10-	8	5	2	0	2	0	1	0	2	8	0	0	1	1	1	0	32
T	1.0	1.2	0.5	0.0	0.5	0.0	1.0	0.0	2.0	1.0	0.0	0.0	0.2	0.2	0.2	0.0	7.9
C	14.8	26.3	15.4	0.0	8.0	0.0	44.4	0.0	36.4	12.5	0.0	0.0	2.6	100.0	10.0	0.0	7.9
R	12.5	15.6	6.2	0.0	6.2	0.0	12.5	0.0	25.0	12.5	0.0	0.0	3.1	3.1	3.1	0.0	100.0
11-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
C	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
R	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12-	0	3	3	0	3	1	4	0	8	0	0	157	8	0	2	1	190
T	0.0	0.7	0.7	0.0	0.7	0.2	1.0	0.0	2.0	0.0	0.0	38.9	2.0	0.0	0.5	0.2	47.0
C	0.0	15.8	23.1	0.0	12.0	20.0	44.4	0.0	36.4	0.0	0.0	82.6	4.2	0.0	1.1	0.5	100.0
R	0.0	1.6	1.6	0.0	1.6	0.5	2.1	0.0	4.2	0.0	0.0	82.6	4.2	0.0	1.1	0.5	100.0
13-	2	1	0	0	1	0	0	0	1	0	0	6	27	0	1	0	39
T	0.5	0.2	0.0	0.0	0.2	0.0	0.0	0.0	0.2	0.0	0.0	1.5	6.7	0.0	0.2	0.0	9.7
C	7.4	5.3	0.0	0.0	4.0	0.0	0.0	0.0	4.5	0.0	0.0	15.4	69.2	0.0	2.6	0.0	100.0
R	5.1	2.6	0.0	0.0	2.6	0.0	0.0	0.0	2.6	0.0	0.0	15.4	69.2	0.0	2.6	0.0	100.0
14-	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
T	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2
C	3.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
R	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
15-	0	0	0	0	0	0	1	0	0	0	0	4	0	0	5	0	10
T	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	1.0	0.0	0.0	1.2	0.0	2.5
C	0.0	0.0	0.0	0.0	0.0	0.0	11.1	0.0	0.0	0.0	0.0	2.1	0.0	0.0	50.0	0.0	2.5
R	0.0	0.0	0.0	0.0	0.0	0.0	10.0	0.0	0.0	0.0	0.0	40.0	0.0	0.0	50.0	0.0	100.0
16-	2	0	1	0	1	0	0	0	0	0	0	1	0	0	0	3	8
T	0.5	0.0	0.2	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.7	2.0
C	7.4	0.0	7.7	0.0	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	37.5	2.0
R	25.0	0.0	12.5	0.0	12.5	0.0	0.0	0.0	0.0	0.0	0.0	12.5	0.0	0.0	0.0	37.5	100.0
SUM	27	19	13	4	25	5	9	0	22	32	0	190	39	1	10	8	404
T	6.7	4.7	3.2	1.0	6.2	1.2	2.2	0.0	5.4	7.9	0.0	47.0	9.7	0.2	2.5	2.0	100.0

Class 3-Total Sample

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	SUM
1-	70	3	0	8	7	0	0	0	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	5	4	8	238
T	1.7	0.1	0.0	0.2	0.2	0.0	0.0	0.0	0.1	2.5	0.4	0.3	0.0				
C	29.4	1.6	0.0	3.5	1.0	0.0	0.0	0.0	3.8	40.8	4.4	2.8	0.0	5.3	1.0	2.0	5.8
R	29.4	1.3	0.0	3.4	2.9	0.0	0.0	0.0	1.7	42.9	6.3	5.0	0.0	2.1	1.7	3.4	100.0
2-	1	72	0	4	7	3	0	0	3	31	35	19	1	4	2	4	186
T	0.0	1.7	0.0	0.1	0.2	0.1	0.0	0.0	0.1	0.8	0.8	0.5	0.0	0.1	0.0	0.1	4.5
C	0.4	38.7	0.0	1.8	1.0	1.0	0.0	0.0	2.9	12.4	10.4	4.4	0.9	4.3	0.5	1.0	4.5
R	0.5	38.7	0.0	2.2	3.8	1.6	0.0	0.0	1.6	16.7	18.8	10.2	0.5	2.2	1.1	2.2	100.0
3-	0	1	25	2	2	0	0	0	1	16	6	18	1	5	0	0	77
T	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.1	0.4	0.0	0.1	0.0	0.0	1.9
C	0.0	0.5	32.5	0.9	0.3	0.0	0.0	0.0	1.0	6.4	1.8	4.2	0.9	5.3	0.0	0.0	1.9
R	0.0	1.3	32.5	2.6	2.6	0.0	0.0	0.0	1.3	20.8	7.8	23.4	1.3	6.5	0.0	0.0	100.0
4-	1	7	4	120	8	2	0	0	2	21	39	5	1	6	6	5	227
T	0.0	0.2	0.1	2.9	0.2	0.0	0.0	0.0	0.0	0.5	0.9	0.1	0.0	0.1	0.1	0.1	5.5
C	0.4	3.8	5.2	52.9	1.2	0.7	0.0	0.0	1.9	8.4	11.5	1.2	0.9	6.4	1.4	1.2	5.5
R	0.4	3.1	1.8	52.9	3.5	0.9	0.0	0.0	0.9	9.3	17.2	2.2	0.4	2.6	2.6	2.2	100.0
5-	30	20	9	20	536	9	0	2	3	0	0	6	2	5	30	17	689
T	0.7	0.5	0.2	0.5	13.0	0.2	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.1	0.7	0.4	16.7
C	12.6	10.8	11.7	8.8	77.8	3.0	0.0	3.1	2.9	0.0	0.0	1.4	1.9	5.3	7.2	4.2	16.7
R	4.4	2.9	1.3	2.9	77.8	1.3	0.0	0.3	0.4	0.0	0.0	0.9	0.3	0.7	4.4	2.5	100.0
6-	2	4	1	5	17	243	1	0	2	0	0	0	0	1	10	12	298
T	0.0	0.1	0.0	0.1	0.4	5.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.3	7.2
C	0.8	2.2	1.3	2.2	2.5	81.5	0.5	0.0	1.9	0.0	0.0	0.0	0.0	1.1	2.4	3.0	7.2
R	0.7	1.3	0.3	1.7	5.7	81.5	0.3	0.0	0.7	0.0	0.0	0.0	0.0	0.3	3.4	4.0	100.0
7-	49	27	19	18	30	3	19	14	5	6	2	3	1	1	9	4	210
T	1.2	0.7	0.5	0.4	0.7	0.1	0.5	0.3	0.1	0.1	0.0	0.1	0.0	0.0	0.2	0.1	5.1
C	20.6	14.5	24.7	7.9	4.4	1.0	9.0	21.5	4.8	2.4	0.6	0.7	0.9	1.1	2.2	1.0	5.1
R	23.3	12.9	9.0	8.6	14.3	1.4	9.0	6.7	2.4	2.9	1.0	1.4	0.5	0.5	4.3	1.9	100.0
8-	2	1	1	1	2	1	1	24	0	9	7	0	1	2	13	0	65
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.2	0.2	0.0	0.0	0.0	0.3	0.0	1.6
C	0.8	0.5	1.3	0.4	0.3	0.3	0.5	36.9	0.0	3.6	2.1	0.0	0.9	2.1	3.1	0.0	1.6
R	3.1	1.5	1.5	1.5	3.1	1.5	1.5	36.9	0.0	13.8	10.8	0.0	1.5	3.1	20.0	0.0	100.0
9-	8	10	3	2	7	4	1	1	47	3	7	1	1	0	8	1	104
T	0.2	0.2	0.1	0.0	0.2	0.1	0.0	0.0	1.1	0.1	0.2	0.0	0.0	0.0	0.2	0.0	2.5
C	3.4	5.4	3.9	0.9	1.0	1.3	0.5	1.5	45.2	1.2	2.1	0.2	0.9	0.0	1.9	0.2	2.5
R	7.7	9.6	2.9	1.9	6.7	3.8	1.0	1.0	45.2	2.9	6.7	1.0	1.0	0.0	7.7	1.0	100.0
10-	45	9	1	3	7	3	110	4	6	47	0	1	0	1	9	4	250
T	1.1	0.2	0.0	0.1	0.2	0.1	2.7	0.1	0.1	1.1	0.0	0.0	0.0	0.0	0.2	0.1	6.0
C	18.9	4.8	1.3	1.3	1.0	1.0	52.4	6.2	5.8	18.8	0.0	0.2	0.0	1.1	2.2	1.0	6.0
R	18.0	3.6	0.4	1.2	2.8	1.2	44.0	1.6	2.4	18.8	0.0	0.4	0.0	0.4	3.6	1.6	100.0
11-	6	7	0	14	4	6	46	8	12	0	218	1	0	0	6	10	338
T	0.1	0.2	0.0	0.3	0.1	0.1	1.1	0.2	0.3	0.0	5.3	0.0	0.0	0.0	0.1	0.2	8.2
C	2.5	3.8	0.0	6.2	0.6	2.0	21.9	12.3	11.5	0.0	64.5	0.2	0.0	0.0	1.4	2.5	8.2
R	1.8	2.1	0.0	4.1	1.2	1.8	13.6	2.4	3.6	0.0	64.5	0.3	0.0	0.0	1.8	3.0	100.0
12-	4	7	5	11	6	1	18	1	1	1	0	363	2	0	5	6	431
T	0.1	0.2	0.1	0.3	0.1	0.0	0.4	0.0	0.0	0.0	0.0	8.8	0.0	0.0	0.1	0.1	10.4
C	1.7	3.8	6.5	4.8	0.9	0.3	8.6	1.5	1.0	0.4	0.0	84.2	1.9	0.0	1.2	1.5	10.4
R	0.9	1.6	1.2	2.6	1.4	0.2	4.2	0.2	0.2	0.2	0.0	84.2	0.5	0.0	1.2	1.4	100.0
13-	0	3	1	3	0	0	0	0	1	0	0	0	87	0	11	1	107
T	0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.1	0.0	0.3	0.0	2.6
C	0.0	1.6	1.3	1.3	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	81.3	0.0	2.6	0.2	2.6
R	0.0	2.8	0.9	2.8	0.0	0.0	0.0	0.0	0.9	0.0	0.0	0.0	81.3	0.0	10.3	0.9	100.0
14-	5	1	3	2	4	3	6	1	1	0	1	0	1	59	5	2	94
T	0.1	0.0	0.1	0.0	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	1.4	0.1	0.0	2.3
C	2.1	0.5	3.9	0.9	0.6	1.0	2.9	1.5	1.0	0.0	0.3	0.0	0.9	62.8	1.2	0.5	2.3
R	5.3	1.1	3.2	2.1	4.3	3.2	6.4	1.1	1.1	0.0	1.1	0.0	1.1	62.8	5.3	2.1	100.0
15-	5	7	1	9	35	8	7	10	13	3	3	1	8	5	219	84	418
T	0.1	0.2	0.0	0.2	0.8	0.2	0.2	0.2	0.3	0.1	0.1	0.0	0.2	0.1	5.3	2.0	10.1
C	2.1	3.8	1.3	4.0	5.1	2.7	3.3	15.4	12.5	1.2	0.9	0.2	7.5	5.3	52.4	20.9	10.1
R	1.2	1.7	0.2	2.2	8.4	1.9	1.7	2.4	3.1	0.7	0.7	0.2	1.9	1.2	52.4	20.1	100.0
16-	10	7	4	5	17	12	1	0	3	11	5	1	1	0	81	243	401
T	0.2	0.2	0.1	0.1	0.4	0.3	0.0	0.0	0.1	0.3	0.1	0.0	0.0	0.0	2.0	5.9	9.7
C	4.2	3.8	5.2	2.2	2.5	4.0	0.5	0.0	2.9	4.4	1.5	0.2	0.9	0.0	19.4	60.6	9.7
R	2.5	1.7	1.0	1.2	4.2	3.0	0.2	0.0	0.7	2.7	1.2	0.2	0.2	0.0	20.2	60.6	100.0
SUM	238	186	77	227	689	298	210	65	104	250	338	431	107	94	418	401	4133
T	5.8	4.5	1.9	5.5	16.7	7.2	5.1	1.6	2.5	6.0	8.2	10.4	2.6	2.3	10.1	9.7	100.0

Class 5-Combined High-Average Group

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	SUM
1-	41	2	0	6	6	0	0	0	3	79	10	8	0	4	2	8	169
R	1.7	0.1	0.0	0.2	0.2	0.0	0.0	0.0	0.1	3.2	0.4	0.3	0.0	0.2	0.1	0.3	7.0
C	24.3	1.4	0.0	4.4	1.4	0.0	0.0	0.0	5.2	40.5	5.3	4.3	0.0	5.3	1.0	3.6	7.0
B	24.3	1.2	0.0	3.6	3.6	0.0	0.0	0.0	1.8	46.7	5.9	4.7	0.0	2.4	1.2	4.7	100.0
2-	0	62	0	1	4	3	0	0	3	28	31	9	1	1	2	3	144
R	0.0	2.6	0.0	0.0	0.2	0.1	0.0	0.0	0.1	1.0	1.3	0.4	0.0	0.0	0.1	0.1	5.9
C	0.0	43.1	0.0	0.7	0.9	1.7	0.0	0.0	5.2	12.3	16.6	4.8	5.9	1.3	1.0	1.3	5.9
B	0.0	43.1	0.0	0.7	2.8	2.1	0.0	0.0	2.1	16.7	21.5	6.2	0.7	0.7	1.4	2.1	100.0
3-	0	0	16	1	1	0	0	0	1	13	6	5	0	4	0	0	47
R	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.2	0.2	0.0	0.2	0.0	0.0	1.9
C	0.0	0.0	34.0	0.7	0.2	0.0	0.0	0.0	1.7	6.7	3.2	2.7	0.0	5.3	0.0	0.0	1.9
B	0.0	0.0	34.0	2.1	2.1	0.0	0.0	0.0	2.1	27.7	12.8	10.6	0.0	8.5	0.0	0.0	100.0
4-	0	6	1	73	5	1	0	0	1	16	21	2	0	4	3	4	135
R	0.0	0.2	0.0	3.0	0.2	0.0	0.0	0.0	0.0	0.7	0.9	0.1	0.0	0.2	0.1	0.2	5.6
C	0.0	2.8	2.1	54.1	1.2	0.6	0.0	0.0	1.7	8.2	11.2	1.1	0.0	5.3	1.6	1.8	5.6
B	0.0	3.0	0.7	54.1	3.7	0.7	0.0	0.0	0.7	11.9	15.6	1.5	0.0	3.0	2.2	3.0	100.0
5-	21	17	3	13	348	5	0	1	2	0	0	1	1	4	8	13	433
R	0.9	0.7	0.1	0.5	14.2	0.2	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.2	0.3	0.5	17.8
C	12.4	11.8	6.4	9.6	79.4	2.9	0.0	2.6	3.4	0.0	0.0	0.5	5.9	5.3	4.2	5.8	17.8
B	4.8	3.9	0.7	3.0	79.4	1.2	0.0	0.2	0.5	0.0	0.0	0.2	0.2	0.9	1.8	3.0	100.0
6-	2	3	0	4	11	138	1	0	1	0	0	0	0	0	6	9	175
R	0.1	0.1	0.0	0.2	0.5	5.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.4	7.2
C	1.2	2.1	0.0	3.0	2.5	78.9	0.6	0.0	1.7	0.0	0.0	0.0	0.0	0.0	3.1	4.0	7.2
B	1.1	1.7	0.0	2.3	6.3	78.9	0.6	0.0	0.6	0.0	0.0	0.0	0.0	0.0	3.4	5.1	100.0
7-	32	24	15	9	22	3	15	11	4	4	2	3	1	1	8	1	155
R	1.3	1.0	0.6	0.4	0.9	0.1	0.6	0.5	0.2	0.2	0.1	0.1	0.0	0.0	0.3	0.0	6.4
C	18.9	16.7	31.9	6.7	5.1	1.7	9.7	28.2	6.9	2.1	1.1	1.6	5.9	1.3	4.2	0.4	6.4
B	20.6	15.5	9.7	5.8	14.2	1.9	9.7	7.1	2.6	2.6	1.3	1.9	0.6	0.6	5.2	0.6	100.0
8-	1	1	1	1	2	0	1	17	0	6	3	0	0	2	4	0	39
R	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.7	0.0	0.2	0.1	0.0	0.0	0.1	0.2	0.0	1.6
C	0.6	0.7	2.1	0.7	0.5	0.0	0.6	43.6	0.0	3.1	1.6	0.0	0.0	2.6	2.1	0.0	1.6
B	2.6	2.6	2.6	2.6	5.1	0.0	2.6	43.6	0.0	15.4	7.7	0.0	0.0	5.1	10.3	0.0	100.0
9-	5	7	2	1	5	1	1	1	25	2	0	1	0	0	4	1	58
R	0.2	0.3	0.1	0.0	0.2	0.1	0.0	0.0	1.0	0.1	0.0	0.0	0.0	0.0	0.2	0.0	2.4
C	3.0	4.9	4.3	0.7	1.2	1.7	0.6	2.6	43.1	1.0	0.0	0.5	0.0	0.0	2.1	0.4	2.4
B	8.6	12.1	3.4	1.7	8.6	5.2	1.7	1.7	43.1	3.4	0.0	1.7	0.0	0.0	6.9	1.7	100.0
10-	45	7	0	2	8	1	79	3	3	39	0	1	0	1	8	2	195
R	1.9	0.3	0.0	0.1	0.2	0.0	3.2	0.1	0.1	1.6	0.0	0.0	0.0	0.0	0.3	0.1	8.0
C	26.6	4.9	0.0	1.5	0.9	0.6	51.0	7.7	5.2	20.0	0.0	0.5	0.0	1.3	4.2	0.9	8.0
B	23.1	3.6	0.0	1.0	2.1	0.5	40.5	1.5	1.5	20.0	0.0	0.5	0.0	0.5	4.1	1.0	100.0
11-	4	4	0	8	3	3	38	3	5	0	108	0	0	0	4	7	187
R	0.2	0.2	0.0	0.3	0.1	0.1	1.6	0.1	0.2	0.0	4.6	0.0	0.0	0.0	0.2	0.3	7.7
C	2.0	2.8	0.0	5.9	0.7	1.7	24.5	7.7	8.6	0.0	57.8	0.0	0.0	0.0	2.1	3.1	7.7
B	2.1	2.1	0.0	4.3	1.6	1.6	20.3	1.6	2.7	0.0	57.8	0.0	0.0	0.0	2.1	3.7	100.0
12-	2	2	2	5	1	0	10	1	1	1	0	156	1	0	2	2	186
R	0.1	0.1	0.1	0.2	0.0	0.0	0.4	0.0	0.0	0.0	0.0	6.4	0.0	0.0	0.1	0.1	7.7
C	1.2	1.4	4.3	3.7	0.2	0.0	6.5	2.6	1.7	0.5	0.0	83.9	5.9	0.0	1.0	0.9	7.7
B	1.1	1.1	1.1	2.7	0.5	0.0	5.4	0.5	0.5	0.5	0.0	83.9	0.5	0.0	1.1	1.1	100.0
13-	0	1	0	1	0	0	0	0	1	0	0	0	13	0	1	0	17
R	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.7
C	0.0	0.7	0.0	0.7	0.0	0.0	0.0	0.0	1.7	0.0	0.0	0.0	76.5	0.0	0.5	0.0	0.7
B	0.0	5.9	0.0	5.9	0.0	0.0	0.0	0.0	5.9	0.0	0.0	0.0	76.5	0.0	5.9	0.0	100.0
14-	5	0	2	2	4	3	3	1	0	0	0	0	0	50	5	1	76
R	0.2	0.0	0.1	0.1	0.2	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	2.1	0.2	0.0	3.1
C	3.0	0.0	4.3	1.5	0.9	1.7	1.9	2.6	0.0	0.0	0.0	0.0	0.0	65.8	2.6	0.4	3.1
B	6.6	0.0	2.6	2.6	5.3	3.9	3.9	1.3	0.0	0.0	0.0	0.0	0.0	65.8	6.6	1.3	100.0
15-	5	6	1	6	7	8	6	1	6	2	2	0	0	5	97	40	192
R	0.2	0.2	0.0	0.2	0.3	0.3	0.2	0.0	0.2	0.1	0.1	0.0	0.0	0.2	4.0	1.6	7.9
C	3.0	4.2	2.1	4.6	1.6	4.6	3.9	2.6	10.3	1.0	1.1	0.0	0.0	6.6	50.5	17.9	7.9
B	2.6	3.1	0.5	3.1	3.6	4.2	3.1	0.5	3.1	1.0	1.0	0.0	0.0	2.6	50.5	20.8	100.0
16-	6	9	4	2	14	7	1	0	2	9	4	0	0	0	38	132	223
R	0.2	0.4	0.2	0.1	0.6	0.3	0.0	0.0	0.1	0.4	0.2	0.0	0.0	0.0	1.6	5.4	9.2
C	3.6	2.8	8.5	1.5	3.2	4.0	0.6	0.0	3.4	4.6	2.1	0.0	0.0	0.0	19.8	59.2	9.2
B	2.7	1.8	1.8	0.9	6.3	3.1	0.4	0.0	0.9	4.0	1.8	0.0	0.0	0.0	17.0	59.2	100.0
SUM	169	144	47	135	833	175	155	39	58	195	187	186	17	76	192	223	2831
R	7.0	5.9	1.9	5.6	17.8	7.2	6.4	1.6	2.4	8.0	7.7	7.7	0.7	3.1	7.9	9.2	100.0

Class 3-Low Group

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	SUM
1-	29	1	0	2	1	0	0	0	1	23	5	8	0	1	2	0	69
T	1.7	0.1	0.0	0.1	0.1	0.0	0.0	0.0	0.1	1.4	0.3	0.2	0.0	0.1	0.1	0.0	4.1
C	42.0	2.4	0.0	2.2	0.4	0.0	0.0	0.0	2.2	41.8	3.3	1.6	0.0	5.6	0.9	0.0	4.1
R	42.0	1.4	0.0	2.9	1.4	0.0	0.0	0.0	1.4	33.3	7.2	5.8	0.0	1.4	2.9	0.0	100.0
2-	1	10	6	3	3	0	0	0	0	7	8	10	0	3	0	1	42
T	0.1	0.6	0.0	0.2	0.2	0.0	0.0	0.0	0.0	0.4	0.2	0.6	0.0	0.2	0.0	0.1	2.5
C	1.4	23.8	0.0	3.3	1.2	0.0	0.0	0.0	0.0	12.7	2.6	4.1	0.0	16.7	0.0	0.6	2.5
R	2.4	23.8	0.0	7.1	7.1	0.0	0.0	0.0	0.0	16.7	9.5	23.8	0.0	7.1	0.0	2.4	100.0
3-	0	1	9	1	1	0	0	0	0	3	0	13	1	1	0	0	30
T	0.0	0.1	0.5	0.1	0.1	0.0	0.0	0.0	0.0	0.2	0.0	0.8	0.1	0.1	0.0	0.0	1.8
C	0.0	2.4	30.0	1.1	0.4	0.0	0.0	0.0	0.0	5.5	0.0	5.3	1.1	5.6	0.0	0.0	1.8
R	0.0	3.3	30.0	3.3	3.3	0.0	0.0	0.0	0.0	10.0	0.0	43.3	3.3	3.3	0.0	0.0	100.0
4-	1	3	3	47	3	1	0	0	1	5	10	3	1	2	3	1	92
T	0.1	0.2	0.2	2.8	0.2	0.1	0.0	0.0	0.1	0.3	1.1	0.2	0.1	0.1	0.2	0.1	5.6
C	1.4	7.1	10.0	51.1	1.2	0.8	0.0	0.0	2.2	9.1	11.9	1.2	1.1	11.1	1.3	0.6	5.4
R	1.1	3.3	3.3	51.1	3.3	1.1	0.0	0.0	1.1	5.4	19.6	3.3	1.1	2.2	3.3	1.1	100.0
5-	9	3	6	7	192	8	0	1	1	0	0	5	1	1	22	4	256
T	0.5	0.2	0.4	0.4	11.3	0.2	0.0	0.1	0.1	0.0	0.0	0.3	0.1	0.1	1.3	0.2	15.0
C	13.0	7.1	20.0	7.6	75.0	3.3	0.0	3.8	2.2	0.0	0.0	2.0	1.1	5.6	9.7	2.2	15.0
R	3.5	1.2	2.3	2.7	75.0	1.6	0.0	0.4	0.4	0.0	0.0	2.0	0.4	0.4	8.6	1.6	100.0
6-	0	1	1	1	6	105	0	0	1	0	0	0	0	1	4	3	123
T	0.0	0.1	0.1	0.1	0.4	6.2	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.2	0.2	7.2
C	0.0	2.4	3.3	1.1	2.3	85.4	0.0	0.0	2.2	0.0	0.0	0.0	0.0	5.6	1.8	1.7	7.2
R	0.0	0.8	0.8	0.8	4.9	85.4	0.0	0.0	0.8	0.0	0.0	0.0	0.0	0.8	3.3	2.4	100.0
7-	17	3	4	9	8	0	4	3	1	2	0	0	0	0	1	3	55
T	1.0	0.2	0.2	0.5	0.5	0.0	0.2	0.2	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.2	3.2
C	24.6	7.1	13.3	9.8	3.1	0.0	7.3	11.5	2.2	3.6	0.0	0.0	0.0	0.0	0.4	1.7	3.2
R	30.9	5.5	7.3	16.4	14.5	0.0	7.3	5.5	1.8	3.6	0.0	0.0	0.0	0.0	1.8	5.5	100.0
8-	1	0	0	0	0	1	0	7	0	3	8	0	1	0	9	0	26
T	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.4	0.0	0.2	0.2	0.0	0.1	0.0	0.5	0.0	1.5
C	1.4	0.0	0.0	0.0	0.0	0.8	0.0	26.9	0.0	5.5	2.6	0.0	1.1	0.0	8.0	0.0	1.5
R	3.8	0.0	0.0	0.0	0.0	3.8	0.0	26.9	0.0	11.5	15.4	0.0	3.8	0.0	34.6	0.0	100.0
9-	3	3	1	1	2	1	0	0	22	1	7	0	1	0	4	0	46
T	0.2	0.2	0.1	0.1	0.1	0.1	0.0	0.0	1.3	0.1	0.4	0.0	0.1	0.0	0.2	0.0	2.7
C	4.3	7.1	3.3	1.1	0.8	0.8	0.0	0.0	47.8	1.8	4.6	0.0	1.1	0.0	1.8	0.0	2.7
R	6.5	6.5	2.2	2.2	4.3	2.2	0.0	0.0	47.8	2.2	15.2	0.0	2.2	0.0	8.7	0.0	100.0
10-	0	2	1	1	3	2	31	1	3	8	0	0	0	0	1	2	55
T	0.0	0.1	0.1	0.1	0.2	0.1	1.8	0.1	0.2	0.5	0.0	0.0	0.0	0.0	0.1	0.1	3.2
C	0.0	4.8	3.3	1.1	1.2	1.6	56.4	3.8	6.5	14.5	0.0	0.0	0.0	0.0	0.4	1.1	3.2
R	0.0	3.6	1.8	1.8	5.5	3.6	56.4	1.8	5.5	14.5	0.0	0.0	0.0	0.0	1.8	3.6	100.0
11-	2	3	0	6	1	3	8	5	7	0	110	1	0	0	2	3	151
T	0.1	0.2	0.0	0.4	0.1	0.2	0.5	0.3	0.4	0.0	6.5	0.1	0.0	0.0	0.1	0.2	8.9
C	2.9	7.1	0.0	6.5	0.4	2.4	14.5	19.2	15.2	0.0	72.8	0.4	0.0	0.0	0.9	1.7	8.9
R	1.3	2.0	0.0	4.0	0.7	2.0	5.3	3.3	4.6	0.0	72.8	0.7	0.0	0.0	1.3	2.0	100.0
12-	2	5	3	6	5	1	8	0	0	0	0	207	1	0	3	4	245
T	0.1	0.3	0.2	0.4	0.3	0.1	0.5	0.0	0.0	0.0	0.0	12.2	0.1	0.0	0.2	0.2	14.4
C	2.9	11.9	10.0	6.5	2.0	0.8	14.5	0.0	0.0	0.0	0.0	84.5	1.1	0.0	1.3	2.2	14.4
R	0.8	2.0	1.2	2.4	2.0	0.4	3.3	0.0	0.0	0.0	0.0	84.5	0.4	0.0	1.2	1.6	100.0
13-	0	2	1	2	0	0	0	0	0	0	0	0	74	0	10	1	90
T	0.0	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.3	0.0	0.6	0.1	5.3
C	0.0	4.8	3.3	2.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	82.2	0.0	4.4	0.6	5.3
R	0.0	2.2	1.1	2.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	82.2	0.0	11.1	1.1	100.0
14-	0	1	1	0	0	0	3	0	1	0	1	0	1	9	0	1	18
T	0.0	0.1	0.1	0.0	0.0	0.0	0.2	0.0	0.1	0.0	0.1	0.0	0.1	0.5	0.0	0.1	1.1
C	0.0	2.4	3.3	0.0	0.0	0.0	5.5	0.0	2.2	0.0	0.7	0.0	1.1	50.0	0.0	0.6	1.1
R	0.0	5.6	5.6	0.0	0.0	0.0	16.7	0.0	5.6	0.0	5.6	0.0	5.6	50.0	0.0	5.6	100.0
15-	0	1	0	3	28	0	1	9	7	1	1	1	8	0	122	44	226
T	0.0	0.1	0.0	0.2	1.6	0.0	0.1	0.5	0.4	0.1	0.1	0.1	0.5	0.0	7.2	2.6	13.3
C	0.0	2.4	0.0	3.3	10.9	0.0	1.8	34.6	15.2	1.8	0.7	0.4	8.9	0.0	54.0	24.7	13.3
R	0.0	0.4	0.0	1.3	12.4	0.0	0.4	4.0	3.1	0.4	0.4	0.4	3.5	0.0	54.0	19.5	100.0
16-	4	3	0	3	3	5	0	0	1	2	1	1	1	0	43	111	178
T	0.2	0.2	0.0	0.2	0.2	0.3	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.0	2.5	6.5	10.5
C	5.8	7.1	0.0	3.3	1.2	4.1	0.0	0.0	2.2	3.6	0.7	0.4	1.1	0.0	19.0	62.4	10.5
R	2.2	1.7	0.0	1.7	1.7	2.8	0.0	0.0	0.6	1.1	0.6	0.6	0.6	0.0	24.2	62.4	100.0
SUM	69	42	30	92	256	123	55	26	46	55	151	245	90	18	226	178	1702
T	4.1	2.5	1.8	5.4	15.0	7.2	3.2	1.5	2.7	3.2	8.9	14.4	5.3	1.1	13.3	10.5	100.0

APPENDIX F

A SAMPLE TYPESCRIPT

A SAMPLE TYPESCRIPT

1 2 3
Well here we are,/ we're going back to/ our new workbooks, yes./
4 5 6
In these books of/course we're going to find/lots of new words/
7 8 9 10
How are you/going to find out/what these new words are?/I'm not going
11
to tell/you. /
12 13 14
First you see if/you know the word, then/you look at the ending./
15
Hmm hmm./
16 17
It could be ski,/or explosion
18
We could rhyme it./
19 20 21 22 23
O.K. We could/rhyme it. We/could put on/endings./ What else/can
24
we do?/
25
Sound it out! /
26 27 28
Sound it out./ What else can we do?/What else can we do/to find
29 30 31
out what a new/word is? What else can we do?/ Right. What else/
32
do we do?/
33 34
That's all,/Umm. /
35 36 37
Put it together/. . ./Listen to it/
38 39 40
O.K. But if you don't/know what it is you/can't listen to it/
41
can you?/
42
I know./

APPENDIX G

PROCEDURES USED FOR COMPUTING

SCOTT'S COEFFICIENT

PROCEDURES FOR COMPUTING SCOTT'S COEFFICIENT

The investigator and a second observer select a random portion of taped classroom verbal interaction of approximately ten minutes. Depending upon procedures to be used in classroom observation, and the statistical procedures anticipated, either numbers or IBM sheets may be used.

After completion of categorization at three second intervals, the two observers' tallies for each category are recorded separately.

Actual data used to compute Scott's coefficient for this study are cited following:

A Category	B Observer x	C Observer y	D % x	E % y	F % difference	G average %
1	12	14	4.92	5.34	0.42	0.26317
2	0	0	0.0	0.0	0.00	0.00000
3	0	0	0.0	0.0	0.00	0.00000
4	2	2	.80	.76	0.04	0.00608
5	42	42	17.21	16.03	1.18	2.76224
6	11	13	4.51	4.96	0.45	0.22420
7	50	55	20.49	20.99	0.50	4.30148
8	12	12	4.92	4.58	0.34	0.22563
9	.	.	.	.	.	.
10	.	.	.	.	.	.
11	.	.	.	.	.	.
12	.	.	.	.	.	.
13	.	.	.	.	.	.
14	.	.	.	.	.	.
15	.	.	.	.	.	.
16	.	.	.	.	.	.
Total	244	262	99.99	99.99	8.00	14.91746

Figure G.1. Figures used to calculate Scott's coefficient.

Scott's coefficient is calculated by the following formula:

$$Pi = \frac{A - R}{100 - R}$$

R is the proportion of agreement expected by chance, and is determined by squaring the proportions of tallies in each category, and summing these over all categories (Figure G.1., column G).

A is the proportion of disagreement between two observers (Figure , column F) subtracted from 100, or complete agreement.

Therefore, using the calculations in Figure , the above formula, after substitution, would read:

$$Pi = \frac{(100 - 8.00) - 14.917}{(100 - 14.917)} = .906$$

A measure of constancy of observer reliability may be obtained by performing Scott's coefficient throughout an extended observational period. However, if both observers are not actively engaged in the coding procedures a lower Scott's coefficient may be expected.

An observer may also check reliability by re-coding from tapes, portions of verbal interaction coded in situ. However, since some nonverbal behaviors tend to substitute for verbal behavior, a lower Scott's coefficient may result due to the nature of the stimuli.

APPENDIX H

RATIONALE ON WHICH TEACHER QUESTIONNAIRE WAS BASED AND REPRODUCTION OF TEACHER QUESTIONNAIRE

TEACHER QUESTIONNAIRE

Research points to the value of the questionnaire if it is cross-referenced with observational data. The questionnaire dealt with presage variables (teacher experience, education, self-concept, perceptions of the program, and of pupil needs and abilities) which could influence teacher-pupil verbal interaction.

In this study, teacher solicitation and reaction categories might be compared with pupil talk data, and inferences made regarding teacher perceptions of pupils' abilities to participate.

Questionnaires used in previous studies, and the research questions guiding this investigation tempered the construction of this questionnaire. Considerable space was left following each inquiry to encourage teachers to elaborate rather than to respond briefly.

Particular research which influenced the selection of each questionnaire category is outlined following.

Category one questioned teachers about experience, which was found by Tetley (1964) to have diminishing returns in terms of pupil achievement if it totalled more than ten years. Turner and Fattu (1960-1967) whose study was reviewed by Flanders (1969, Ebel, Ed.) found that the positive effects of experience levelled off after three years. The amount of experience at a particular level might, however, explain proficiency in the use of suitable materials and techniques. Lupone (1961) and Hall (1964), both cited by Flanders found that elementary teachers, permanently certified, as opposed to those provisionally certified, were better able to translate subject matter into living experience.

Category two was concerned with teacher education. Soar (1966), whose findings were reported by Flanders (Ebel, Ed.) found that hours spent in education courses were positively related to product measures of pupils, if teachers were well-adjusted.

Tetley (1964), found that specialization in reading was definitely effective in improving pupil achievement, but recency of training was also important. Pupil achievement, it was expected, would be revealed in some measure by the kinds of teacher-pupil verbal interaction.

The realization that some education is informally acquired prompted the question relating to personal subscription to educational journals. Schubert (in Frizzi, 1971) found that 38% of teachers in a graduate reading class did not subscribe to journals containing articles on reading. This lead to speculation about professional literature regularly read by reading teachers in general.

Teachers' perceptions of LER were queried by six interrelated questions. It was of interest whether these teachers had taught reading by any other method, since previous experience might manifest itself in modifications of the program (Chall, 1966; Harris and Morrison, 1969). As well, such experience might provide a comparative measure

Everett (1969) implied that it was important for teachers to have a choice in selection of a program. McCanne (1967) suggested that a teacher's attitude towards methods and materials could influence

the handling of them. Teachers were asked whether they preferred some other approach to reading in order to determine their attitude towards the LER program.

Teachers were questioned about the goals of LER, in order to determine whether their perceived goals of a program were congruent with those set out in the LER Manual. It was realized, however, that apparent congruence does not insure internalization of those goals and the behaviors which might realize them.

An attempt to substantiate answers to previous questions was made in the final two questions in this section. The teacher was asked whether she wished to use LER the following year, and what modifications she would implement. Answers might uncover weaknesses in the program, but, more important to this study, they could explain deviations between teachers, within the approach. Gallagher (1970, Stake, Ed.) found that individual teachers made a significant impact on how a program was implemented. Nuthall (1970, Stake, Ed.) included program, or subject matter, as an important factor related to teacher behavior. It appeared that individual teachers do interact with the program, and that the complexity of teacher personality, and the program could result in divergent processes which may be manifested in verbal behavior.

Section four was planned to identify differences between the teacher's self-concept as it related to LER requirements, and her perceived role requirements. Rosenthal (1968; 1969) stated that much of what we do, how we feel about ourselves, is determined by our feelings about our own competencies as they are reflected in the eyes of others. Teachers' answers to these questions could relay how they believe others, including the pupils, feel about them and their competencies. These feelings become expectations and may be self-fulfilling.

Bowers and Soar (1962), cited by Flanders (1969) found that personality traits of teachers did affect classroom interaction. While these may be presage variables, Rosenthal's theory implied that these variables develop during the teaching process, as well.

The second question in this section was intended to reinforce the first. It was believed that areas of difficulty for the teacher of LER might manifest themselves in teacher-pupil verbal behavior providing cross-reference for teacher responses. LER was found to be a difficult program for many teachers to implement, (Harris and Morrison, 1969) for it demanded considerable teacher creativity. But it has been contended that teachers were dependent upon the structure and content of manufals and readers (Barton and Wilder, 1961). It is possible that the implementation of the program may vary between teachers, depending upon their abilities for creative implementation of educational goals into meaningful pupil experiences.

Information offered by teachers regarding areas of strength or weakness queried by the questionnaire may not be complete, but may reflect only what they choose to reveal about their abilities. Teachers have been found to be inaccurate in self-appraisal (Chall and Feldman, 1966).

Section five considered teachers' perceptions of pupil needs and abilities, and how teachers saw their pupils in affective and cognitive terms: as a class; as individuals; as group members.

Although teachers may believe that they are aware of the extent and types of individual differences among pupils, the degree of awareness must vary among teachers.

The first question in this section was intended to reveal the interpersonal relationships which existed between teacher and class.

Ryans (in Gordon, 1966) discusses teacher characteristics associated with "warmth", "understanding". Hall (1969) explained the implications of proxemics. To wish to be relieved of the present class could have negative implications regarding classroom ecology.

The second and third questions were expected to indicate teachers' perceptions of pupils' cognitive abilities. Chall (1967) claimed that the teacher interprets the program in terms of her own perceptions of pupil abilities. That limited expectations tend to result in restricted goals, was Pfeiffer's view (1967). While Browne found that differential treatment was accorded different ability groups with less able pupils receiving more teacher corrective reactions, it is possible that some teachers felt more empathy towards particular groups, including the less able, and were more effective teachers of children of a particular ability group. When a teacher was working with a group she preferred, Pfeiffer found she reacted more indirectly. Simon (in Flanders, 1969) reported that preferred groups received most praise.

The child is part of the group, and his behavior may be modified by that group, its peer status and teacher treatment (Kounin, in Gordon, 1966). It is possible that the child identifies with the group in which he is placed - it becomes his environment. This area may be explored by examining the class as a group, and by examining each subgroup in LER, as an entity. Cooperation by the class or ability subgroup in projects may result in information about classroom climate, and the teacher's professional and social dexterity. Sherif (1961) cited by Glidewell (1966) proposed that the availability of goals to all contributed to group cohesiveness. In the same review, it was reported that Schmuck (1962a, b; 1963) found children who perceived that their classroom status was low tended to underutilize their abilities. Group placement and differential treatment of groups may, it appeared, perpetuate a self-fulfilling cycle.

The final question in this section related to individual interpersonal relationships in the classroom. Gordon (1966) believed that peer position influenced achievement. However, adult and peer assessment of a child were not in agreement. Nash (1972) noted that teacher attitudes towards a particular child modified that child's behavior towards the teacher - which in turn modified the teacher's attitude towards the child.

Teachers can influence peer position: N.B. Smith (1965) reported that teachers reacted more positively towards pupils anticipated to be successful (in Flanders, 1969). "Ripple effects" were caused by teacher discipline or praise (Bronfenner et al, 1965, in Glidewell, 1966) if the target pupil was high in the power structure. It is conceivable that ripple effects are operative when low status pupils are criticized or rewarded. This evidence seemed to be substantiated by Porterfield (1961) who noted that reading isolates, at either end

of the scale were social isolates as well.

Status is not a temporary condition. Schmuck and van Egmond (1961), Lippitt and Gold (1959), Jennings (1937), all cited by Gordon (1966), substantiated that high or low status, once established, remained quite stable over several school years.

The reading classroom, it appears, is an hierarchical social structure. Insightful teachers are in an advantageous position to help the vulnerable, and encourage the able, to create an environment where all can feel worthy. Questions which might reveal teachers' awareness of these factors were included in the questionnaire for this study.

In summary, the questionnaire was designed to discover reasons for teacher-pupil behaviors, to indicate possible interrelationships between these reasons.

In many instances, teacher responses could be linked with OSAPRL categories. In others, anecdotal notes might provide data.

Much research appeared to support connections on one hand, between education, experience, perception of self, program, pupils, and on the other hand, teacher effectiveness.

Although professional knowledge may be a reliable predictor of teacher performance, (Howsam, in Flanders, 1969) it seemed reasonable that experience, education, self-perception, perception of programs taught and perception of pupils, may be part of the complexity "professional knowledge." They may be influential causes of teacher behavior, which then interacts in a cyclical fashion with pupil behavior producing a by-product: verbal interaction in the classroom.

The teacher questionnaire devised as a result of this research, follows.

TEACHER DATA INTERVIEW FORM

I. TEACHER EXPERIENCE

1. NUMBER OF YEARS OF TEACHING EXPERIENCE.

2. NUMBER OF YEARS OF EXPERIENCE TEACHING AT THIS LEVEL.

3. OTHER PRIMARY TEACHING EXPERIENCE.

II. EDUCATIONAL BACKGROUND - GENERAL

1. NATURE OF TRAINING PRECEDING FIRST FULL-TIME TEACHING EXPERIENCE.

2. TYPE OF SUBSEQUENT TEACHER EDUCATION, IF ANY.

3. STUDY BEING UNDERTAKEN AT THIS TIME.

III. EDUCATIONAL BACKGROUND - READING

1. ANY INITIAL READING COURSES.

2. SUBSEQUENT READING COURSES.

3. READING COURSES BEING UNDERTAKEN AT THIS TIME.

4. DO YOU SUBSCRIBE TO OR HAVE ACCESS TO EDUCATIONAL JOURNALS? WHICH DO YOU FIND MOST USEFUL?

TEACHER'S PERCEPTIONS OF LANGUAGE

EXPERIENCE PROGRAM

1. WHY DO YOU USE THE LANGUAGE EXPERIENCE PROGRAM?

2. HAVE YOU TAUGHT READING USING ANY OTHER PROGRAM?

3. DO YOU PREFER AN APPROACH OTHER THAN LANGUAGE EXPERIENCE?

4. IN YOUR ESTIMATION, WHAT ARE THREE MAJOR GOALS OF LANGUAGE EXPERIENCE?

5. WOULD YOU LIKE TO USE THE LANGUAGE EXPERIENCE APPROACH NEXT YEAR?

6. WHAT MODIFICATIONS, IF ANY, WOULD YOU MAKE IN THE PRESENT LANGUAGE EXPERIENCE PROGRAM IF YOU USED IT NEXT YEAR?

TEACHER'S PERCEPTION OF HER ABILITY TO

IMPLEMENT PROGRAM

1. DO YOU HAVE SPECIAL TRAINING OR ABILITY WHICH HELPS YOU IMPLEMENT A LANGUAGE EXPERIENCE PROGRAM? ELABORATE.

2. DO YOU FIND THIS PROGRAM PARTICULARLY DIFFICULT FOR YOU, PERSONALLY, TO IMPLEMENT? ELABORATE.

TEACHER'S PERCEPTIONS OF PUPILS' NEEDS AND ABILITIES

1. WOULD YOU LIKE TO TEACH THIS CLASS NEXT YEAR?

2. IS THIS CLASS QUICK TO GRASP IDEAS?

3. IS THIS CLASS PRODUCTIVE OF NEW IDEAS?

4. DOES THIS CLASS PARTICIPATE FREELY IN DISCUSSIONS?

5. DOES THIS CLASS COOPERATE WELL IN GROUP PROJECTS?

6. DOES THIS CLASS TAKE PRIDE IN ITS WORK AS A UNIT?

7. ARE THE MEMBERS OF THIS CLASS GENERALLY FRIENDLY AND ACCEPTING OF EACH OTHER?

APPENDIX I

THE USE OF THE DARWIN CHI-SQUARE

THE USE OF DARWIN'S CHI-SQUARE

Statistical comparison of two or more matrices may be made, according to Flanders, by the use of Darwin's chi-square test for significance of difference.

Linnes (1956) quoted in Flanders (1965) states:

> Given two or more matrices, the null hypothesis concerning the matrix distributions can be tested by a likelihood ratio criterion suggested by Darwin.

The Darwin chi-square, a method developed expressly for use in verbal interaction systems, is an adaptation of the chi-square. It assumes that a diadic relationship exists between verbal interaction units, that is, that one unit of behavior may cause another to follow it. The Darwin chi-square attempts to reduce the error factor because of its sensitivity to sequence. However, communication events may be more than one-dependent, so some error still exists when the Darwin chi-square is applied. Further explanation of this procedure is offered by Flanders (1962) and by Darwin (Biometrika, 1959). The interested reader may wish to pursue the principles of Markov chains, basic to the Darwin chi-square, and is referred to Kemeny and Snell (1960).