ACHIEVEMENT RELATED BEHAVIOR OF HIGH AND LOW ACHIEVING INNER-CITY PUPILS

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ABSTRACT

The purpose of this study was to investigate classroom attending behavior. Achievement related behavior was examined in relation to 1) achievement level, 2) cultural background and 3) developmental level. The sample consisted of 136 pupils from each of the elementary grades, 1 to 6, drawn from immigrant and non-immigrant inner-city populations. Behavior was observed during reading and math instruction and coded in seven discrete categories. Achievement level was determined on the basis of scores obtained on the Stanford Achievement Test Battery. Findings indicated that both immigrant and non-immigrant inner-city pupils spend a large proportion of time engaged in academic tasks with high achievers spending somewhat more time actively engaged than low achievers. No meaningful developmental trends were found. To account for the large discrepancy between the attainment levels of the high and low achievers, characteristics of pupils and curriculum demands are discussed.

RESUME

Le but de cette étude était de rechercher le comportement d'attention en classe. Le comportement relatif à l' accomplissement a été examiné en rapport avec 1) niveau d'accomplissement, 2) héritage culturel et 3) niveau développemental. L'échantillon a consisté de 136 élèves de chaque classe (première à sixième année inclusive), tiré de populations immigrantes et non-immigrantes des zones grises. Le comportement a été observé pendant l'instruction des mathématiques et de la lecture et codifié en sept catégories discrètes. Le niveau d'accomplissement de chaque élève a été déterminé utilisant les notes obtenues sur le Stanford Achievement Test Battery. Les résultats ont indiqué que les élèves, et immigrants et non-immigrants des zones grises, passent une grande proportion de leur temps sur des tâches académiques, ceux ayant un niveau d'accomplissement élevé passant un peu plus de temps engagé activement que ceux ayant un niveau d'accomplissement plus bas. Aucune tendance développementale significative a été trouvée. Pour expliquer la grande différence entre les niveaux d'accomplissement les caractéristiques des elèves et les exigences des programmes d'étude sont discutés.

SHORT TITLE OF THESIS

ACHIEVEMENT RELATED BEHAVIOR OF CHILDREN

Sybil Hart

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CHAPTER I

INTRODUCTION

In spite of attempts by teachers, and, more recently, by educational and psychological researchers, to gain understanding of the nature of the learning process, the ways in which children acquire knowledge are not fully understood. Nevertheless, there continues to be a large volume of research and innovation in teaching aimed at facilitating children's learning, especially in the case of "inner-city" children (an euphemism for disadvantaged) who do not progress academically at the rate of their middle class peers. Many of these attempts which focus on the inner-city child have been spearheaded by social and political forces. These forces have grown with the increasing expectation for upward mobility believed to come about through the effects of education as it occurs in the schools. Since those who live in poverty have the most to gain in a social structure that permits upward mobility, they form the group which

appears to have the most at stake in the school system. It is these inner-city children who form the subject of this study.

What follows is first a review of some of the ways in which research on academic achievement has been approached and then trends in research concerning the education of disadvantaged pupils will be discussed. The present investigation has been undertaken in an effort to answer several newly arisen questions. First, these questions pertain to the role of the pupil, rather than of the teacher, in the classroom. This will be seen as one of active participation in the learning situation. Of particular concern will be a study of those behaviors which enhance and those which impede the process of efficient learning in the ordinary classroom setting. More specifically, the behaviors in question are those which are indices of pupils' engagement in academic tasks. Subsequently, it will be determined whether or not there exists a relation between the various behaviors and highly discrepant levels of scholastic attainment. In addition, this research will endeavor to examine developmental trends in pupils' achievement related behavior. Since most studies in this field have examined samples of pupil behavior in a limited number of grades, it remains to be determined whether or not there exists a pattern of growth. This investigation will contribute to our knowledge of classroom behavior by examining the behavior of pupils in

each of the elementary grades. Second, this study will address itself to questions with respect to attributes of inner-city children - attributes that are measures of strengths as well as weaknesses. While previous research has typically examined social class difference and has emphasized the negative aspects of the qualities of inner-city children, this inquiry will explore differences within, not between social class. By a comparison of children within the social class referred to as "inner-city" who are relatively successful and those who are fairly unsuccessful and a comparison of those who come from immigrant and non-immigrant homes, it is hoped to show both favourable and unfavourable features.

CHAPTER II

REVIEW OF THE LITERATURE: PART I

The Study of Academic Achievement

In an attempt to learn how to improve the quality of learning a number of investigators have been striving to relate students' achievement with teaching behaviors. This constitutes the traditional approach in which qualities or behaviors of the classroom teacher are conceived of as the independent variables and cognitive gains of the pupils are viewed as the dependent variables (Berliner, 1976; Rosenshine, 1977, 1978).

The major research in this field has been led by approximately a dozen researchers. Among the major groups of researchers and their organizations are: 1) David Berliner - University of Arizona, 2) Charles Fisher and Len Cohen - Far West Laboratory; Walter Borg - Utah State University, 3) Nathan Gage - Stanford Research and Development Center in Teaching, 4) Jane Stallings -

Stanford Research Institute, 5) Meredith Gall, William Tikunoff and Betty Ward - Far West Laboratory, 6) Thomas Good - University of Missouri, 7) Jere Brophy and Carolyn Evertson - Texas Research and Development Center in Teacher Education, 8) Robert Soar - University of Florida, 9) Fred McDonald - Educational Testing Service, 10) Gene Hall, Sue Loucks, Gary Borich and Robert Peck - Texas Research and Development Center in Teaching, 11) Gaea Leinhardt, Margaret Wang and William Cosley - Learning Research and Development Center, University of Pittsburg, and 12) Homer Coker - Carrolton State College, Georgia and Don Medley - University of Virginia (Rosenshine, 1976).

In recent reviews of the research on teaching effectiveness (Cruickshank, 1976; Rosenshine, 1976) it is reported that the dependent variable most often chosen for examination by these researchers is the extent of pupils' cognitive gains, especially in the basic subjects (i.e., reading and mathematics), while concern with affective outcomes, such as attitude toward school and self concept, has received relatively little attention (Rosenshine, 1977). In general, the selection of dependent cognitive variables has presented minor difficulty. On the other hand, the selection of independent variables has presented sufficient difficulty. While it is not terribly problematic to find a rationale for the investigation of cognitive outcomes as the dependent variable, Cruickshank (1976) maintains that there is

an absence of theoretical bases rich enough to be of assistance in the selection of meaningful independent variables. Resultantly, researchers rarely offer a rationale for their choice of an independent variable.

In spite of this serious shortcoming, numerous researchers have proceeded with investigations in which some 'critical' aspect of the teacher has been regarded as the independent measure. As an example, Brophy and Good's (1974) summary of research concerning individual differences in patterns of teacher-pupil interactions included both teacher expectations and teacher attitudes towards students. In addition, students' characteristics, such as social class, sex, prior achievement, and race were assessed with respect to their effect upon student achievement and teacher behaviors and attitudes (c.f. Dunkin & Biddle, 1974; Good, 1975; Rosenshine & Furst, 1971). Much of the impetus for this approach has been the current committment of educators to the development of competancy-based teacher education and evaluation programmes (Berliner, 1976). This current trend is behaviorally oriented. Thus, the better teacher is considered to be the one who produces better results in terms of student outcomes. This definition is in opposition to the earlier trends in which the good teacher was conceived of as the one who possessed certain 'critical' qualities. These qualities were not assessed in direct relation to pupil outcomes. Rather, they were based on theoretical grounds in

keeping with the current philosophy popular among educators and the public in general. One such example was the early child-centered movement, for which Dewey was a major spokesman (Gage & Berliner, 1975).

In the following section some of the ways in which teacher attributes have been investigated and the limitations to these approaches will be discussed.

Academic Achievement and Teacher Behaviors

Studies of teacher behaviors in relation to student-teacher variables have been reported in the psychological literature since 1945 (e.g., Anderson & Brewer, 1945; Anderson & Brewer, 1946; Anderson, Brewer & Reed, 1946; Flanders & Nuthall, 1972; Flanders & Simon, 1970; Gage, 1972; Rosenshine & Furst, 1971). However, the work of Flanders (1970) marked the beginning of a new era of research. Flanders (1970) developed an interaction analysis instrument accompanied by detailed reports and statistical analyses. In recent years the development of a variety of systematic observational instruments has facilitated the study of classroom behavior (Emmer & Peck, 1973). Simon and Boyer's (1967, 1970) anthology contains many of the hundreds of observational systems that have been developed. Most of the authors of these systems cite the primary purpose in their development has been to describe teaching, to monitor instruction and to train teachers. Several authors developed their scales in an attempt to investigate the relationship between instruction

and student growth (Rosenshine & Furst, 1973). Overviews of observational procedures are contained in the works of Flanders (1970), Rosenshine and Furst (1971), Brophy and Good (1974), Dunkin and Biddle(1974) and Gage and Berliner (1975).

Unfortunately, due to the large number and variety of observational systems, the interpretation of findings has proven to be very complicated (Dunkin & Biddle, 1974). Categories have been developed without examining the relationships within and between categories of observational systems. This has often led to taxonomic confusion and the unnecessary development of new systems (Emmer & Peck, 1973). However, several researchers have begun to employ factor analytic methods in an attempt to disclose intra- and inter-system relationships (e.g., Bartko, 1976; Brophy & Coulter, 1975; Emmer & Peck, 1973; Medley & Hill, 1968; Ober, Wood & Cunningham, 1970).

Some of the difficulty in the development of observational systems has arisen due to the fact that categories of behavior have been included largely on the basis of theoretical grounds rather than empirical data. Berliner (1976) maintains that this has occurred because of the minimal amount of available data which realistically describes the nature of everyday life in the classroom. An example of the type of research needed to overcome this, is a study by Berliner and Tikunoff (1976) initiated largely for the purpose of simply describing the nature of

instructional activities and the daily episodes in which a child engages. The data were collected by ethnographers (rather than psychologists), trained to observe an environment without looking through an observational instrument. This method was instituted since it was apparent that an observational system acts as a 'screen' by permitting one to see only that which one is looking for. If one is looking for good teaching, then one must know what it looks like in order to recognize it. The authors suggest the need for similar ethnographic research such as that proposed by Stubbs (1976) and reviewed by Stubbs and Delamont (1976) and Hammaraley and Woods (1976) (c.f. Berliner, 1978).

It would appear that once a category of behavior has been determined and can be reliably recorded, several obstacles remain to be dealt with. Often independent variables (e.g., verbal praise, probes, criticism), are observed and counted but are found to show very low correlations with measures of student outcomes. While this may occur frequently, it does not preclude that these variables are invalid. Rather, this delineates the need for data which are both qualitative and quantitative. Frequency counts fail to reveal the number of times a particular behavior may be inappropriate (Berliner, 1976). This is a logical state of affairs. For if one is to take into consideration individual differences between children and teaching situations, then few teaching behaviors are categorically and unconditionally

either appropriate or inappropriate.

Another major obstacle is the area concerning the stability (non-stability) of teacher behavior. If indeed the 'good' teacher is flexible and able to adapt methods, styles and demands according to imminent needs, then how consistent or frequent should any particular behavior be? Part of the difficulty of estimating behavioral stability is related to the problem of frequency of occurrence. Low frequencies tend to yield low correlations. Resultantly, rarely exhibited behaviors, which are thought to be highly appropriate, tend to appear statistically insigificant. In effect, it has been suggested that these behaviors are the most difficult to empirically investigate (Berliner & Ward, 1974).

It appears obvious that researchers must always doubt the representativeness and generalizability of the teacher behaviors exhibited in the presence of an observer (especially when the observer's presence is perceived as an imposition). This is particularly critical when the teachers under observation have not been chosen randomly or by the researchers, but rather are those who participate on a voluntary basis.

Impediments to the study of academic achievement, other than those dealing with difficulties in the implimentation of independent variables, are also critical. Before we can establish valid empirical relationships between teacher attributes and student achievement we must deal effectively

with problems of statistical analysis, instrumentation and methodology (Berliner, 1976). In addition we must learn more about what learners do in experimental treatments (c.f. Snow, 1974).

As a result of these drawbacks a number of researchers have concluded that we are without any solid empirical evidence linking teacher behavior to student outcomes (Berliner, 1976) although some researchers (e.g., Brophy, 1973; Bronfenbrenner, 1974) suggest that teacher effects are, at best, unstable. Berliner (1976) however, contends that we must acknowledge that we are without evidence that warrants any action which can be empirically justified. Hence educators have been left open to some severe criticism of their attempts to meet the demands of developing successful intervention programmes (e.g., Jensen, 1969). Furthermore, many researchers, as well as the public, have begun to look beyond the effects of schooling in an attempt to identify variables contributing to academic achievement.

Much research has been generated which implies that teacher effects are minimal. The Equality of Educational Opportunity (EEO) Report by Coleman (1966), as well as its derivitives by Jencks (1972), Mosteller and Moynihan (1972) and Heath and Nielson (1974), have been highly influencial in suggesting that socio-economic-status (SES), family background and ethnicity account for the bulk of the variance in pupil outcomes. In addition, Jensen (1968, 1973) has had

a major impact on educational policy through his scholarly works which have largely attributed the variance in academic outcomes to pupils' innate cognitive potential. These reports have had a strong impact to the extent that they have provided rationales for cuts in the funding of educational research, budget cuts in schools, and they have been a major impetus for social ramifications such as bussing. Recently, the actual results and interpretations of these reports have been seriously challenged. Results of several re-examinations of the EEO Report strongly refute the initial findings which suggested that little of the variance in achievement was related to teacher effects (Dishaw, 1977; Harnischfeger & Wiley, 1976; Wiley, 1976; Wiley & Harnischfeger, 1974).

The lack of statistically significant and useful findings from studies of teacher effectiveness, despite the enormous efforts that have been invested, plus the impact of the intital findings of the EEO Report, have left researchers in the field of educational psychology unable to conclusively determine the extent of the effects of teaching and also somewhat disillusioned and perplexed. In fact, McDonald (1976) cites as one of the most critical questions: "Do teachers make a difference?". An effort to tackle this issue was attempted at a symposium, entitled How Teachers Make a Difference (U.S. Office of Education, 1971), by such noted authorities as Flanders, Gage, Jackson, Lortie, Mood,

Rosenshine and Stolurow, who had been invited to address the topic. Indeed, it may be years before sophisticated but reasonable experimental designs in the field of education are implimented which will yield results that are meaningful and valid. However, it is the contention of Berliner and Rosenshine (1977) that it is no longer tenable to take seriously those who minimize the impact of the teacher on students' acquisition of knowledge. This statement is posed in view of newly emerging literature on disadvantaged children (e.g., Stallings & Kaskowitz, 1974; Pederson, 1978) indicating that teachers do make a difference. If one is to assume that teachers do, in fact, make a difference then the next questions which must be answered are: how much of a difference do they make, and, most importantly, what do they do that makes the difference?

While it is important that research be geared toward the answering of these questions it is suggested that such pursuits be complemented by the implementation of a methodological approach in which the role of the teacher is not the major focus with respect to pupils' levels of attainment. Instead, the role of the pupil himself, may be examined.

Academic Achievement and Pupil Behaviors

Traditionally, research on classroom interaction has proceeded from the assumption that teachers' behavior is responsible for determining pupils' behavior. Teachers are perceived as playing the active role while pupils play

mainly a reactive role (Fiedler, 1975). However, a child is an active human being rather than a passive receiver of information. Thus, it is assumed that a teacher does not influence student achievement directly. Rather, her influence is indirect. For the immediate cause of student learning must be the activities of the pupil, not those of the teacher. Therefore, the activities of the teacher must be understood to influence student learning indirectly, through the intermediate student behaviors (Marliave, Fisher, Filby & Dishaw, 1977). Berliner (1976) referrs to these intermediate student behaviors as the 'mediating link' between teacher behaviors and student outcomes.

The present emphasis on the role of the student as learner has been significantly influenced by the works of Carroll (1963) and Bloom (1976). It also emerged from a comprehensive observational study of classroom processes and instructional procedures in the Follow Through Planned Variation projects completed at the Stanford Research Institute (SRI) (Stallings & Kaskowitz, 1974). In this study seven types of educational programmes, based on divergent educational and developmental theories, were selected for observational study in an attempt to assess their differential effectiveness with respect to the extent of academic gains. Among the measurements employed was the SRI Classroom Observation Instrument which focused not only on behaviors of the teachers but also those of the pupils. The children

involved in this study were first and third grade students from disadvantaged homes. The specific child behaviors recorded were: independence, task persistance, cooperation and the asking of questions. In addition, other student variables, such as school attendance and absences and a number of aptitude, achievement and personality measures were ascertained. Cruickshank (1976) notes that the strongest correlates of improvement, in both first and third grade math, were length of school day and time spent on math activities. Stallings (1976) found that the opportunity to engage in, and to be exposed to, reading was related to higher reading scores. It was also found that instructional processes predicted as much as more of the outcomes score variance than initial entering school test scores. Based on these findings it was concluded that classroom learning does contribute to achievement in the basic skills, good attendance and desired child behaviors.

This work has had large implications with respect to further research on teacher effectiveness and it has led several researchers to focus directly upon the attributes of the child in relation to academic attainment. Investigators, such as Harper (1978), are aiming to pinpoint attributes of the child, independent of intelligence, which contribute to the enhancement of academic achievement. This research has proceeded by examining behavioral attributes demonstrated in the normal classroom setting. According to Cobb (1972b)

certain observable manifestations are considered to be 'essential prerequisites for acquiring knowledge in an academic situation. They are not academic behaviors per se, but provide the conditions conducive to academic responding'. The type of behavior most often cited in the literature as conducive to academic achievement is that which indicates that a pupil is actively engaged, paying attention, spending time on task or trying to learn (Carroll, 1963; Cobb, 1972a; Lahaderne, 1968).

What follows is a review of the major studies reported that have been undertaken incorporating some perspective of pupil behavior in an academic setting. In these studies several methodological techniques have been employed to analyse achievement related behavior. One of the most common methods has involved the collection of several measures of academic achievement which are then separately correlated with the frequencies of specific behaviors (e.g., Lahaderne, 1968). Often the same frequencies have been combined in multiple regression equations and cannonical correlations to be used to predict academic achievement (e.g., Cobb, 1972a). In some cases, behaviors best believed to discriminate between high and low achievers have been delineated and assessed in relation to these two groups (e.g., Soli & Devine, 1976). Differences between normal children and those with behavior disorders (e.g., Nelson, 1971) or learning disabilities (e.g., Bryan & Wheeler, 1972) have also been

undertaken by comparing different samples on the same behavioral rating scales.

Teacher-Rated Classroom Behavioral Data

Several empirical studies have been undertaken in which pupil behaviors have been rated by teachers on questionnaires or checklists. The major methodological weakness of such studies employing teacher-assigned behavior ratings is the process by which these ratings are obtained. It is assumed that assessments made after the fact are less accurate than those made at the time of occurrence (Soli, 1974). Furthermore, it has been shown that teacher rating scales may suffer from teacher bias (Jackson, Silberman & Wolfson, 1969; Silberman, 1969). Nevertheless, some research has been undertaken which employs this type of measure of pupil behavior.

One teacher-rated scale that has had a considerable impact on research through its widespread use is the Devereux Elementary School Behavior Rating Scale (DESB) (Spivack & Spotts, 1966) which has been used in numerous studies (Spivack & Swift, 1967; Spivack, Swift & Prewitt, 1971; Swift & Spivack, 1968, 1969a, 1969b, 1973, 1975; Swift, Spivack, Delisser, Danset, Danset-Leger & Winnykamen, 1972). The authors have attempted to identify achievement enhancing and achievement-impeding behaviors among high and low achievers and normal and disturbed children in elementary and high schools and in various cultures. Their aim has been to

develop a means of early screening for purposes of remediation which can be implemented by educators and mental health personel. Perhaps the major strength of the DESB scale is the method by which it was developed (authors actively sought input from teachers of both normal and exceptional children). The Devereux consists of 11 specific behavioral categories selected through factor analysis of teacher ratings for a broad range of behaviors related to classroom learning and/or adjustment, plus 3 items which did not load on any of the factors. The categories are: classroom disturbance, impatience, disrespect-defiance, external blame, achievement anxiety, external reliance, comprehension, inattentative-withdrawn, irrelevant-responsiveness, creative initiative, need for closeness to teacher, unable to change, quits, slow work. The validity of the scale has been criticized because its relation to achievement measures (highest mean r = .66) has been described as statistically significant but characteristically low (Little, 1972). In an attempt to determine whether this criticism represented somewhat of an overgeneralization, Wallbrown (1977) designed a study to investigate how well DESB (Spivack & Swift, 1967) ratings obtained in kindergarten could predict academic achievement one year later. The sample consisted of upper middle class children who were well above average in intelligence. Results showed that R's between Devereux ratings were not only statistically

significant but also accounted for 24.5 per cent and 16.5 per cent of the variance in reading and math achievement respectively.

In an additional predictive study (Attwell, Orpet & Meyers, 1967; Meyers, Attwell & Orpet, 1968) it was possible to secure achievement scores on a sample of fifth grade pupils who, four and one half years earlier, while in kindergarten, had undergone a thorough test battery. The battery had included 13 individual ability tests as well as ratings on 10 overt characteristics of test-taking behaviors. The investigators were most struck by the unanticipated finding that ratings of behavior were predictive of later achievement. 'Attention' was found to be the most powerful behavioral predictor (correlations ranging from .26 to .40) and as predictive as the most valid achievement test.

In a correlational study by Kim, Anderson and Bashaw (1968) teachers observed randomly selected second grade children and rated them on an 18 item Child Behavior Scale (CBS) (Kim, Anderson & Bashaw, 1967). The analysis of the data corroborated earlier findings (e.g., Spivack & Swift, 1966) (The correlation obtained between the CBS and the Stanford Achievement Test (SAT) battery was .48). It is of interest to note that the CBS correlated most highly (.69) with classroom grades determined by the teacher. The authors state that this high correlation may be partly artifactual since a teacher's general perception of the child as a good

or poor student may have an effect on the teacher's rating on items of the CBS.

Both of the following studies to be reviewed are of particular interest in those they explore the relationship between behavioral data collected by teachers and that collected by outside observers. What these studies serve to indicate, as has that of Kim, Anderson and Bashaw, is the need for a more objective source of information about pupils than teachers are often capable of providing.

Nelson (1971) undertook an investigation to examine the differences between normal and 'conduct disturbed' children. Children in third through sixth grade were rated by their teachers on the Adapted Devereux Child Behavior Rating Scale (ADCB) (Spivack & Spotts, 1966). Subsequent to this, pupils' overt behaviors were classified into 3 major categories: on task, deviant or teacher-pupil interaction and coded by observers employing a technique adapted from Werry and Quay (1968). The results of the study suggested that conduct disturbed children engage in significantly more deviant behavior and less task-oriented behavior than their normal peers. The findings also strongly suggest that direct observation procedures are an effective method of identifying and describing conduct disturbed children. This corroborates the conclusions of other studies concerning the overt behavior of children with conduct disorders (e.g., Werry & Quay, 1968, 1969). This investigation also demonstrated that direct

observation data are corroborated by teacher ratings. However, teacher ratings were found to be better predictors of maladjustment when the resultant behavior is acted out (i.e., overt) rather than inhibited (i.e., covert).

Camp and Zimet (1974) undertook an examination of the relationship between teacher ratings of positive and negative classroom behavior and reading achievement. First grade pupils were rated by their teachers on the Pittsburg Adjustment Survey Scale (Ross, 1965) and the Conners Teacher Rating Scale (Conners, 1969). Observers recorded behavior in 39 categories, the major ones being: on task, off task, deviant and nondeviant. Observations of classroom behavior were compared with ratings on the two teacher-rated scales and results of intelligence and reading achievement tests. Analysis of the data suggested a significant difference between the two teachers in this study in the extent to which their ratings agreed with items reported by the observers. While both teachers gave similar interpretations of their pupils' positive classroom behavior they differed markedly in their interpretations of negative behavior. Yet the observers showed the classes to be very similar with respect to both positive and negative behavior. This finding on teachers' unreliable ratings of negative behavior seems to lend support for Nelson's (1971) conclusion that teachers often make inappropriate interpretations of maladjustment. In general, while using only two teachers, the results of

Camp and Zimet's study suggest that positive classroom behavior as reported by teachers, the lack of off task behavior as reported by observers, mental age and measures of reading achievement are highly interrelated.

In an attempt to overcome some of the shortcomings of teacher-rated scales many recent investigations have based their findings on data collected by outside observers. The next section of this review will discuss such endeavors.

Observationally Derived Behavioral Data

In an attempt to overcome some of the shortcomings, mentioned earlier, of teacher-rated scales, recent investigations have based their findings on data collected by outside observers. Werry and Quay (1969) compared one group of 8 to 10 year old children with three groups of children considered to have conduct disorders. Classroom observations were coded in three major categories: deviant behaviors, attention and teacher contact. While significant differences were found on almost all categories, with the largest differences occurring in frequencies of attending behaviors, no significant difference in 'on task' behavior was found between the normal group and the single conduct disturbed group which had been matched for CA, IQ, SES and ethnic group (Mean frequency of on task behavior for the normal group was 77.0 as opposed to 69.3 for the matched conduct disturbed group).

In another study, Lahaderne (1968) observed sixth grade

pupils and coded behaviors described as attentive, inattentive, uncertain and not observable. Correlations between rates of attention and various achievement measures ranged between .37 and .53 and attention correlated with IQ at the level of .48 for boys and .44 for girls.

Cobb (1972a) undertook a study to examine the discrete classroom behaviors associated with academic achievement by more clearly defining the categories 'attentive' and 'inattentive' into 6 task-oriented categories, these being: attention, talk-to-teacher-positive, talk-to-peer-positive, volunteers, initiation-to-teacher and compliance; as well as 8 non-task-oriented categories: self-stimulation, out-of-chair, play, inappropriate-talk-to-peer, noncompliance, looking around and not attending. Fourth grade pupils from two schools were observed during arithmetic periods. The final multiple R, based on 8 categories, for predicting arithmetic achievement was .69 in one school and .63 for the other. 'Attending' was the single most powerful correlate of arithmetic achievement, where R's for schools were .40 and .47 respectively. Reading and spelling achievement levels were moderately predictable from observations taken during arithmetic lessons, where R's were .66 and .50.

From the findings of several studies, Cobb (1969, 1970, 1972a) derived a set of achievement-oriented behaviors that are not academic per se, but are referred to as 'survival skills'. These skills have been sub-classified into two

categories of behavior: 1) social, and 2) academic. Social behaviors consist of components of positive social interaction among students and teachers such as smiling, greeting and cooperative play. Examples of academic behaviors include following teachers' instructions and looking at the proper page of the text book (Cobb & Hops, 1973; Hops & Cobb, 1973). Survival skills are considered necessary but insufficient for academic functioning. They appear to be of considerable importance, especially for the younger child, since 'formal education depends heavily on the prior establishment in the child of a repertoire of social discriminative stimuli that will control his attentional behaviors, and other motor behaviors as well' (Staats, 1968). This repertoire is believed to consist of the prerequisite skills that will enable any child to benefit from all educational opportunities offered to the extent to which he is innately capable (Cobb, 1972b; Hops & Cobb, 1973). Since these skills appeared to be so critical subsequent studies were initiated to further analyse these skills and to incorporate them in intervention programmes.

Cobb and Hops (1973) in a subsequent study, attempted to determine a causal relationship between achievement and survival skills. This study involved 18 grade one pupils, chosen from three regular classrooms whose teachers agreed to participate in the study. All of the pupils initially had low rates of survival skills and low scores on standardized

reading tests. The 12 pupils in the experimental group received systematic instruction in a training programme which included the acquisition of attending and volunteering behaviors. Results of the study suggest that the experimental children had significantly greater gains in both survival behaviors and academic achievement than did the controls. Reading achievement, measured on the Gates-MacGinitie Primary A Reading test, for the control group improved from 40.9 to 45.1 (standard scores) and for the experimental group improved from 38.1 to 54.7 (standard scores).

Hops and Cobb (1974) undertook a follow up study which compared the effectiveness of two types of intervention procedures on three groups of first grade pupils. Two groups were instructed in survival skills and one group was given a programmed, individualized reading curriculum. A fourth group was given no special treatment. All three experimental groups were found to have made significantly greater gains in reading achievement than the control group. However, the group which received curriculum training made a significantly greater gain than one of the groups receiving behavior training. (Mean gains for the control group, survival skills groups 1 and 2, and curriculum training group respectively, were 7.6, 12.9, 10.9 and 15.0.)

In a similar study by Walker and Hops (1976), effects of three types of intervention procedures were compared to assess improvements in increasing academic achievement for

children in grades 1 to 3 with relatively low frequencies of appropriate behavior. (These children were generally only one half year below grade level in reading and math achievement and had average or above average IQ scores). While the control subjects remained in the regular classroom, experimental children received treatment in three types of experimental class settings. Children in Group 1 were reinforced for behaviors thought to be facilitative of academic performance, those in group 2 for correct academic performance and those in group 3 for both. The results were interpreted as revealing significant improvement among all experimental groups in levels of appropriate behavior and achievement in reading and math. (Reading standard scores for the experimental group improved from as low as 55.94 to 69.60 as compared with the control group whose greatest improvement was from 58.00 to 67.73. Math standard scores for the experimental group were raised from as low as 65.31 to 75.40 while the greatest improvement for the control group was from 64.06 to 69.56.) However, no significant differences between the three treatment procedures were found.

An experimental study by Greenwood, Hops and Walker (1977) was designed to evaluate the effectiveness of a 'packaged' group behavior management program which had been developed on the basis of Cobb's (1972) work. This programme is known as the Programme for Academic Survival Skills (PASS). The experimental teachers were taught to

implement PASS on a sample of low achieving, low-survival-skill pupils of normal intelligence in grades 1, 2 and 3. Results of the effects of PASS indicated significant improvement in survival skills across grades. However, a significant gain in academic achievement was obtained only in reading scores among first grade experimental children, who improved by 14.4 standard score units in contrast with first grade controls' gain of 3.3. The only other significant increase was obtained, rather surprisingly, by the second grade control group. There were no significiant gains in math.

The four experimental studies reviewed above are of major importance in that they are the only reports in the literature of work which have direct implications for educational policy. While Cobb and Hops (1973) and Greenwood, Hops and Walker (1977) found that appropriate behavior could be significantly increased through survival skill training, only Cobb and Hops (1973) found that significant gains, although modest, could also be causally related to changes in reading and math scores. Furthermore, survival skill training, as examined by Hops and Cobb (1974) and Walker and Hops (1976), was not found to be any more effective in bringing about academic achievement gains than other forms of intervention. It must also be noted that these studies have employed a coding scale by, or adapted from, Cobb's work, which has several limitations. First, while Cobb

claims to consider the role of the pupil exclusively and consistently refers to student behaviors as 'independent variables' he does include the role of the teacher, for example, in a category such a 'compliance'. Second, several categories do not appear to be mutually exclusive. The category 'inappropriate-talk-to-peer' seems to cover behavior not unlike that coded as 'play'; similarly, 'looking around' and 'not attending' appear to overlap considerably. Third, the behaviors 'attention' and 'not attending' are redundant since a correlation of high achievement with 'attention' implies an almost equivalent correlation of low achievement with 'not attending'. Fourth, this system does not appear to be a low inference scale since some categories such as 'play' and 'compliance' require more interpretation on the part of the observer than others, such as 'out-of-chair' and 'looking around'. Despite the limitations, Cobb's work cannot be underestimated for it has had a major impact on much of the research in this field.

Soli and Devine (1976) employed Cobb's method to investigate how behavioral correlates of achievement vary for different subgroups of children in the classroom. A total of 312 third and fourth grade pupils were observed during both math and verbal skills instruction. Comparisons between high and low achievers were obtained by splitting the sample at the mean of the combined achievement scores. The cross-validation between academic settings of .29 for predicting verbal achievement from behavioral scores in math and .17

for predicting math achievement from behavioral scores in reading were considered evidence of moderate stability of behavior across academic settings. However, achievement and behavior were found to be differentially related among high and low achievers. While task-oriented behavior was most predictive in the high group, the absence of inappropriate behavior was most predictive in the low group. It was also found that the amount of time spent in task-oriented behavior correlated with the achievement scores of low achieving pupils. In general, high and low achieving groups differed only slightly in the mean proportion of classroom time spent exhibiting any of the coded behaviors. For example, higher achievers spent 75 per cent of the time attending compared to 72.8 per cent for lower achievers, while all other behaviors differed by less than 2 per cent. Results of the total sample are consistent with Cobb's (1969) findings that individual behaviors correlate with achievement and that multiple regressions of behavior on achievement predict achievement more accurately than single behaviors, although the magnitude of the correlations in this study are admittedly low.

A descriptive study was undertaken by Good and Beckerman (1978) to compare the behaviors of high and low achieving sixth graders across academic settings and SES levels. Pupil behaviors were coded, in categories derived from Kounin's (1970) work, according to level of task involvement. This

included: 'involved', 'not involved', 'can't tell' and 'misbehaving'. Although this study lacks normative data useful for interpretation, it provides some interesting comparisons. They found that levels of pupils' involvement declined as the teacher worked with the whole class and increased as tasks became more individualized in teacher-led small-group work. Differences in levels of involvement were also found to exist between achievement level groups. Proportion of time 'involved' was 76 per cent for the high group, 73 per cent for the middle group and 64 per cent for the low group. Differences in levels of involvement were also found to be related to SES level. Children in School 1, which served pupils from families representing a wide SES range, were involved 82 per cent of the time, whereas those from School 2, which served predominantly low SES families, were involved between 60 to 68 per cent of the time. Findings related to achievement level generally corroborate those of previous studies (e.g. Cobb, 1972a; Soli & Devine, 1976). Results related to SES level are also worth noting in view of the fact that they tend to corroborate Cobb's (1972b) report that survival skill behavior is significantly poorer among lower SES children as compared to middle class pupils. Cobb hypothesized that this difference between SES levels can be attributed to environmental conditions where opportunities to acquire the basic repertoire of survival skills prior to school entry may not have been provided in

low SES homes. It is argued that an environment conducive to the acquisition of such skills is one in which the mother plays an active teaching role. For example, by providing experiences similar to those encountered at school, such as reading a book, a child learns to attend. Similarly, by setting up structured play activities the child learns to follow directions.

Influenced by the works of Lahaderne (1968) and Cobb (1972a), Forness and Esvldt (1975a) undertook a study to compare the overt classroom behavior of boys, who had been referred to an outpatient child psychiatry unit because of learning or behavior problems, with that of their normal male classroom peers. All children in the study were enrolled in a regular first or second grade class with a mean CA of 7.2 and a mean IQ of 104.6. Pupils were observed during reading and math and their behavior was coded as: 'attend', 'interact positive', 'not attend', 'teacher disrupt' and 'peer disrupt'. Differences between groups in per cent of 'total positive behavior', that is, the first two categories combined, were significantly different in both reading and math. For the referred group, 69 per cent of behaviors observed in reading were coded as 'total positive behavior' as compared to 79 per cent for the control group; math scores were considered to be very similar and therefore not reported.

A subsequent study (Forness & Esveldt, 1975b) of

systematic classroom observation was designed in order to determine its usefulness as a clinical screening technique. Data gathered from direct observations of kindergarten pupils at the beginning of the school year yielded accurate predictions of children who, by the end of the school year, were identified by their teachers as educationally 'at risk'. On task (total positive) behavior, observed at the beginning of the year was predictive of teacher ratings at the end of the year ($r = .44$), while disruptive behavior was found to be much more notably predictive ($r = .86$). It is also of interest to note that on the average, pupils spent approximately 82 per cent of their time in on task behavior. An analysis of the beginning of the year data by Forness, Guthrie, and Nahira (1975) revealed four distinct patterns, or clusters, of behaviors that function as predictors. The most salient feature of children 'at risk' (in cluster 4) was found to be overactivity in <u>both</u> on and off task situations. These pupils also appeared to require more teacher contact and tended to interact more often with peers in non-task related behaviors. (Percentages of behavior coded as verbal positive, attention, nonattention and disruptive, respectively, were: 8.8, 63.8, 21,9 and 5.5.)

In a follow-up study of the kindergarten population (Forness & Esveldt, 1975b) at the completion of first grade, Forness, Guthrie and Hall (1976) aimed to determine the validity of the original clusters of observable behavior

for purposes of predicting educational risk. Children previously delineated 'at risk' had largely retained their status. However, while increased activity level was the original distinguishing feature of these pupils, attention was found to be the most critical dimension in predicting educational risk. In the most recent study of the predictiveness of kindergarten observations, Forness, Hall and Guthrie re-evaluated the same pupils at the completion of second grade. The results suggested a significant relationship between initial prediction and eventual second grade academic status. Attending behavior appeared to be the most significant dimension in regard to prediction; most children were found to be attending between 70 and 80 per cent of the time as compared to less than 63 per cent for pupils 'at risk'. In fact, the authors state that "it may well be that simple measures of task attention, taken early in kindergarten amidst the complex demands of actual classroom environments, would provide the best indicator of educational risk".

One additional study by Forness and Guthrie (1977) is of special interest in that it addresses itself to methodological issues with respect to research in this field. In order for data to be truly representative, the authors note the diversity of opinion over the questions of how many observations must be recorded and over what period of time. While Cobb (1972a) suggests that longer periods of time are required, others such as McKinny (1975) use relatively few observations. While

some studies (e.g., Nelson, 1971) have complete observational data after a single day, others gather data over several days (e.g., Forness & Esvaldt, 1975a). Some gather data over consecutive days (e.g., Cobb & Hopps, 1973), others take observations over a period of months (e.g., Bryan, 1974) and yet others collect data over an entire year (e.g., Camp & Zimmet, 1974).

Forness and Guthrie (1977) attempted to determine the minimum number of observation days necessary for a reliable estimate of behavior. Thirty kindergarten pupils were observed on 18 consecutive school days for approximately one half-hour per day by observers employing the method of Forness and Esveldt (1975b). Findings of the study failed to corroborate Cobb's contention that longer periods of time are required. By the fourth day of observations, correlations of .72 to .77 between the daily averages and the grand mean were obtained suggesting that a representative sample had been gathered.

In an attempt by Samuels and Turnure (1974) to replicate studies with sixth grade pupils (Lahaderne, 1968) and fourth grade pupils (Cobb, 1972a), first grade pupils were selected in order to determine whether the relationship between behavior and achievement is established prior to any history of academic success or failure. The results of the study confirmed the hypothesis since it was found that skills in word recognition was significantly correlated with

attentiveness (r = .44). In addition, girls were found to be significantly more attentive than boys but not significantly different in reading readiness skills.

McKinney and Mason (1975) sought to explore the behavioral correlates of academic achievement and to assess the predictive value of combinations of discrete behaviors at the beginning and end of the school year. The study also aimed to determine the extent to which variability in achievement scores can be attributed to individual differences in either classroom behavior or ability level. Children in this study consisted of second grade pupils whose mean IQ was 98.69 (mean level of achievement was not reported) and who were observed at the beginning and end of the school year. Observations were classified into 12 categories which had been previously derived (through factor analytic procedures) from The Schedule for Classroom Activity Norms (SCAN) devised by Spaulding (1970). The final multiple R between behavior patterns and achievement at the beginning of the year was .63, and .51 at the end of the year. The final multiple R for predicting end of the year achievement from beginning of the year behavior was .60. It was also found that the predictive value of combinations of discrete behaviors correlated favourably (r = .70) with that obtained from IQ tests. Furthermore it was found that behavioral information, in conjunction with test information, could yield a more accurate prediction of academic achievement gains over the

school year than that provided by either alone. Although the mean propertions of behavior recorded in each category were not reported, the authors state that the child who is attentive, independent and task-oriented in his interaction with peers is more likely to succeed academically than the child who is distractible, dependent and passive in peer-group activities. The authors also note that although the age group and observational procedures in this study differed from those in other studies (Cobb, 1972a; Lahaderne, 1968; Samuels & Turnure, 1974) the general composite of the competent child was quite similar to that reported previously.

In yet another study, Harper, Gregory, Guidubaldi and Kehle (1978) attempted to determine the generalizability of the previously discussed findings by McKinney and Mason (1975). Variables were derived from two measures of classroom behavior, teacher ratings and direct observations (these were coded into 4 of the most predictive categories of SCAN). These means were used in regression equations with measured intelligence to predict the academic achievement of kindergarten, first and second grade children in an 'open school' whose mean IQ was 122. The results suggested that measures of classroom behavior contribute significant variance to the prediction of academic achievement measures independent of, and in addition to, measured intelligence. However, differences in the predictive measures among the various grades were noted. Among kindergarten pupils

'distractibility' and 'constructive play' added significant independent variance (32%) to that accounted for by IQ scores, while among second grade pupils 'passive responding' was the only behavioral variable to add significant additional variance (13%). However, among grade 1 pupils none of the observable variables added any significant independent variance whatsoever. To account for results so inconsistent with those of McKinney and Mason (1975) they suggest that this study investigated achievement related behaviors of a sample of children who differed markedly on the critical variables of intelligence and program structure. They contend that these inconsistencies indicate that intervention designs must be tailored to group characteristics and task requirements rather than focusing on a common set of target behaviors. The authors also note that while it is encouraging that researchers, such as Cobb and Hops (1973), are directing efforts to identifying pupil attributes, related to achievement, that are amenable to change, enthusiasm must be tempered by the realization that varying developmental levels and environmental requirements preclude the simplistic use of a uniform set of behavioral predictors in intervention strategies.

Implications

The emphasis on the learner as the decisive element in the attainment of academic achievement has led to investigations of student behavior, in general, and the

extent of student engagement, in particular. This variable, that is, student engagement, has been viewed in conjunction with other investigations of 'opportunity to learn' or 'time allocated'. It is the combination of these two variables: time allocated plus time engaged, that has led Berliner and Rosenshine (1976) to develop a concept which they refer to as 'Academic Engaged Time'. In essence, the critical element appears to be the amount of academic content that is covered. This appears to be largely determined by the amount of time that is allocated and the amount of allocated time that is used productively by the child.

This concept has been influenced by examinations of the allocation of school time. Numerous researchers have investigated total time allocated during the school year (e.g., Harnischfeger & Wiley, 1975a, 1975b, 1976; Stallings & Kaskowitz, 1974; Wiley, 1976; Wiley & Harnischfeger, 1974) and time allocated during the school day (e.g., Stallings & Kaskowitz, 1974). Measures of time elapsed in school, such as length of school day, number of school days per year and student and teacher absenteism have yielded fairly consistent evidence suggesting that achievement is related to the amount of total allocated time. The conclusion drawn by Rosenshine (1976a) is that educational policy must not only take into consideration how pupils are taught, but also precisely for what period of time.

This conclusion leads to interesting questions regarding

the role of the teacher as the one who is often responsible for deciding how time is invested and how to motivate children to use time productively. In addition, these studies imply the need for a new approach, in line with the theories of Carroll (1963) and Bloom (1974, 1976), with respect to the examination of individual differences in pupils' rates of learning and the amount of time needed for learning to take place. Several researchers have begun to explore these variables (e.g., Anderson, 1976; Arlin, 1974, Arlin & Roth, 1978; Arlin & Westburg, 1976; Hanson, 1975).

REVIEW OF THE LITERATURE: PART II

Academic Achievement and the Disadvantaged Child

Within the last decade educators and the public have taken a great interest in the education of the poor. This concern was generated by studies in the mid-1950s (Bloom, 1956; Bloom & Statler, 1957) and later by the EEO Report (Coleman et al., 1966) and its offshoots (Jencks, 1972; Mosteller & Moynihan, 1972). These reports clearly indicated that children of low socio-economic-status do not attain levels of academic achievement commensurate with those of their middle class counterparts.

Traditionally, many theorists maintained that the lower attainment levels of the poor evolved due to inadequate environmental stimulation during the very early stages of

development. The emphasis on early stimulation was largely influenced by the works of Hebb (1949), Harlow (1961), Hunt (1961) and Bloom (1964). Resultantly, numerous researchers sought to identify th se factors influencing the early development of middle class children which were presumably lacking in that of the disadvantaged child.

Research has compared the home environment of the middle SES with the lower SES family and found it to be under-stimulating in some cases (e.g., Ausubel, 1965; Deutsch, 1967) and overstimualting in other cases (e.g., Hunt, 1964; Deutsch, 1964). Investigators have also focused on parents' interaction with their children (e.g., Deutsch, 1967; Hess & Shipman, 1968; Jensen, 1967). Many investigations have analyzed children's use of language. The emphasis on verbal ability has been prompted by the belief that differences in language competancies largely account for the discrepancy between middle class and disadvantaged pupils' performance on school tasks and IQ tests (e.g., Bernstein, 1970; Deutsch, 1967; Loban, 1963).

This research was approached with the belief that the early childhood period is the time of most rapid growth in human characteristics. Furthermore, Ausubel (1967) maintained that a learning deficit, which begins during this 'critical' period, accumulates and hampers both current and future intellectual development. He suggested that environmentally induced retardation is not completely irreversible, although

the possibility of the counteraction decreases as the child matures. This is often referred to as the 'cumulative deficit hypothesis' (Deutsch, 1967). Thus the conclusion was drawn that intervention would be most effective during this early critical period. Hence the notion that early intervention could become an 'antidote for cultrual deprivation' (Hunt, 1964).

This traditional approach has been strongly influenced by the cumulative deficit hypothesis and highly geared toward the development of compensatory programmes. Perhaps an inadvertant implication of the research on disadvantaged children is the widely held misleading assumption that all disadvantaged children are underachievers. Indeed, the disadvantaged child has almost come to be known, by definition, as an underachiever. As Shipman (1976b) points out, there are those children 'that do not fit the generalization that low social class equals low achievement'. Most studies, she contends, have focused on pathology to the extent where our understanding of the strengths of disadvantaged children to withstand the stresses of their environment is meagre at best.

Farrell, Derevensky, Hymovitch, Stoloff and Zlotowski (1977) believe that this assumption has come about largely through the design of most investigations. Many research investigations have tended to compare disadvantaged pupils

with their middle class peers. In their review of previous research on disadvantaged children, Farell et al. (1977) suggest that at least thirty per cent of disadvantaged children are not failing academically. This finding is based on the results of studies such as those of Deutsch (1967), Passow (1972) and Sexton (1961). In fact, research shows that among disadvantaged pupils there are those who are unquestionably successful, despite their impoverished environment. Farrell (1973) found that individual differences within a sample of disadvantaged pupils is at least as great as that between social classes. Grade one pupils' IQ scores were found to range from 60 to 128. Language competancies, measured on a variety of instruments, ranged from zero to 90 per cent accuracy and reading scores ranged from zero to the grade 4.3 level. Brookover and Gottlieb (1963) investigated over- versus under-achievers and found that one third of their disadvantaged sample was achieving quite adequately. Shipman (1976b) also reports the existance of wide ranges in cognitive aptitude and academic achievement among third grade children from relatively homogenous disadvantaged groups.

Given these findings, researchers are being led to undertake investigations which aim to pinpoint the factors which academically differentiate between successful and nonsuccessful individuals <u>within</u> disadvantaged groups rather than <u>between</u> SES levels. Shipman (1976b) claims that this

approach is not intended as an alternative or substitute for previous types of analyses, but rather as a supplement. Through multiple analytic strategies she believes that contributions can be made to further the understanding of a child's development and thus contribute to the planning of environments in order to facilitate that development and to provide a basis for informed 'socioeducational' intervention.

Shipman's report, Disadvantaged Children and Their First School Experiences (1976b), describes a series of exploratory and case studies (Shipman, 1971, 1972a, 1972b, 1976a) which form part of the United States Health, Education and Welfare Head Start longitudinal studies. The most recent report in this series, Notable Early Characteristics of High and Low Achieving Black Low-SES Children (Shipman, 1976a), focused on pupils who, by third grade, were significantly above or below the average performance for children of similar ethnic or income status, or were significantly deviant from the level predicted by their performance on a test of preacademic skills administered at 4 years old. A massive array of child, family and school information was gathered. Given the multiple interacting nature of influences upon any behavior and the error contained in any measurement technique used, the magnitude of correlations obtained between psychological variables and the child's functioning was reported to be moderate at best and accounted for little of the behavior

examined. Greenberg and Davidson (1972) and Stedman and McKenzie (1971), in their research with high and low achieving low SES urban northern black and southwestern Mexican-American children respectively, found relationships between achievement and attributes of the home environment. Farrell (1973) investigated the home environment of low income Canadian homes and found that the home environment most often associated with success in school was one where the family was intact, often including grandparents, and was actively involved in school activities. Majoribanks, Walbang and Bargen (1975) found a positive relationship between achievement and sibsize. Rankin (1967) found a similar relationship with achievement among children whose parents encouraged them to read. Other researchers have looked at factors not directly related to the home. Swift and Spivack (1973) investigated attributes of the child himself, such as classroom behavior, Mackler, Catalina and Holman (1965) looked at appropriate social behavior and Pederson (1978) investigated the long term effects of first grade teachers. In a longitudinal study by Farrell et al. (1977) critical variables influencing inter-individual differences in relation to academic achievement among inner-city children was investigated. Their preliminary results corroborate earlier reports that 30 per cent of the sample are functioning at grade level at the very least. Furthermore, evidence was found that directly contradicts the cumulative

deficit hypothesis. Results of reading achievement tests showed that, in one sample, while 30 per cent of second grade pupils were reading at or above grade level, almost 50 per cent of fifth grade classes had achieved grade level performance or above. This finding tends to reflect the role of ethnic influences, since this sample was derived from a school which consisted predominantly of first generation immigrant children as contrasted with another sample consisting of a second or third generation indigent population. Undoubtedly, some of the trend toward improvement among the immigrant sample is due to increasing language competencies with age. However, other factors may also contribute to this trend - possibly relating to phenomena that are uniquely Canadian.

It is premature to contend that any of these studies have yielded conclusive findings. Yet, at the very least, they are adopting an approach which focused on strengths rather than pathology and may contribute to our limited knowledge of the factors that facilitate healthy growth academically, despite poverty.

Summary and Conclusions

This review began with a summary of the traditional approach to the investigation of scholastic attainment. This approach regarded academic achievement as dependent upon the direct behaviors of the teacher. Limitations to the implimentation of this approach were discussed in view of the fact that findings of research have generally failed to conclusively reveal empirical evidence linking academic

achievement with teacher attributes.

The review proceeded to propose the instrumentation of an alternative independent variable, that is, pupil behaviors, to complement research regarding the role of the teacher. Investigations of the relationship between academic achievement and student behaviors were reviewed. Although the research in this field is only in its initial stage, there have been consistent reports that a positive relationship between students' overt behaviors and achievement does indeed exist. The discrete behavior most often cited to correlate positively with achievement is 'attending' or 'on task' behavior. However, the studies reviewed reported behavioral ratings, on a number of scales, to correlate differentially between males and females, normal versus conduct-disturbed or learning disabled children, pupils from disadvantaged versus middle class homes, and high achievers versus low achievers, implying the possibility of behavioral differences between pupils of varying IQ levels. Differential correlations across academic settings and grade levels were not typically reported. The impact of these findings on experimental intervention programmes was briefly discussed in view of their limitations on educational policy. The validity of findings on pupil behaviors have begun to be substantiated by investigations of the predictiveness of observationally-derived findings. These have been corroborated by teacher-rated findings or

results of psychological testing, in addition to the evidence from experimental research. Nevertheless, successful implementation of this research requires solutions to problems of statistics, methodology as well as cross validations of both teacher- and observer-rated scales. Furthermore, the lack of replications suggests constraints on generalizability of findings.

An attempt to stress the relevance of these studies was made by placing them in the context of studies on time allocated. The major contention of researchers in this field is that a crucial factor, with respect to achievement, is the amount of academic content that is covered. This suggests the need for additional research on how the role of the teacher should be perceived with respect to questions on how time should be allocated and how pupils can be brought to use this time maximally, in order to cover as much academic content as possible. It is premature to consider any of the evidence as definitive. Yet, at the very least, the approach being taken is innovative and raises pertinent questions with respect to a variable that is amenable to change.

In the second part of this review the disadvantaged child was the major focus of discussion. Initially, the traditional approach of research on inner-city children was addressed. This approach is largely characterized by the investigation of disadvantaged children as compared to their

middle class counterparts. The major assumption underlying this approach is the notion that disadvantaged children are lacking some particular attribute of middle class children. It was then suggested that researchers look beyond factors associated with economic poverty in order to complement our knowledge of the development of disadvantaged children. This suggestion was posed in view of an emerging body of literature indicating that the variance within disadvantaged groups is as great as that between SES groups. In particular, it has been found that among disadvantaged children there are those who are <u>not</u> underachievers, despite the fact that this is how they have come to be somewhat stereotyped. Furthermore, evidence has been found which suggests, in contradiction to the developmental lag hypothesis, that some disadvantaged children improve with age, rather than fall behind, academically.

Given these reports, researchers are urged to be directed to probe beyond differences between SES levels and to investigate differences within SES levels to uncover causes of underachievement apart from those associated with poverty. Furthermore, it is strongly suggested that researchers aim to isolate factors conducive to success rather than failure.

CHAPTER III

RESEARCH DESIGN

Principle Aims - I

The review of the literature on behaviors of children in the classroom leads us to clearly suggest that differential behaviors are correlated with academic success. Furthermore, the literature shows trends, or clusters of behaviors, that seem to impede or contribute to the acquisition of knowledge. However, not only is there a strong need for experimental replication, but there are several gaps which must be filled before we can conclude, with any degree of confidence, that the relationship between achievement and overt behavior is not only statistically significant but also meaningful enough to contribute to educational policy. The present research has been designed in an attempt to fill in some of the gaps in our knowledge of the relationship between achievement and behavior in the following manner:

First, accepting the tenet of Cruickshank (1976), that

researchers rarely offer a rationale for their choice of an independent variable, the present research attempts to overcome this by adopting a coding scale based on ethnographic work by Berliner (1975). These independent variables were generated from written protocols describing life in classrooms of teachers who were selected as being either 'more' or 'less' effective according to their success in bringing about student improvement in reading and math (Cruickshank, 1976). This scale overcomes the weaknesses of many teacher-rated scales and observer-rated scales such as those like Cobb's since the classification system employed ignores any interactional variables that include factors relating to qualities of the teacher. Pupil behaviors are viewed exclusively and are classified in categories that are not overlapping or redundant. In addition, this system is considered to be a low inference scale since only observable behavior, requiring a minimum of interpretation on the part of the observer, is recorded.

Second, whereas each of the studies reviewed have drawn their findings on the basis of results of investigations of children in three different grades at the very most, the present study has included observations of pupils in each of the elementary grades (grade 1 - grade 6). The objective of this approach is to explore developmental trends which do not appear to have been reported, and may reveal significant and meaningful patterns of growth in learning styles.

Third, little attention has been directed to matters pertaining to the implementation of observational methods. Forness and Guthrie (1977), reviewed earlier, noted a whole range of instrumentation procedures presently adopted by a variety of researchers. Thus, an additional goal of this study is to contribute to our knowledge of instrumentation procedures.

Principle Aims - II

The second major focus of the present research is the education of the disadvantaged child. Unlike the traditional approaches, and more in line with the ideology of recent researchers such as Shipman (1976b) and Farrell (1977), the goal of this research is to contribute to the emerging body of literature which suggests that the disadvantaged population is not a homogenous group. Since it has been established that there exists a large variance in levels of academic achievement within disadvantaged populations, the next goal is the isolation of factors that function to make discriminations between academically successful and nonsuccessful disadvantaged pupils in a Canadian milieu. Specifically, the study is designed to determine differences between the overt behaviors demonstrated by disadvantaged children of highly discrepant academic achievement levels since investigations of achievement behavior have generally examined the behavior of middle class children rather than low SES pupils.

Method

Subjects

The subjects of this study were selected from two inner-city schools in Montreal. The schools differ in that they tend to serve two types of populations. School 1 consists predominantly of first generation Portuguese, Greek and Chinese children. School 2 serves a predominantly second or third generation, English speaking Canadian indigent population.

Within each school and grade a division was made between subjects. This was accomplished to permit half of all observations to be obtained on high achievers and half on low achievers. High and low achieving pupils were selected on the basis of achievement testing administered during the previous academic year by Farrell (1977). The total sample of children in this study included 138 pupils (72 males, 66 females) from each of the elementary grades (i.e., 1 through 6). Within each grade level, from each school, 10 children were selected as 'target' pupils for observation. This yielded an N of 120. On several occasions in School 1 it was necessary to include additional pupils (using identical criteria) to substitute for regular target pupils who were not available for observation. Thus the total N was 138. Under normal conditions, 10 pupils per grade level and per school were observed: 5 high achievers and 5 low achievers (See Table 1).

Table 1

DISTRIBUTION OF SAMPLE BY SCHOOL AND ACHIEVEMENT LEVEL

Grade	School 1		School 2		
	High Achievers	Low Achievers	High Achievers	Low Achievers	
1	6	6	5	5	22
2	5	5	5	5	20
3	5	9	5	5	24
4	5	5	5	5	20
5	8	8	5	5	26
6	6	10	5	5	26
Total	35	43	30	30	138

Coding System

Behaviors of target pupils were rated on a seven-category scale adapted from "Learner Moves", which is one among several more elaborate measures of classroom phenomena designed by Marliave, Fisher, Filby and Dishaw (1977). This classification system is presented in Table 2.

Procedure

Classification of pupils into high or low achievement groupings was established on the basis of scores obtained on the age appropriate level reading and mathematics subtests of the Stanford Achievement Test (SAT). Pupils were chosen from among the fifteen highest (age appropriate stanine scores of 7, 8 and 9) and the fifteen lowest (age appropriate stanine scores of 1, 2 and 3) achievers at each

Table 2

BEHAVIORAL CATEGOREIS

EW:	Engaged-Written, e.g., using pencil or crayon directly related to lesson
EO:	Engaged-Oral, e.g., question, response or discussion with teacher or peers pertaining to lesson
EC:	Engaged-Covert, e.g., listening, reading silently, thinking
ED:	Engaged-Directions, e.g., turning pages, walking to the teacher when appropriate
NI:	Not engaged-Interim, e.g., nonacademic activity, preparing for lesson, finding materials
NW:	Not engaged-Waiting, e.g., waiting for teacher's help or corrections
NO:	Not engaged-Off Task, e.g., daydreaming, socializing, misbehaving

grade level, from 1 to 6, in each school. The SAT battery, administered during the previous academic year by Farrell (1977), included:

Metropolitan Readiness (Nurse & McGauvran, 1974) Form P, Level I

Metropolitan Readiness (Nurse & McGauvran, 1974) Form P, Level II

Stanford Achievement Test (SAT, 1972) Form A, Primary Level I

SAT (1972) Primary Level II, Form A

SAT (1972) Primary Level III, Form A

SAT (1972) Intermediate Level I, Form A

SAT (1972) Intermediate Level II,

The following year, participating teachers were randomly selected by the researchers. They were informed of the general nature of the project - to compare the behavior of high and low achieving pupils through observational techniques. They were told that an observer would be in each of their classes during reading and math lessons every day for approximately one week or five consecutive school days. The teachers were not told precisely which of their pupils were to be under observation nor were they informed as to which behaviors were being rated and recorded.

Observers were two females in their early twenties. They were trained in the use of the rating scale by studying the procedures employed by researchers engaged in similar studies (e.g., Marliave, Fisher, Filby & Dishaw, 1977).

Inter-rater reliability, using videotape procedures, ranging between 85 and 90 per cent agreement, was ascertained before entering the schools. Subsequent reliability checks, mid-way through the study, yielded similar results. The reliability check was obtained by dividing the number of instances in which there was agreement by the total number of ratings, multiplied by 100 (R = agreement/total number of ratings x 100). It is of importance to note that inter-rater differences rarely occurred over the question as to whether or not a pupil was academically engaged. Rather, differences in interpretation usually arose over the issue of how the pupil was demonstrating on or off task behavior.

Having informed the participating teachers of the nature of the study, the observers proceeded to informally become acquainted with the teachers and pupils in order that their presence would be less noticable or disturbing. Each observer obtained an entire class list and floor plan in order to enable them to identify the target pupils without disclosing the pupils' identity to either the teachers or children. While the observers proceeded to learn to recognize the target pupils, they also familiarized themselves with regular classroom procedures. In classrooms without permanent seating arrangements, or where pupils were often engaged in tasks located in a variety of places, the observers had to have each of the children in the class 'name tagged' for approximately one lesson or until she had learned to

recognize the target pupils.

After establishing rapport with staff members and pupils and learning to recognize target pupils, formal data collection began. The observer positioned herself at the front of the classroom (on one side) which enabled observation of eye and head orientation of each child. Any eye contact or verbal interaction with either the teacher or pupils was carefully avoided. Each observer was equipped with a stop-watch and a behavior coding form, which was kept on a clip board and out of view. At the beginning of each minute it was the task of the observer to locate the first target pupil on her list, observe him for a period lasting up to 10 seconds, record the rating of his behavior and proceed to repeat the same procedure with each of the remaining pupils on the list. This cycle took place in the same sequential order every 60 seconds, from the beginning until the completion of the lesson. The entire procedure typically lasted one half hour but varied substantially according to grade level. For example, a reading lesson in grade one may have lasted 20 minutes whereas a sixth grade reading lesson could exceed one hour. The duration of the lesson was always determined according to the time span which the teacher had allocated. A minimum number of two hundred observation-ratings were obtained per child, one hundred during math lessons and one hundred during reading lessons. This was always the case expect for 18 pupils in

School 1, for whom substitutes were observed. Under normal circumstances, five children were observed at the same time by a single observer. This permitted one observation to be recorded on five children every minute. When the number of target pupils varied, ratings per individual child were still recorded at the constant rate of one per minute. In this manner the frequency of ratings remained constant under all conditions. The one hundred observations recorded for each subject area (i.e., reading or math) were spaced over a minimum of four separate instructional sessions over four separate days. Through this design an attempt was made to gain a representative sample of observations for each child in the study, across subject areas and time, which would act as a reliable and representative measure of each child's behavior.

Observations in School 2 took place from February until mid-April, those in School 1 from mid-April until early June.

CHAPTER IV

RESULTS

This research was designed to provide data relevant to the relationship between measures of seven discrete achievement related behaviors and 1) achievement level, 2) cultural background, and 3) grade level. In addition, the research was designed to provide data relevant to methodological issues and problems of intrumentation procedures. Two types of statistical analyses were performed on the data: canonical correlation and multivariate analyses.

Canonical Correlation

A canonical correlation was performed on the data in order to determine 1) the extent to which the data collected could be considered a reliable estimate of each pupils' behavior, 2) whether or not subjects with some missing data (not the full complement of 200 observations) could be used in subsequent multivariate analyses, and 3) methological implications concerning the number of observations necessary

for ensuring a representative behavioral repertoire. This procedure was deemed of particular importance due to the unequal number of observations collected per pupil. Of the 138 children in this study, only 102 were observed in both reading and math to yield behavioral ratings amounting to the sum of 100 per child (per subject area), but occasionally ranging as high as 150. For the remaining 36 pupils who often acted as substitutes during a single lesson, less than 100 behavioral ratings were obtained in either reading or math, often ranging as low as 35. The first canoncial correlation sought to determine the consistency of pupils' behavior across time; the second across academic settings.

The first analysis was performed by comparing all possible combinations of the first third (X = observations 1 to 34), second third (Y = observations 35-68) and final third (Z = observations 69-102) of all observations in both reading and math. Table 3 shows the results of the analysis performed on behavioral ratings collected during reading and math lessons. Clearly, from this Table, it is evident that all of the correlations are highly statistically significant, suggesting that a representative measure of behavior was ascertained (r ranged from .62 to .81, $p < .001$). Since the first third of ratings (X), in both reading and math, was significantly correlated with later observations (Y and Z), it was decided that all subsequent analyses were to be based on the entire set of data collected. This was essential

Table 3

CANONICAL CORRELATION BETWEEN FIRST THIRD (X), SECOND THIRD (Y) AND FINAL THIRD (Z) OF ALL SCORES

Comparison	Canoncial Correlation	X^2	df	p
Reading				
XY	.76	173.45	49	<.001
XZ	.65	107.95	49	<.001
YZ	.82	199.17	49	<.001
Math				
XY	.66	91.83	49	<.001
XZ	.66	122.46	49	<.001
YZ	.62	92.52	49	<.001

since several (N = 36) children had only partial data. If it was found that the behavioral data in the first third of ratings were not truly representative of a child's bahavioral repertoire, then subsequent analyses would have had to account for subjects with missing data.

The second canonical correlation sought to determine the relationship between each pupil's behavior across academic settings. This analysis was performed by deriving a linear composite score from the 7 behavioral categories in both reading and math for each pupil. The results of the canonical correlation between reading and math are presented in Table 4 and suggest a very strong relationship between behavior

Table 4

CANONICAL CORRELATION BETWEEN SCORES ON ALL BEHAVIORAL CATEGORIES IN READING AND MATHEMATICS

Canonical Correlation	X^2	df	p*
.79	215.79	49	<.001
.64	108.25	36	<.001
.50	50.46	25	<.002
.36	19.05	16	.266
.17	3.98	9	.912
.08	.89	4	.935
.05	.25	1	.613

* First significance level is in respect to all canonical correlations; second significance level is in respect to all canonical correlations but the first; etc ...

exhibited across academic settings ($r = .79$, $p<.001$). This finding served to further suggest the high stability of a child's behavior and added weight to the decision to employ the entire set of data.

Means of raw scores obtained in all behavioral categories, presented in Appendices 2 to 8, indicate differences between schools, achievement levels and grade levels. The behavioral data, used in all subsequent analyses is summarized in Table 5, which represents the distribution and frequency of occurrence for each of the behavioral categories by achievement level and grade and Table 6, which represents the same information by school and grade.

Table 5

MEAN PROPORTION OF FREQUENCIES OF OBSERVED BEHAVIOR IN ALL CATEGORIES* BY ACHIEVEMENT LEVEL** AND GRADE

Grade	EW		EO		EC		ED		NI		NW		NO	
	H	L	H	L	H	L	H	L	H	L	H	L	H	L
Reading														
1	18	15	8	6	58	59	4	4	3	2	0	1	11	14
2	25	24	5	5	43	32	1	1	6	6	1	1	18	31
3	26	9	3	5	49	61	2	3	3	2	2	1	16	18
4	24	13	4	5	57	53	1	2	3	4	1	0	11	21
5	11	19	5	2	75	43	0	0	2	2	0	3	7	32
6	10	17	2	4	76	53	0	0	1	2	0	0	11	22
Mean	19	16	5	5	60	50	1	2	3	3	1	1	12	23
Math														
1	26	23	11	5	44	51	3	3	2	3	1	0	12	14
2	44	35	7	5	30	31	1	1	3	4	1	3	14	23
3	33	30	4	1	46	47	2	1	2	4	2	3	11	16
4	34	27	3	1	48	50	2	1	2	2	3	1	8	18
5	37	33	6	1	49	43	0	0	1	3	0	0	7	19
6	38	39	2	2	50	39	0	2	3	0	1	1	8	18
Mean	35	31	6	3	45	44	1	1	2	3	1	1	10	18
Reading and Math														
1	22	19	10	6	51	55	4	4	3	3	1	1	12	14
2	35	30	6	5	37	32	1	1	5	5	1	2	16	27
3	30	20	4	3	48	54	2	2	3	3	2	2	14	17
4	29	20	4	3	53	52	2	1	3	3	2	1	10	20
5	24	26	6	2	62	43	0	0	2	3	0	1	7	26
6	24	28	2	3	63	46	0	1	2	1	1	1	10	20
Mean	27	24	5	4	52	47	1	2	3	3	1	1	12	21

* EW: Engaged-Written
EO: Engaged-Oral
EC: Engaged-Covert
ED: Engaged-Directions
NI: Not engaged-Interim
NW: Not engaged-Waiting
NO: Not engaged-off task

** H: High
L: Low

Table 6

MEAN PROPORTION OF FREQUENCIES OF OBSERVED BEHAVIOR IN ALL CATEGORIES* BY SCHOOL** AND GRADE

Grade	EW		EO		EC		ED		NI		NW		NO	
	1	2	1	2	1	2	1	2	1	2	1	2	1	2
Reading														
1	19	13	9	7	53	63	5	3	3	1	1	0	11	14
2	37	14	5	5	29	45	3	1	5	7	3	0	18	29
3	15	20	5	3	57	53	2	2	3	1	2	3	16	18
4	15	23	3	6	59	52	3	0	4	3	1	0	15	16
5	18	12	3	5	55	63	0	0	2	1	2	0	20	19
6	24	0	1	6	42	91	1	0	3	0	1	0	28	3
Mean	22	14	4	5	49	61	2	1	3	2	2	1	18	17
Math														
1	29	20	6	11	44	51	4	3	4	0	2	0	11	15
2	52	26	10	2	17	44	2	0	5	3	3	0	11	25
3	38	21	2	3	40	56	2	1	2	3	3	2	13	14
4	36	22	2	2	44	56	2	2	3	1	3	1	10	16
5	40	26	5	1	39	57	1	0	3	2	0	0	12	14
6	46	22	1	2	38	58	0	0	3	1	1	0	11	17
Mean	40	20	4	4	38	54	2	1	3	2	2	1	11	17
Reading and Math														
1	24	17	8	9	49	57	5	3	4	1	2	0	11	15
2	45	20	8	4	23	45	3	1	5	5	3	0	15	27
3	27	21	4	3	49	55	2	2	3	2	3	3	15	16
4	26	23	3	4	52	54	3	1	4	2	2	1	13	16
5	29	19	4	3	47	60	1	0	3	2	1	0	16	17
6	35	11	1	4	40	75	1	0	3	1	1	0	20	10
Mean	31	18	4	4	43	57	2	1	3	2	2	1	15	17

* EW: Engaged-Written
EO: Engaged-Oral
EC: Engaged-Covert
ED: Engaged-Directions
NI: Not engaged-Interim
NW: Not engaged-Waiting
NO: Not engaged-Off task

** 1: School 1
2: School 2

Analyses of Variance

To determine the effects associated with sex upon the 7 measures of behavior a multivariate analysis of variance was performed on data collected in reading and math. Results of the analysis of the data, presented in Tables 7 and 8, show no significant main effects in reading ($F = .22$, $df = 7,115$, $p > .05$) or math ($F = 1.21$, $df = 7,124$, $p > .05$).

Since the overall effects of sex were found to be non-significant, subsequent analyses did not take this variable into account. In order to determine the effects associated with grade, school and achievement level upon the 7 behavioral measures, three-way multivariate analyses of variance (6 x 2 x 2), with repeated measures, were performed.

The multivariate analysis revealed significant overall differences between grades (Tables 9 and 10) for both reading ($F = 12.63$, $df = 35,393$, $p < .01$) and math ($F = 13.77$, $df = 35.431$, $p < .01$). All univariate interactions were significant ($p < .05$) except one, obtained in reading scores, on grade x category NI ($p > .05$).

Table 11 and 12 illustrate the results of the analysis of variance for the effects of achievement level in reading and math. There was a significant main effect for reading ($F = 9.19$, $df = 7,93$, $p < .01$) and math ($F = 11.34$, $df = 7,102$, $p < .01$). Significant univariate interactions were obtained in both reading and math for categories EW and NO ($p < .01$), in category EC for reading and in category EO in

Table 7

MULTIVARIATE AND UNIVARIATE ANALYSES OF VARIANCE FOR ALL CATEGORIES* IN READING SOURCE OF VARIANCE: SEX

Category	Mean Squares		F	df	p
	Between	Within			
Multivariate			.22	7,115	.982
Univariate					
EW	26.53	177.33	.14	1,121	.694
EO	5.29	15.36	.34		.556
EC	134.73	578.97	.23		.638
ED	.04	4.11	.01		.915
NI	.00	10.86	.00		.983
NW	.01	3.44	.00		.942
NO	63.29	243.45	.26		.611

* EW: Engaged-Written
EO: Engaged-Oral
EC: Engaged-Covert
ED: Engaged-Directions
NI: Not engaged-Interim
NW: Not engaged-Waiting
NO: Not engaged-Off task

Table 8

MULTIVARIATE AND UNIVARIATE ANAYLSES OF VARIANCE FOR ALL CATEGORIES* IN MATH SOURCE OF VARIANCE: SEX

Category	Mean Squares		F	df	p
	Between	Within			
Multivariate			1.21	7,124	.294
Univariate					
EW	74.00	627.27	.11	1,130	.736
EO	9.49	22.92	.41		.523
EC	367.61	354.50	1.03		.318
ED	1.09	3.63	.30		.584
NI	.26	6.30	.04		.836
NW	2.69	4.80	.56		.455
NO	687.41	131.16	5.24		.026

* EW: Engaged-Written
EO: Engaged-Oral
EC: Engaged-Covert
ED: Engaged-Directions
NI: Not engaged-Interim
NW: Not engaged-Waiting
NO: Not engaged-Off task

Table 9

MULTIVARIATE AND UNIVARIATE ANALYSES OF VARIANCE FOR ALL CATEGORIES* IN READING SOURCE OF VARIANCE: GRADE

Category	Mean Squares		F	df	p
	Between	Within			
Multivariate			12.63	35,393	<.001
Univariate					
EW	426.32	41.70	10.22	5,99	<.001
EO	60.16	9.05	6.64		<.001
EC	3234.15	116.53	27.75		<.001
ED	43.44	1.32	32.83		<.001
NI	78.50	5.35	14.64		<.001
NW	4.20	1.43	2.93		.016
NO	439.29	85.23	5.15		<.001

* NW: Engaged-Written
NO: Engaged-Oral
NC: Engaged-Covert
ED: Engaged-Directions
NI: Not engaged-Interim
NW: Not engaged-Waiting
NO: Not engaged-Off task

Table 10

MULTIVARIATE AND UNIVARIATE ANALYSES FOR ALL CATEGORIES*

IN MATHEMATICS SOURCE OF VARIANCE: GRADE

Category	Mean Squares		F	df	p
	Between	Within			
Multivariate			13.77	35,431	<.001
Univariate					
EW	1654.18	111.57	14.82	5,108	<.001
EO	134.60	7.20	18.68		<.001
EC	3872.45	143.45	26.99		<.001
ED	40.98	1.32	31.00		<.001
NI	5.66	2.66	2.12		.068
NW	18.11	2.09	8.65		<.001
NO	95.48	95.42	1.00		.041

* NW: Engaged-Written
NO: Engaged-Oral
NC: Engaged-Covert
ND: Engaged-Directions
NI: Not engaged-Interim
NW: Not engaged-Waiting
NO: Not engaged-Off task

Table 11

MULTIVARIATE AND UNIVARIATE ANALYSES OF VARIANCE FOR ALL CATEGORIES* IN READING SOURCE OF VARIANCE: ACHIEVEMENT LEVEL

Category	Mean Squares		F	df	p
	Between	Within			
Multivariate			9.19	7,93	<.001
Univariate					
EW	489.89	41.70	11.74	1,99	<.001
EO	0.13	9.05	0.01		.904
EC	4814.48	116.56	41.31		<.001
ED	3.80	1.32	2.87		.093
NI	3.33	5.35	0.62		.431
NW	4.18	1.43	2.92		.090
NO	4309.41	85.23	50.56		<.001

* EW: Engaged-Written
EO: Engaged-Oral
EC: Engaged-Covert
ED: Engaged-Directions
NI: Not engaged-Interim
NW: Not engaged-Waiting
NO: Not engaged-Off task

Table 12

MULTIVARIATE AND UNIVARIATE ANALYSES OF VARIANCE FOR ALL CATEGORIES* IN MATH SOURCE OF VARIANCE: ACHIEVEMENT LEVEL

Category	Mean Squares		F	df	p
	Between	Within			
Multivariate			11.34	7,102	<.001
Univariate					
EW	789.58	111.57	7.07		.009
EO	356.30	7.20	49.46		.001
EC	231.58	143.45	1.61		.207
ED	.35	1.32	.26		.606
NI	8.63	2.66	3.24		.074
NW	5.31	2.09	2.54		.114
NO	3778.71	95.42	39.60		<.001

* NW: Engaged-Written
EO: Engaged-Oval
EC: Engaged-Covert
ED: Engaged-Directions
NI: Not engaged-Interim
NW: Not engaged-Waiting
NO: Not engaged-Off task

math ($p < .01$).

Results of the analysis of variance in reading and math for the effects of school (presented in Tables 13 and 14) reveal significant main effects for both reading ($F = 35.43$, $df = 7,93$, $p < .01$) and math ($F = 82,65$, $df = 7,102$, $p < .01$). Significant univariate analyses occurred throughout ($p < .01$) except on category EO in reading and categories EC and NO in math ($p > .05$).

Significant differences between the behaviors of high and low achievers were found to occur not only across grades (Table 9 and 10) but also between grades (Tables 15 and 16). Results of the analyses of variance revealed significant main effects for reading ($F = 6.17$, $df = 35,393$, $p < .01$) and math ($F = 2.86$, $df = 35,431$, $p < .01$). All univariate analyses were significant ($p < .05$) except those by category NI in reading and categories EW and ED in math ($p > .05$).

Differences were found to exist between children in different grades both across (Tables 13 and 14) and within (Tables 17 and 18) schools. Main effects for both reading ($F = 12.32$, $df = 35,393$, $p < .01$) and math ($F = 9.92$, $df = 35,431$, $p < .01$) and all univariate interactions ($p < .01$) were significant.

The only multivariate analysis which did not yield a significant overall main effect was that between achievement level x school in reading ($F = 1.55$, $df = 7,93$, $p > .05$) (Table 19). Apparently, there were no significant

Table 13

MULTIVARIATE AND UNIVARIATE ANALYSES OF VARIANCE FOR ALL CATEGORIES* IN READING SOURCE OF VARIANCE: SCHOOL

Category	Mean Squares		F	df	p
	Between	Within			
Multivariate			35.43	7,93	<.001
Univariate					
EW	3359.45	41.70	80.56	1,99	<.001
EO	26.42	9.05	2.91		.091
EC	2039.93	116.56	17.50		<.001
ED	70.28	1.32	53.12		<.001
NI	36.14	5.35	6.74		.011
NW	96.98	1.43	67.79		<.001
NO	486.65	85.23	5.70		.019

* EW: Engaged-Written
EO: Engaged-Oral
EC: Engaged-Covert
ED: Engaged-Directions
NI: Not engaged-Interim
NW: Not engaged-Waiting
NO: Not engaged-Off task

Table 14

MULTIVARIATE AND UNIVARIATE ANALYSES FOR ALL CATEGORIES*

IN MATHEMATICS SOURCE OF VARIANCE: SCHOOL

Category	Mean Squares		F	df	p
	Between	Within			
Multivariate			82.65	7,102	<.001
Univariate					
EW	47410.11	111.57	424.91	1,108	<.001
EO	112.72	7.20	15.65		<.001
EC	430.09	143.45	2.99		.086
ED	64.69	1.32	48.94		<.001
NI	249.30	2.66	93.69		<.001
NW	158.53	2.09	75.72		<.001
NO	14.11	95.42	.14		.701

* EW: Engaged-Written
EO: Engaged-Oral
EC: Engaged-Covert
ED: Engaged-Directions
NI: Not engaged-Interim
NW: Not engaged-Waiting
NO: Not engaged-Off task

Table 15

MULTIVARIATE AND UNIVARIATE ANALYSES OF VARIANCE FOR ALL CATEGORIES* IN READING SOURCE OF VARIANCE: GRADE x ACHIEVEMENT LEVEL

Category	Mean Squares		F	df	p
	Between	Within			
Multivariate			6.17	35,393	<.001
Univariate					
EW	693.67	41.70	16.63	5,99	<.001
EO	45.75	9.05	5.05		<.001
EC	2037.43	116.56	17.48		<.001
ED	5.05	1.32	3.82		.003
NI	8.21	5.35	1.53		.186
NW	11.14	1.43	7.78		<.001
NO	417.03	85.23	4.89		<.001

* EW: Engaged-Written
EO: Engaged-Oral
EC: Engaged-Covert
ED: Engaged-Directions
NI: Not engaged-Interim
NW: Not engaged-Waiting
NO: Not engaged-Off task

Table 16

MULTIVARIATE AND UNIVARIATE ANALYSES FOR ALL CATEGORIES* IN MATHEMATICS SOURCE OF VARIANCE: GRADE x ACHIEVEMENT LEVEL

Category	Mean Square		F	df	p
	Between	Within			
Multivariate			2.86	35,431	<.001
Univariate					
EW	137.26	111.57	1.23	5,108	.300
EO	32.13	7.20	4.46		<.001
EC	339.44	143.45	2.36		.044
ED	.70	1.32	.53		.748
NI	12.90	2.66	4.84		<.001
NW	9.60	2.09	4.60		<.001
NO	183.41	95.42	1.92		.096

* EW: Engaged-Written
EO: Engaged-Oral
EC: Engaged-Covert
ED: Engaged-Directions
NI: Not engaged-Interim
NW: Not engaged-Waiting
NO: Not engaged-Off task

Table 17

MULTIVARIATE AND UNIVARIATE ANALYSES OF VARIANCE FOR ALL CATEGORIES IN READING SOURCE OF VARIANCE: GRADE x SCHOOL

Category	Mean Squares		F	df	p
	Between	Within			
Multivariate			12.32	35,393	<.001
Univariate					
EW	1197.78	41.70	28.72	5,99	<.001
EO	39.35	9.05	4.34		<.001
EC	2880.10	116.56	24.71		<.001
ED	8.77	1.32	6.63		<.001
NI	40.48	5.35	7.55		<.001
NW	4.29	1.43	3.00		.015
NO	1656.24	85.23	19.43		<.001

* EW: Engaged-Written
EO: Engaged-Oral
EC: Engaged-Covert
ED: Engaged-Directions
NI: Not engaged-Interim
NW: Not engaged-Waiting
NO: Not engaged-Off task

Table 18

MULTIVARIATE AND UNIVARIATE ANALYSES OF VARIANCE FOR ALL CATEGORIES* IN MATH SOURCE OF VARIANCE: GRADE x SCHOOL

Category	Mean Squares		F	df	p
	Between	Within			
Multivariate			9.92	35,431	<.001
Univariate					
EW	1972.86	111.57	17.68	5,108	<.001
EO	132.16	7.20	18.34		<.001
EC	1239.93	143.45	8.64		<.001
ED	4.19	1.32	3.17		.010
NI	26.26	2.66	9.87		<.001
NW	8.10	2.09	3.89		.003
NO	272.94	95.42	2.86		<.018

* EW: Engaged-Written
EO: Engaged-Oral
EC: Engaged-Covert
ED: Engaged-Directions
NI: Not engaged-Interim
NW: Not engaged-Waiting
NO: Not engaged-Off task

Table 19

MULTIVARIATE AND UNIVARIATE ANALYSES OF VARIANCE FOR ALL CATEGORIES* IN READING SOURCE OF VARIANCE: ACHIEVEMENT LEVEL x SCHOOL

Category	Mean Squares		F	df	p
	Between	Within			
Multivariate			1.55	7,93	.158
Univariate					
EW	0.80	41.70	0.01	1,99	.890
EO	0.64	9.05	0.07		.790
EC	103.59	116.56	0.88		.348
ED	0.97	1.32	0.74		.392
NI	0.46	5.35	0.08		.768
NW	5.62	1.43	3.92		.050
NO	517.95	85.23	6.07		.016

* EW: Engaged-Written
EO: Engaged-Oral
EC: Engaged-Covert
ED: Engaged-Directions
NI: Not engaged-Interim
NW: Not engaged-Waiting
NO: Not engaged-Off task

differences between high achievers between schools, nor were there differences between low achievers between schools. All univariate interactions were non-significant except those for categories NW and NO ($p < .05$). These analyses seem to suggest that the behaviors of achievement groups were largely the same on measures of 'on task' behavior (categories EW, EO, EC and ED) but significantly different in the extent of 'off task' behaviors (categories NW and NO). The same multivariate analysis on scores obtained in math (Table 20) did reveal a significant main effect ($F = 3.40$, $df = 7,102$, $p < .01$). Significant univariate interactions were obtained on categories EW, EO and NI ($p < .05$).

The overall interaction of all sources of variances, that is, grade, school and achievement level, was significant for reading ($F = 4.84$, $df = 35,393$, $p < .01$) and math ($F = 3.31$, $df = 35,431$, $p < .01$) (Tables 21 and 22). Univariate interactions were significant throughout ($p < .05$) except for category ED in reading and category NO in math ($p > .05$).

A summary of the main effects for all interactions in both reading and math is represented in Table 23.

The final statistical procedure was a multivariate analysis to determine the effects associated with grade, school and achievement level on a single measure of behavior rather than on all measures. This was done primarily to investigate the effects of a more global measure of behavior. Thus, categories EW, EO, EC and ED were combined to form one

Table 20

MULTIVARIATE AND UNIVARIATE ANALYSES OF VARIANCE FOR ALL CATEGORIES* IN MATHEMATICS SOURCE OF VARIANCE: ACHIEVEMENT LEVEL x SCHOOL

Category	Mean Squares		F	df	p
	Between	Within			
Multivariate			3.40	7,102	.003
Univariate					
EW	999.01	111.57	8.95	1,108	.004
EO	53.45	7.20	7.42		.008
EC	309.64	143.45	2.15		.145
ED	3.62	1.32	2.73		.101
NI	.00	2.09	.00		.963
NW	12.41	2.66	4.66		.033
NO	24.95	95.42	.26		.610

* EW: Engaged-Written
EO: Engaged-Oral
EC: Engaged-Covert
ED: Engaged-Directions
NI: Not engaged-Interim
NW: Not engaged-Waiting
NO: Not engaged-Off task

Table 21

MULTIVARIATE AND UNIVARIATE ANALYSES OF VARIANCE FOR ALL CATEGORIES* IN READING SOURCE OF VARIANCE: GRADE x ACHIEVEMENT LEVEL x SCHOOL

Category	Mean Squares		F	df	p
	Between	Within			
Multivariate			4.84	35,393	<.001
Univariate					
EW	383.38	41.70	9.19	5,99	<.001
EO	42.93	9.05	4.74		<.001
EC	2187.53	116.56	18.77		<.001
ED	1.12	1.32	.85		.518
NI	21.59	5.35	4.02		.002
NW	14.14	1.43	9.88		<.001
NO	641.28	85.23	7.52		<.001

* EW: Engaged-Written
EO: Engaged-Oral
EC: Engaged-Covert
ED: Engaged-Directions
NI: Not engaged-Interim
NW: Not engaged-Waiting
NO: Not engaged-Off task

Table 22

MULTIVARIATE AND UNIVARIATE ANALYSES OF VARIANCE FOR ALL CATEGORIES* IN MATHEMATICS SOURCE OF VARIANCE: GRADE x ACHIEVEMENT LEVEL x SCHOOL

Category	Mean Squares		F	df	p
	Between	Within			
Multivariate			3.31	35,431	<.001
Univariate					
EW	309.87	111.57	2.77	5,108	.021
EO	38.96	7.20	5.40		<.001
EC	546.07	143.45	3.80		.003
ED	6.42	1.32	4.86		<.001
NI	7.60	2.66	2.85		.018
NW	11.44	2.09	5.46		<.001
NO	171.29	95.42	1.79		.120

* EW: Engaged-Written
EO: Engaged-Oral
EC: Engaged-Covert
ED: Engaged-Directions
NI: Not engaged-Interim
NW: Not engaged-Waiting
NO: Not engaged-Off task

Table 23

SUMMARY OF MULTIVARIATE ANALYSES OF VARIANCE FOR ALL CATEGORIES* IN READING AND MATH. SOURCES OF VARIANCE ARE: GRADE (A), ACHIEVEMENT LEVEL (B), AND SCHOOL (C).

	Reading			Reading		
Source	F	df	p	F	df	p
A	12.63	35,393	<.001	13.77	35,431	<.001
B	9.19	7,93	<.001	11.34	7,102	<.001
C	35.43	7,93	<.001	82.65	7,102	<.001
A x B	6.17	35,393	<.001	2.86	35,431	<.001
A x C	12.32	35,393	<.001	9.92	35.431	<.001
B x C	1.55	7,93	.158	3.40	7,102	.003
A x B x C	4.84	35,393	<.001	3.31	35,431	<.001

* EW: Engaged-Written
EO: Engaged-Oral
EC: Engaged-Covert
ED: Engaged-Directions
NI: Not engaged-Interim
NW: Not engaged-Waiting
NO: Not engaged-Off task

behavioral index of on task behavior. In this process, the univariate effects of these categories were not revealed. In addition, this procedure eliminated the effect of the unequal distributions of frequencies of scores across the 4 categories. Categories EW and EC tended to have much higher scores than categories EO and ED, that is, a large amount of pupils' time is spent in writing (e.g. seatwork), or in covert activities (e.g. listening), whereas much less time is spent talking and very little is spent in following directions (e.g. walking to the blackboard). Categories EW, EO, EC, ED appeared to form a good measure of on task behavior since they all contribute to the amount of academic content that is covered. Conversely, preparing for lesson (category NI), waiting for help (category NW) and not-engaged (category NO) are similar in that they fail to contribute to the amount of content that is covered.

On task behavior was calculated as a composite frequency score by adding the scores across categories EW, EO, EC and ED, dividing by the sum of scores across all categories and multiplying by 100 [(EW+EO+EC+ED/EW+EO+EC+ED+NI+NW+NO) x 100]. Table 24 presents the per cent of raw scores in the on task category for both schools by achievement levels in reading and math, allowing one to gain an index of the proportion of time different groupings of pupils spent on task. Table 25 represents the result of the first multivariate analysis of the effects of sex in reading and math. No significant differences between the behavior of males and females were

Table 24

MEAN PROPORTIONS OF ON TASK* BEHAVIOR BY SCHOOL AND ACHIEVEMENT LEVEL

Grade	School 1		School 2	
	High Achievers	Low Achievers	High Achievers	Low Achievers
Reading				
1	87.79	81.85	84.16	86.09
2	82.51	64.92	68.95	57.92
3	70.32	85.92	88.15	68.66
4	83.67	75.41	87.97	72.47
5	96.56	55.83	85.25	73.05
6	96.56	55.83	96.87	97.40
Mean	86.23	69.96	85.23	75.93
Math				
1	82.64	83.16	86.32	82.25
2	88.54	73.84	74.85	70.80
3	82.34	82.06	88.10	71.33
4	86.67	82.32	87.17	76.97
5	94.18	75.51	88.20	81.11
6	87.21	82.30	91.47	71.67
Mean	86.93	79.86	86.01	75.68

* Proportion of On Task Behavior = $\frac{EW+EO+EC+ED}{EW+EO+EC+ED+NI+NW+NO} \times 100$

Table 25

MULTIVARIATE ANALYSIS OF VARIANCE FOR ON TASK* BEHAVIOR

SOURCE OF VARIANCE: SEX

	F	df	p
Academic Setting			
Reading	.22	4,118	.926
Math	11.76	44,127	.140

* On Task = $\frac{EW+EO+EC+ED}{EW+EO+EC+ED+NI+NW+NO}$

found. Since sex did not appear to have an effect, subsequent analysis did not consider sex as factor.

Table 26 represents the multivariate effects of grade, school and achievement levels for on task behavior. As expected, the results corroborate those found previously (Table 23). All interactions were significant, except that between school x achievement level in reading. Once again, in reading, high achievers did not behave in a significantly different manner between schools; likewise for the low achievers.

Table 26

SUMMARY OF MULTIVARIATE ANALYSES OF VARIANCE FOR ON TASK* BEHAVIOR. SOURCES OF VARIANCE ARE: GRADE (A), ACHIEVEMENT LEVEL (B) AND SCHOOL (C).

	Reading			Math		
Source	F	df	p	F	df	p
A	17.42	20,319	<.001	18.78	20,349	<.001
B	14.85	4,96	<.001	18.49	4,105	<.001
C	32.52	4,96	<.001	77.71	4,105	<.001
A x B	7.69	20,319	<.001	2.49	20,349	<.001
A x C	14.45	20,319	<.001	6.84	20,349	<.001
B x C	.70	4,96	.592	2.78	4,105	<.030
A x B x C	6.07	20,319	<.001	3.12	20,349	<.001

* On Task = $\frac{EW+EO+EC+ED}{EW+EO+EC+ED+NI+NW+NO}$

CHAPTER V

DISCUSSION

In this chapter, achievement related behavior will be discussed as it pertains to level of academic attainment, cultural background, and developmental trends. In addition, features of the results, which are relevant to problems of methodology and instrumentation procedures, will be presented.

Achievement Related Behavior and Academic Attainment Level

The most important finding of this research is related to the relationship between achievement level and achievement related behavior. High achieving children, as compared with low achieving children, were found to spend a significantly greater proportion of their time engaged in activities listening, asking questions, seatwork, etc., conducive to the acquisition of knowledge in the regular classroom setting. This finding is consistant with those of previous investigations, in which rates of attending behavior have been compared

with levels of scholastic attainment (Lahaderne, 1968; Cobb, 1972a).

Although the multivariate analysis, using achievement level as the dependent measure, yielded a significant main effect, a close inspection of the mean proportion of on task behavior (composite scores) (Table 24) reveals interesting insights into the meaningfulness of the statistical findings. On the average, high achieving pupils were found to engage in on task behavior during 85 per cent of the time allocated to reading or math instruction; low achieving pupils were found to demonstrate the same behavior under similar conditions for 75 per cent of the time. This finding is worth noting on two counts. First, it suggests that the sample observed in this study spends somewhat more time engaged in on task behavior than samples in similar studies, in which high achievers are reported to be on task between 75 and 82 per cent of the time and low achievers from 63 to 72 per cent of the time (Forness, Guthrie, & Hall, 1976). Although it is possible that this discrepancy is an artifactual finding, resulting from observing an atypical sample of the population, the use of a dissimilar coding system or a difference in interpretation, it is not likely that this is the case. Berliner (Note 1), having investigated the classroom behavior of children living in the San Francisco Bay area and using a coding system similar to the one employed in the present study, reports that the mean on task time is

approximately 75 per cent. Therefore, he suggests that it seems more likely that this discrepancy may reflect some cross cultural differences between Canadian and American school children. Indeed, Bloom (1974) reports large cross cultural differences in student engagement, known to range from 50 to 90 per cent, or more, of class time. However, this cross cultural difference may not only reflect a difference in pupil behavior, it may also reflect differences in teachers' skill in keeping pupils motivated and engaged in their tasks. Second, and more important, it seems that the difference between the high and low achievers, in terms of the amount of time spent in on task behavior (i.e., 85 versus 75 per cent), may be statistically significant but perhaps quite meaningless. In terms of everyday classroom life, this 10 per cent difference amounts to a total of 6 minutes of on task behavior per hour (i.e., 51 versus 45 minutes per hour). While this may add up to a substantial amount of time over a school year, as argued earlier, clearly, it does not seem probable that the very large difference between the attainment levels of the samples of high and low achievers in this study could be substantially related to such a relatively small difference in on task behavior.

Given this interpretation of the findings, it seems logical to conclude that on task behavior, as investigated in this and similar studies, is a grossly over-simplified measure of student classroom learning. Berliner (Note 1), offering

a possible explanation for the findings of this study, notes that the Academic Engaged Time model of classroom instruction has been broadened into one known as 'Academic Learning Time' (ALT). The basic components of ALT include those of Academic Engaged Time - allocated time and rate of student engagement, plus a third and critical process variable - rate of student success. Success rate is intended to reflect the degree of appropriateness of any task that is assigned. The degree of appropriateness is believed to be a function of the level of the task's difficulty and to have a direct influence on the amount learned. Unfortunately, level of difficulty is not easily measured. Tasks are broadly categorized as being easy, medium or hard - a classification system that is admittedly crude. This system is operationalized so that easy material is defined as that which involves a high rate of success, hard material a low rate of success and medium material is in between. Rate of success is measured according to the number of errors made within a given period of time. The ALT model proposes that low success tasks are always detrimental to learning and that generally, most student learning will occur when they are assigned a small amount of medium success material and a larger amount of high success material. Thus, Academic Learning Time is defined as 'the amount of time a student spends engaged in an academic task that the student can perform with high success. The more ALT a student accumulates, the more the student is

learning' (Fisher, Berliner, Filby, Marliave, Cahen, Dishaw & Moore, 1978).

To apply the ALT model to account for the large discrepancy between the achievement levels of the subjects in this study, it is hypothesized that while the high and low achievers in this sample work almost equally diligently, within roughly equal amounts of time, their tasks are not equally appropriate. In order for the high achievers to be learning so much more, it may be that they are being presented with predominantly high success material, which permits them to work at a fast rate and cover a relatively large amount of academic content. On the other hand, the low achievers are being presented with mostly low success material, which permits them to work at a slow pace and cover a relatively small amount of academic content. Applying the ALT model and incorporating Carrol's (1963) definition of aptitude - the amount of time needed by a student to reach a criterion, allows this research to be described as an observational study, examining the classroom behavior of fast and slow learners. The former group was found to be highly engaged in appropriate tasks, yielding high levels of achievement; the latter almost equally engaged, but in inappropriate tasks, yielding low levels of achievement. More simply stated, it appears that the most critical differences between the two groups are the speed with which they work and the appropriateness of the tasks they are assigned.

The data on achievement related behavior also suggest several interesting findings pertaining to the nature of pupils' everyday classroom activity. A perusal of the univariate statistics and proportions of behavioral ratings across categories (Tables 5 and 6) reveals that a consistently high frequency of behavior was classified as engaged-written, engaged-covert and not engaged-off task, and a consistently low frequency was classified as engaged-oral, engaged-directions, not engaged-interim and not engaged-waiting. The data would appear to suggest that the children in these schools are offered relatively little opportunity to discuss academically related topics with their peers or teachers and little of the class time during reading or math lessons is devoted to activities which do not directly contribute to covering academic content, e.g., waiting for help, getting organized and preparing (although it is possible that a considerable proportion of school time is devoted to such activities between lessons, when data for the present study were not collected).

This pattern of behavior appeared to be consistent, not only within, but also between, academic settings. The results of the canonical correlation suggest that there is no significant difference between behavior exhibited in math lessons and that demonstrated during reading instruction (Table 4). This finding is consistent with the results of similar studies (Soli & Devine, 1976). In addition, there

appeared to be little difference between the behavior of males and that of females. The results of the analysis of variance, using sex as the dependent measure, revealed no significant multivariate or univariate effects (Tables 7 and 8), with one exception. A significant difference between males and females was found to occur in off task behavior, during math instruction. It would seem to be particularly important to take note of trends in off task behavior since studies, such as those of Nelson (1971) and Camp and Zimmet (1974), found that 'negative' behavior is misinterpreted more often than positive behavior. Unfortunately, sex differences in off task behavior were not investigated in great depth as this was beyond the scope of the present research.

In general, the results of the univariate analysis were in agreement with those of the multivariate analysis, with two exceptions. First, a significant multivariate result was occasionally accompanied by a non-significant univariate result in the categories engaged-oral, engaged-directions, not engaged-interim and not engaged-waiting. However, these univariate results tended to be based on disproportionately low frequencies, thus considered to be of little pertinance. Second, a significant multivariate result was occasionally accompanied by a non-significant univariate result in the category not engaged-off task (NO). Since this finding tended to be based on a substantial proportion of ratings, it was

considered worth noting. As this category provided data inconsistent with the multivariate results on several occasions (Tables 14, 16, 19, 20 and 22), it may be hypothesized that trends in off task are not only related to sex differences, as noted earlier, but also to academic settings, cultural background and grade level.

Achievement Related Behavior and Developmental Trends

One of the major aims of this study was to explore developmental trends and patterns in the growth of learning styles. The analyses of variance, using grade as the dependent measure, yielded significant effects. However, it appears that this relationship was delineated mostly as a result of the large N. An examination of the proportions of raw scores in the seven behavioral categories (Tables 5 and 6) and the on task category (Table 24) lead one to conclude that these differences follow no particular trend - neither that proposed by the cumulative deficit hypothesis, nor that found by Farrell (1977).

In general, it appears that pupil behavior is quite stable across grade levels, as it has been shown to be across academic settings and sex. Differences that exist across grades appear to be arbitrary, possibly related to attributes of the teacher, and not meaningfully related to growth in learning styles.

Achievement Related Behavior and Cultural Background

In this study, classroom behavior of two samples of

inner-city pupils was investigated - one, a predominantly immigrant group, School 1, the other, a predominantly non-immigrant group, School 2. Although the multivariate analysis, using school as the dependent measure, yielded a significant main effect, when the effects of achievement level were taken into account, the results of data collected in reading lessons were not significant (Table 19). Furthermore, an inspection of the data based on proportions of raw scores in the seven behavioral categories (Tables 5 and 6) and on task behavior (Table 24) suggests no meaningful relationship. On the average, pupils in School 1 were found to be involved in on task behavior during reading and math lessons for 80.06 per cent of the time, while those in School 2 for 80.71 per cent of the time. This finding would tend to suggest that inter-individual differences in achievement related behavior do not appear to be related to ethnicity in any meaningful way.

The results are of greater importance in suggesting that inner-city pupils are on task for a large proportion of instructional time - roughly 80 per cent. This finding contradicts some popular misconceptions about low SES children and refutes the results of other investigations, such as those of Cobb (1972a) and Good and Beckerman (1978). Once again, it is possible that this finding is a reflection of cross cultural differences since Good and Beckerman report that their sample of children from low-income American homes were

'involved' between only 60 to 68 per cent of the time. In fact, the high achievers in their study were 'involved' to roughly the same extent as the low achievers in the present study.

Methodological Issues

Results of the canonical correlation (Table 3) clearly suggest that pupil behavior is highly stable across time. It was found that as few as 30 reliably recorded observations, taken at the rate of one per minute, provides a representative sample of a pupil's classroom behavior. This corroborates the findings of Forness and Guthrie (1977). Given the findings that pupil behavior is stable across time and academic settings it would appear that research need not invest more than one half hour observing pupils during either reading or math instruction.

As discussed earlier, the dispersion of behavioral ratings across categories is highly variable (Tables 5 and 6). This has implications in terms of the usefulness of the observational system employed in this study. It appears that this system is useful in gathering information concerning broad categories of behavior but of limited usefulness with respect to rarely exhibited behavior (a problem not unfamiliar to educational psychologists). Thus, it may be possible that this system would be improved if the broad categories were either broken into several, more discrete, categories or further broadened to incorporate behaviors which have here

been included in the low frequency categories. Based on personal observations, several suggestions are offered. For example, the category engaged-covert could be split into "engaged-listening" and "engaged-reading". Similarly, the category not engaged-off task may be split into "off task-covert" and "off task-overt". Perhaps rarely exhibited behaviors, such as not engaged-interim and not engaged-waiting could be absorbed by one of the 'off task' categories. Similarly, behaviors classified as engaged-directions could be included in the engaged-written, engaged-listening or engaged-reading categories, depending on the type of lesson.

Several additional personal observations, with reference to instrumentation procedures, may be worth mentioning, the major one being that undertaking research in schools is a difficult task. However, research which involves the presence of "unobtrusive" observers in the classroom during instructional time, is considerably more difficult. Among the teachers who participated in this study, there were few who appeared to be at ease during the observer's presence. Although the teachers were always notified in advance of the observer's visit, and often helped in scheduling, they occasionally refused to permit the observer to enter the classroom. At times when the observer was permitted to enter it was not uncommon for the teacher to assign seatwork (possibly to avoid being watched while actively instructing) or to remark to the class that they

would soon be tested on the material being covered (possibly to increase attending behavior). Situations such as these arose frequently and force one to question the representativeness of the behavior being sampled.

Summary

This research found that Canadian inner-city pupils spend a large proportion of instructional time actively engaged in behavior conducive to learning. High achieving pupils demonstrated only slightly more on task behavior than low achieving pupils implying that the major differences between these groups are not primarily a function of differences in manifestations of achievement related behavior. Differences between cultural groups and grade levels were small enough to be considered inconsequential. It was found that research of this nature need not be extensive, in terms of numbers of observations, as in the present study, since pupil behavior was found to be highly stable. These findings are not considered generalizable until supported by results of replications undertaken in similar settings.

The most important outcomes of this endeavor are the implications which add weight to the hypothesis that research investigating student learning must not only examine the quantity, but also the quality, of the efforts invested by children. Numerous researchers, influenced by the work of Carroll (1963) and Bloom (1974), have begun to examine the type and quality of students' tasks (e.g., Anderson, 1976;

Arlin, 1974; Fisher et al., 1978; Hanson, 1975). In the quest to determine a measure of a task's degree of "appropriateness" researchers are beginning to seek ways of classifying levels of task difficulty and pupils' rates of success since it is most likely that appropriateness is a function of these two factors. The results of the present research suggest that such efforts are worthwhile endeavors.

APPENDICES

APPENDIX I

CODING FORM

Initials _____

Time In _____

Time Out _____

School: 1 2

Grade: 1 2 3 4 5 6

Discipline: 1 2

Code

EW - 1
EO - 2
EC - 3
ED - 4
NI - 5
NW - 6
NO - 7

Name:

ID:

Name:

ID:

Name:

ID:

Name:

ID:

Name:

ID:

APPENDIX II

MEANS OF RAW SCORES OBTAINED ON CATEGORY EW (ENGAGED-WRITTEN) IN READING AND MATH FOR COMBINATIONS OF SCHOOLS, ACHIEVEMENT LEVELS AND GRADES.

Grades	School 1				School 2			
	High Achievers		Low Achievers		High Achievers		Low Achievers	
	Reading	Math	Reading	Math	Reading	Math	Reading	Math
1	25.4	34.4	18.0	31.6	16.0	34.4	13.8	16.0
2	45.4	60.8	33.2	48.0	16.0	60.8	19.2	23.5
3	34.4	45.8	4.6	59.8	24.6	45.8	18.2	11.7
4	21.8	60.0	16.0	62.4	40.0	60.0	14.0	12.4
5	16.4	67.4	25.8	70.6	8.5	67.4	15.33	22.0
6	26.0	88.4	44.2	93.0	0.0	88.4	0.6	22.6

APPENDIX III

MEANS OF RAW SCORES OBTAINED ON CATEGORY EO (ENGAGED-ORAL) IN READING AND MATH FOR COMBINATIONS OF SCHOOLS, ACHIEVEMENT LEVELS AND GRADES.

Grades	School 1				School 2			
	High Achievers		Low Achievers		High Achievers		Low Achievers	
	Reading	Math	Reading	Math	Reading	Math	Reading	Math
1	10.6	10.0	8.8	2.6	9.3	12.1	5.66	8.2
2	7.0	13.6	4.2	8.4	5.6	1.4	6.6	1.5
3	2.0	4.6	9.8	0.8	4.8	5.2	2.7	1.7
4	3.0	3.2	5.6	2.0	6.6	4.0	7.0	1.2
5	5.0	14.4	1.2	1.4	6.5	2.28	3.0	0.6
6	1.8	1.8	1.0	3.4	3.2	2.71	10.0	1.3

APPENDIX IV

MEANS OF RAW SCORES OBTAINED ON CATEGORY EC (ENGAGED-COVERT) IN READING AND MATH FOR COMBINATIONS OF SCHOOLS, ACHIEVEMENT LEVELS AND GRADES.

Grades	School 1				School 2			
	High Achievers		Low Achievers		High Achievers		Low Achievers	
	Reading	Math	Reading	Math	Reading	Math	Reading	Math
1	62.2	42.8	56.4	56.8	73.0	42.8	70.5	47.0
2	34.8	19.2	27.6	16.4	70.6	19.2	43.4	47.2
3	48.2	44.0	100.2	65.0	64.2	44.0	49.7	48.0
4	88.8	77.4	64.4	71.2	60.2	77.4	59.4	64.0
5	90.4	75.6	41.8	60.0	74.0	75.6	53.5	63.2
6	87.9	74.6	35.2	73.8	108.0	74.6	105.0	43.4

APPENDIX V

MEANS OF RAW SCORES OBTAINED ON CATEGORY ED (ENGAGED-DIRECTIONS) IN READING AND MATH FOR COMBINATIONS OF SCHOOLS, ACHIEVEMENT LEVELS AND GRADES.

Grades	School 1				School 2			
	High Achievers		Low Achievers		High Achievers		Low Achievers	
	Reading	Math	Reading	Math	Reading	Math	Reading	Math
1	5.0	4.6	5.2	4.8	3.5	2.66	2.8	2.3
2	3.4	2.2	2.0	2.8	0.2	0.0	0.2	0.2
3	1.8	2.6	4.0	1.6	1.6	0.8	3.2	0.4
4	3.2	2.4	4.6	5.0	0.0	3.2	1.0	0.6
5	0.4	1.2	0.2	0.6	0.5	0.0	0.0	0.2
6	0.2	0.2	1.4	0.0	0.2	0.0	0.0	0.0

APPENDIX VI

MEANS OF RAW SCORES OBTAINED ON CATEGORY NI (NOT ENGAGED-INTERIM ACTIVITIES) IN READING AND MATH FOR COMBINATIONS OF SCHOOLS, ACHIEVEMENT LEVELS AND GRADES.

Grades	School 1				School 2			
	High Achievers		Low Achievers		High Achievers		Low Achievers	
	Reading	Math	Reading	Math	Reading	Math	Reading	Math
1	4.6	5.0	3.2	4.4	1.5	0.0	0.66	0.8
2	6.2	4.0	4.0	5.6	8.4	2.4	10.4	2.7
3	5.8	1.8	1.8	3.4	1.6	3.0	4.0	5.1
4	3.6	5.2	6.4	3.8	3.2	1.8	3.6	0.0
5	1.8	2.4	3.8	7.4	1.8	1.1	1.3	1.0
6	2.2	5.0	6.2	5.8	0.4	2.1	0.2	0.6

APPENDIX VII

MEANS OF RAW SCORES OBTAINED ON CATEGORY NW (NOT ENGAGED-WAITING) IN READING AND MATH FOR COMBINATIONS OF SCHOOLS, ACHIEVEMENT LEVELS AND GRADES.

Grades	School 1				School 2			
	High Achievers		Low Achievers		High Achievers		Low Achievers	
	Reading	Math	Reading	Math	Reading	Math	Reading	Math
1	0.4	2.6	1.6	1.2	0.5	0.2	0.33	0.2
2	3.0	3.0	3.0	3.2	0.4	0.0	0.2	0.2
3	4.4	2.6	1.0	5.8	0.2	2.4	1.0	0.7
4	2.4	6.8	0.8	1.6	0.6	1.0	0.2	0.0
5	0.0	0.2	5.6	0.6	0.0	0.3	0.0	0.2
6	0.0	2.2	2.6	2.6	0.0	0.0	0.0	0.3

APPENDIX VIII

MEANS OF RAW SCORES OBTAINED ON CATEGORY NO (NOT ENGAGED-OFF TASK) IN READING AND MATH FOR COMBINATIONS OF SCHOOLS, ACHIEVEMENT LEVELS AND GRADES.

Grades	School 1				School 2			
	High Achievers		Low Achievers		High Achievers		Low Achievers	
	Reading	Math	Reading	Math	Reading	Math	Reading	Math
1	9.4	11.8	14.8	13.8	16.5	13.3	14.0	14.8
2	10.0	6.0	29.2	18.0	32.8	21.6	39.8	28.7
3	25.0	16.4	16.6	18.6	11.0	7.0	28.7	19.0
4	16.8	10.0	22.6	24.8	10.8	12.6	27.2	23.4
5	2.2	7.2	45.2	35.0	13.6	11.6	25.2	18.8
6	26.0	17.0	56.4	28.2	3.2	6.0	3.2	25.6

NOTES

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