

An Investigation of Time On Task
Academic Achievement, and Lesson,
Format in a Low Income Kindergarten Classroom

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A Thesis
in
The Department,
of
Education

Presented in Partial Fulfillment of the Requirements
for the degree of Master of Arts at
Concordia University
Montreal, Quebec, Canada

March 1983

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ACKNOWLEDGEMENTS

I would like to express my gratitude to my advisor, Dr. Mona Farrell, for her support and insightful assistance throughout this project. I am especially indebted to Bill Postl for his generous help and encouragement. To Sam, Adam and Kate, a special thanks, for their always cheerful support and cooperation. This research was funded by a Quebec Ministry of Education F.C.A.C. grant awarded to Dr. M. Farrell.

ABSTRACT

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Research in the seventies has begun to identify some significant student behaviours as well as instructional formats which either predict or have at times appeared to cause learning outcomes. Relatively few of the studies to date have focussed on the kindergarten child and none could be found that sampled a low SES kindergarten classroom. In this study, twenty kindergarten children in a low income inner-city Montreal classroom were observed. The teacher in this classroom had an active, structured approach to teaching typical of techniques specified in the Direct Instructional Model. Over an eight day period, subjects' classroom behaviours were coded in 3 discrete categories using the Beginning Teacher Evaluation Study (BTES) Schedule

and these behaviours were examined in relation to different lesson formats and achievement. Achievement was determined on the basis of composite scores on the Metropolitan Readiness Form P, level 1 (Nurss & McGauvran, 1974).

Findings indicated that both high and low achievers in this classroom spent a large proportion of time engaged in task related behaviour and this task related behaviour was not greater for Direct Instruction type lesson formats as compared to other Non-Direct Instruction lesson formats.

To account for this, teacher style and the differences in the kindergarten curriculum from that of later elementary grades are discussed.

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CHAPTER I

INTRODUCTION

Pinpointing the crucial elements of the teaching learning process has consistently eluded researchers in the last several decades. As early as 1939 researchers such as Anderson (1939), Anderson and Brewer (1945) attempted to relate observations of classroom behaviour to pupil change (Soar 1972). Medley and Mitzel (1959) did an extensive review of studies where teacher effectiveness had been rated and then compared to measures of pupil growth and concluded that there was no consistent relationship between measured change in students and teacher effectiveness ratings.

A major shift in educational research however occurred in the 1970's stimulated by the work of Carroll (1963) and later Bloom (1968) on the concept of mastery learning. From seeing the student as a passive responder whose academic success depended largely upon what the teacher did, attention focussed on the student as an active participant who brought to the learning task more than just what the input of the teacher provided.

The process-product studies that have emerged as a result of this focus on student behaviour or what Berliner (1976a, 1976b) has referred to as the "mediating link" between student achievement and teacher behaviour have yielded fairly consistent results when middle socio-economic status

(SES) elementary school children have been sampled. These naturalistic as well as experimental field studies concentrating on reading and math subject areas have established a strong relationship between achievement gain and student behaviours such as "attention" also referred to as "on-task", "engagement" and "involvement". While attention has been found to be a predictor of achievement in that high attenders tend to make greater achievement gains, the converse is also true. Achievement gain is also a predictor of level of attention (Good and Beckerman 1978).

An equally strong relationship has been reported by Berliner (1976a, 1976b) for what is now termed 'direct instruction' teaching strategies and student achievement gain. Direct Instruction is a series of instructional techniques, eg., whole class teaching, teacher focussed activities which tend to enhance the attention of the student. Rosenshine (1979) focussing on instructional setting (eg., small group vs. whole class) and teacher centered teaching vs. less supervision also reported that attention levels of elementary school children tended to be lower in independent seatwork activities than in teacher-led lessons with more adult supervision.

Most of the research investigating student behaviours and achievement outcomes to date has focussed on the upper elementary class levels. A couple of researchers (Kounin, 1974; Forness & Esveldt 1975b) have attempted to study the

middle SES kindergarten child. However, the focus of these two studies was the identification of teaching characteristics which yielded high student involvement (Kounin 1974) or the identification of high risk children using the identified teaching characteristics (Forness & Esveldt 1975b).

Research on student classroom behaviours would appear to be even more crucially important for the low SES child for whom the search to date for significant variables to moderate achievement levels has yielded few insights that would improve their learning. The failure of the massive Project Follow Through to yield significant generalizeable results in regard to teaching and learning strategies resulted in the major evaluation teams (eg., Abt. Assoc. 1977; House et al 1978; Andersen et al, 1978) strongly recommending local small scale studies in individual schools. Of the teaching models and strategies studied, only one--the Direct Instructional Model--yielded significant improvement in learning and only in some classrooms. Brophy and Evertson (1976), Good and Beckerman (1978) and Medley (1978) have reported that certain teacher instructional behaviours and teaching format at the upper elementary grades (grade 6) vary according to socio-economic status (SES). However whether specific teaching formats within a particular SES group for a particular grade child yield differential learning outcomes is far from clear and no study examining this has been found in the literature.

Much of the research on the low income, disadvantaged child (in reality a low-achieving child) has focussed on inter-social class comparisons which can be extremely useful and interesting. However the study of differential learning outcomes within a social group such as low SES, given that school, teacher and milieu are largely controlled, may in the long run provide more meaningful and worthwhile insights.

Problem Definition

The problem this study is exploring is the relationship between¹ certain student classroom behaviours (five on-task behaviours: engaged verbally with teacher; engaged listening to teacher; engaged writing; engaged constructing/drawing; engaged in following directions, i.e., clean-up; three off-task behaviours: eyes not on teacher or task; talking to peers; playing with peers);² lesson format ((a) supervised seatwork; (b) whole group teacher supervised activities; (c) whole group teacher-led activities; (d) small group construction activities); and³ academic achievement in a Montreal low income inner city kindergarten classroom where the teacher has been subjectively identified by colleagues, consultants and school board personnel as using what is typically seen as a Direct Instructional approach. The specific hypotheses to be tested in the proposed investigation are:

- (a) High achievers will exhibit significantly higher time

on task behaviour as compared to low achievers;

(b) On task behaviour will be significantly higher for both high and low achievers in lesson formats which typify what has been described as Direct Instruction (i.e., supervised seatwork, whole group teacher-led activities) as opposed to other types of lesson formats (whole group teacher-supervised activities, small group construction activities).

Significance of Study

Society is still looking to the school system to redress the below average achievement of the low socio-economic status (SES) inner city/disadvantaged child. Since the 1960s when research on the disadvantaged began to flood the literature, the low SES inner city child has been investigated mostly in comparative social class studies on a number of variables and found in relative terms to be deficient. The cumulative deficit hypothesis has been postulated and found to be characteristic of many inner city classrooms. Yet there is evidence that approximately 30 percent of these children succeed in school (Farrell, Derevensky, Hymovitch, Stoloff, and Zlotowski, 1977). The identification of classroom variables, assuming there are some, which contribute to this differential academic achievement is of critical importance so that educators can concentrate their efforts and resources in areas where these will be most productive.

Furthermore, since most learning is fundamentally hierarchical in nature (the academic foundations are laid in kindergarten) and children's attitudes and motivation toward achievement are conditioned in the earliest school years, the study of the kindergarten child seems to be vitally important. This is especially so given the meagre research on the productive classroom learning behaviours of the kindergarten child. The study therefore has implications for teacher training institutions, school and school board administrators as well as for the individual teacher who should become more consciously aware of his/her own teaching style and teaching strategies.

Limitations of Study

This is not an experimental study and therefore no cause and effect implications are implied. Rather the study is attempting only to identify significant variables which are predictive of academic achievement in Montreal inner city kindergartners--variables which might be studied experimentally given a solution to certain ethical constraints. Furthermore, because this study has concentrated on within group differences in one low SES classroom generalizability is limited.

CHAPTER II

REVIEW OF THE LITERATURE

In this chapter I will present relevant literature on (1) Student classroom behaviors which are believed to relate to academic achievement, (2) The Direct Instructional model, (3) The Observation Approach.

Student Classroom Behaviors

For teachers, the involvement of their students in classroom activities often serves as a barometer for the success of their teaching (Jackson and Belford, 1965). The student's "involvement" or attention to classroom activities is one variable that has been isolated (as being crucial to the learning process) by such researchers as Bloom (1968) and Carroll (1963). Carroll (1963) contended that everything else being equal, attainment mastery is determined by the opportunities provided by the teacher for a pupil to study a given content, and the use made of that opportunity by the pupil. Bloom (1968) in his analysis of the Carroll model also sees 'learning time' as the important factor in determining the degree and amount of school learning.

Lahaderne (1968) conducted a study which addressed both the relationship between student's attentiveness and attitudes towards schooling and student attention and achievement. Over a two month period, student behaviors in four

sixth grade classrooms were coded as: attentive, inattentive, uncertain and not observable. Lahaderne obtained a significant positive relationship between measures of student's attention and scores on achievement and intelligence tests. Little or no relationship was found between student's attitudes towards school and measures of attention.

Cobb (1972a) designed what was to be the first of several studies in which he operationalized "attention" into more discrete behaviours. Using a sample of fourth grade students in two schools, Cobb observed task oriented behaviours (attention) and non-task oriented behaviours (inattention) during a nine day period of arithmetic lessons. The findings indicated that "attending" was the most powerful behavioural correlate of arithmetic achievement. Based on this and two prior studies (Cobb, 1969, 1970), Cobb (1972b) derived a set of achievement-oriented behaviours made up of both social and academic components which he called 'survival skills'. These 'survival skills' which included task related behaviours such as following teachers' instructions, looking when appropriate, at the text book, as well as social behaviours such as cooperative play, etc., were seen by Cobb as being critical and prerequisite skills that enabled a child to benefit from all educational opportunities to the best of his/her abilities. On the basis of this study, Cobb (1972b) speculated from these findings that survival skills were significantly poorer among low SES children as compared to

middle SES children. He argued that these differences in 'survival skills' existed prior to school entry and were likely symptomatic of different home environments.

Having isolated the relationship between attention and achievement, Cobb and Hops (1973) attempted to establish a causal relationship between student survival skills and achievement. They carried out an intervention program which taught certain designed academic survival skills to a group of eighteen low-achieving, first grade, readers--twelve of whom were in the experimental group. Although initially all the pupils had similar levels of survival skills and standardized reading test scores, results of this study indicate that the twelve children in the experimental group as compared to the controls showed significantly greater gains in both survival skills and academic achievement as measured by standardized reading test scores.

In a follow-up study, Hops and Cobb (1974) compared the effectiveness of two kinds of intervention programs using three groups of first grade pupils--two experimental and one control group. They found that students receiving the curriculum training program had significantly better reading scores than those either receiving the survival skill training program or no special training at all. However, Cobb's work has inspired success with intervention programmes such as PASS--"Programme for Academic Survival Skills" (Greenwood, Hops and Walker, 1977).

The seminal work of Lahaderne and Cobbs on "attention" has encouraged a number of studies which essentially replicated their studies while using different age groups and grades. Samuels and Turnure (1974) found further evidence for a relationship between achievement and student classroom behaviour in that word recognition skills and attention in first grade children were significantly correlated ($r = .44$), $p < 0.05$). Mckinney and Mason (1975) used second graders to assess the predictive nature of discrete student behaviours as measured by "The Schedule for Classroom Activity Norms" (SCAN) developed by Spaulding (1970). SCAN and achievement scores were obtained for the children at the beginning and end of the school year. Student SCAN scores were found to be positively correlated to improvement in Student Achievement and I.Q. test scores (measured during the school year). Further to Mckinney and Mason's (1975) research, Harper et al (1978) conducted a study using four of the most predictive categories of SCAN as dependent measures with children attending three grade levels (K; gr. 1 and gr. 2) in an "open concept school". The findings were generally inconsistent with those of Mckinney and Mason especially among grade one children where none of the observable variables added any significant independent variance to that already accounted for by the I.Q. scores.

Soli and Devine (1976) using Cobb's method of coding discrete categories, looked at the relationship of classroom

behaviour to academic achievement within high and low achieving third and fourth grade children. Three hundred and twelve third and fourth grade children were observed during math and verbal skills instruction. By splitting the sample at the mean of the combined achievement scores, comparisons on classroom behaviours between the high and low achievers were obtained. Cross validation between academic settings provided evidence of moderate stability of the classroom behaviour--achievement relationship in different settings. However among high and low achieving classroom groups, certain classroom behaviours were more characteristic for each of these groups. That is certain task-oriented behaviour such as interacting with both the teacher and peers about academic matters proved to be the most predictive behaviour amongst the high achievers, while in the low achieving group the absence of such inappropriate behaviour as playing during class and neglecting to pay attention was most predictive. It was further found that only among the lower achievers was there a positive correlation between achievement levels and amount of time spent in total task-oriented behaviour. The two groups, high and low achievers, differed only slightly in the mean proportion of classroom time spent engaging in any of the coded behaviours. Higher achievers spent 75 percent of the time attending compared to 72.8 percent for the low achievers while all other behaviours differed by less than 2 percent. While the magnitude of the correlations in this study are rather low, the results from

the total sample are on the whole consistent with Cobb's (1969) findings in that single student classroom variables correlated with achievement but that multiple regression of behaviours on achievement predicted achievement more accurately than single behaviours.

Forness and Esveldt (1975) directly observed four kindergarten classes. From their observations of student classroom behaviour they were able to predict which children would be identified as being educationally high-risk by the end of the school year. In a subsequent related study, Forness, Guthrie and Nitura (1976) analysed the same observational data and were able to characterize the high risk group as exhibiting less attentive behaviour, being more active in both on and off task situations, and requiring more teacher supervision than non-risk children in the same classroom. Forness, Guthrie and Hall (1976) followed up this original kindergarten population but at their completion of grade one. This was done to determine the validity of the original clusters of observable behaviour in predicting educational risk. Findings from this study only partially confirmed the predictive validity of the original clusters. While children previously identified as 'high-risk' were still doing poorly in some areas, this was significantly related to only certain classroom behaviour. Whereas increased activity level (i.e., task oriented verbal behaviour and also disruptive behaviours) was the original distinguishing feature of the at-risk children, "attention" (defined as eye contact to teacher or task) now

seemed to be the critical dimension in predicting educational risk.

Adding further support to the body of research suggesting a relationship between attention and student achievement gain is an observational study by Stallings and Kaskowitz (1975) in which they took pictures every fifteen minutes of each child in a classroom and what he/she was doing. Percentages of time that the average class spent actively engaged in reading or math lessons and the corresponding achievement gain was reported. A particularly strong correspondence between relative time spent in reading and math activities and achievement gain was established. Similarly, two other studies, one by Hoge and Luce (1979) and the other by Denham and Liberman (1980) also report high correlations between "time on task" and achievement gain.

Good and Beckerman (1978) attempted to isolate the effects of student achievement level, differences in learning activities and differences in student socio-economic status (SES), on student achievement. These researchers investigated "time on task" as a measure of student involvement in classroom activities using a coding scheme derived from the work of Kounin (1976). Good and Beckerman set out to look at three things: whether student involvement was different for high, middle and low achievers; whether pupils were more involved in some subjects than others; and whether some classroom activities elicited different levels of student involvement.

Their sample was selected from two schools of differing SES and consisted of six different classrooms of sixth grade children. Regretably the data collected in this study were primarily descriptive limiting the interpretation of the findings. However several interesting findings emerged. Firstly, differences in levels of involvement were found between achievement groups in that the proportion of time 'involved' was 76% for the high achievers; 73% for the middle group and 64% for the low achievers. Secondly, different instructional settings seem to have been related to student involvement in such a way that student involvement was relatively low in teacher-led whole class activities and increased in more individualized, small group, teacher-led activities.

Finally, and of particular interest to the purposes of this study, was the finding that student involvement differed with SES level. That is, children in the school with a wide SES range of families were found to be involved in classroom activities 82% of the time. In contrast, children in the school with a predominantly low SES population, were involved in similar activities only 60-68% of the time.

To summarize, the studies reviewed provide fairly strong evidence for a positive relationship between the student classroom behaviour "attention" (also referred to as "involvement" and defined in more recent work as "time on task") and student achievement in the areas of reading and

mathematics. Most investigators have found this to be the case among middle and upper socio-economic groups and most specifically at the upper elementary grades. Harper et al (1978) questioned this relationship for their first graders and Forness and Esveldt (1975b) reported that this relationship (first sampled in kindergarten) was found for only certain areas in their high risk grade one children. Good and Beckerman (1978) suggest that grade six student involvement is also a function of social class as well as of instructional setting.

The question which this study is attempting to explore, that is, whether high and low achievement among low SES kindergarten is also a function of certain student classroom behaviours and specific lesson format has not as yet been answered in the literature.

Direct Instruction in the Classroom

In an attempt to bring order to the massive research findings on teacher effectiveness, Borich (1979) reviewed what he considered to be the five major research projects (Stallings & Kaskowitz: Project Follow Through, 1974; Soar & Soar 1972; Brophy & Evertson 1974, 1976; Brophy et al, 1975; MacDonald et al: Beginning Teacher Evaluation Study, 1975) of the last decade, which studied teaching strategies and student outcomes. All five investigations studied students in the elementary grades and focussed on reading and

math instruction with pupil outcomes measured by standardized tests. Low inference classroom observation systems were used to measure Teacher Behaviours. These studies collected data on every facet of classroom activity. Variables investigated included: length of school day, instruction time, classroom management, teacher use of praise, feedback from teacher to students, teacher use of questions, teacher affect, textbooks, and student initiative. "Catching" and keeping pupil attention, using specialized materials such as textbooks and workbooks, systematic questioning and using student initiated questions, whole class teaching were reported to be significantly related to different achievement variables across different and not always the same grade level. Reduced structure for more complex material and increased structure for more basic content was also reported as being important.

Good (1979) reported that in every process-product study to date, teachers' managerial abilities (e.g., whole class teaching; structured lessons; controlled seatwork) have related positively to student achievement. He also claimed that the research findings indicate that the teacher who can structure, maintain and supervise learning activities is more effective in teaching basic skills. In the Texas Teacher Effectiveness Program (Evertson and Anderson, 1978; Anderson and Evertson, 1978) not only were researchers able to identify teachers with managerial problems in the first few days of school which continued throughout the year, but

were also able to significantly relate these managerial abilities to student involvement. Stallings and Kaskowitz (1974) reported that while they found no evidence that any one curriculum or program was best for all schools, they did find that how teachers manage classes was clearly related to student's progress and acquisition of basic skills.

In 1978 Stallings and Hentzell concluded that orderly classrooms; involvement in academic tasks, teacher's active involvement with students and a well organized and structured learning situation are all associated with higher achievement gain. Gage (1978) in a review of studies on the effects of "open" versus more structured forms of education found that it was the more structured programs that were associated with greater student gain. McDonald (1976) and Stallings (1976) report that greater achievement gains in different subjects and across grade levels is related to teaching methods that increase direct instructional time. Fisher, Filby, Marliave, Cohen, Dishaw, Moore and Berliner (1978) at the Far West Lab reached similar conclusions.

From these and other studies (eg., Gage, 1978) on teacher effectiveness and managerial ability, a pattern of instruction associated with student learning has emerged. The pattern is one of an active teaching role, clearly focussed academic goals and high levels of student involvement in tasks. This pattern has come to be called, in the research on teacher effectiveness, "Direct Instruction" (Good, 1979):

Kounin (1974, 1975, 1979) and his associates have attempted to specify more precisely, characteristics of the Direct Instructional Model in a kindergarten classroom and subsequently at the grade three level (Kounin & Doyle, 1975). They described lesson characteristics which affect student attention as "signal systems" in instructional activities. (Kounin and Gump, 1974; Kounin and Doyle, 1975; Kounin and Sherman, 1979). Signal systems are defined as the capacity inherent in a specific task or activity to elicit, shape and sustain the actions of children; and as such, they have three dimensions which seem to relate to student attention: continuity (as in a teacher read story); insulation (activities which afford protection from distraction); and intrusiveness (activities which are easily deflected from their original purpose). Kounin and his colleagues found that lessons with higher continuity, greater insulation and lower intrusiveness (e.g., individual construction activities) produced lower percentages of off-task behaviour.

In a subsequent study with third grade pupils, Kounin and Doyle (1975) compared lessons that produced high levels of pupil task involvement to those that resulted in low task involvement. They found that student involvement was higher in teacher-led small groups than in either seatwork or whole class recitation. What stands out in the work of Kounin and his associates is that a teacher can control and manipulate

the classroom environment to maximize student involvement.

Based on Kounin's work, Oxford, Morrison and McKinney (1979) observed kindergarten children using a time-sampling procedure during three differently structured lessons.

Students were found to be more distractible, passive, and non-constructively involved in whole class recitation than in either independent seatwork or activities with more continuity (eg., the teacher reading a story).

Research findings on direct instruction across different SES groups has not proved to be conclusive. Medley (1978) reported in a review of Brophy and Evertson's (1976) study that the average SES level of the sample population appears to be critical when predicting which instructional behaviours will yield learning outcomes. That is, of 84 process-product comparisons, 62 percent showed reversals across different socio-economic status populations. Brophy (1976) noted that lower student SES levels accounted for reversals in the following teacher behaviours: structuring and control where lower SES pupils generally benefitted from tighter control but were more likely to achieve higher cognitive objectives in a less structured situation; teacher praise seemed to benefit lower SES pupils more than higher SES pupils; and teacher affect with low teacher affect being more effective with high SES pupils and high teacher affect with low SES pupils..

Further to these findings, Good and Beckerman (1978)

conducted a study in which they compared the relative effectiveness of a common set of teaching behaviours for fourth grade mathematics students from two different SES groups.

Good and Beckerman found that while there were real differences between SES groups they weren't as great as those suggested by Brophy and Evertson (1976) and Medley (1978). Few of the

behavioural comparisons according to Good and Beckerman

showed important differences across the two SES samples

although significant differences were found at the grade 6

level for some variables. Among the variables which did

seem to have differential impact were: "praise" which was

positively related to student achievement in the low SES

setting and negatively related in the high SES group;

"climate variable" where a relaxed climate appeared to be more

important for the low SES group; and "seatwork" with teacher

initiated contact more strongly associated with student

achievement gain for the low SES group. Support for these

findings were also reported by Brophy and Evertson (1976).

To summarize, the research reported in this section points to a relationship that consistently emerges, that is,

strong classroom management and organization of instruction

promote student engagement or attention which in turn is

associated with achievement gain. This pattern of instruction

has been termed Direct Instruction--an active teaching model

seen as a collection of instructional techniques which

enhance student attention. The research findings further

suggest that certain learning activities such as teacher-led lessons elicit more student attention than independent activities with less teacher supervision like seatwork--an activity which can occupy a large portion of classroom time. Kounin and his associates have contributed further to our understanding of this instructional model by examining specific lesson formats and their effect on student attention and characterizing different lesson formats as having certain "signal systems", which are the capacity of these tasks to elicit and sustain student participation.

Findings on Direct Instruction (eg., Good & Beckerman 1978; Brophy & Evertson 1976; Medley 1978) when applied to low SES students are inconclusive and far from clear, especially for the kindergarten child. Farrell, Derevensky, Hymovitch, Stoloff, and Zlotowski (1977) suggest that at least 30 percent of children in low SES school settings are achieving above grade level. Brookover and Gottlieb (1963) conducting a study on high and low achievers found that one-third of their low sample was achieving adequately. Farrell (1973) found that individual differences within a sample of low SES students were at least as great as that between social classes as does Shipton (1976b) who reports wide ranges in cognitive aptitude and academic achievement in low SES third grade children. Because of these findings, Shipton and Farrell both emphasize the importance of investigating the factors which academically differentiate between successful

and unsuccessful students within low SES groups rather than between high and low SES settings. 'Rosenshine (1978)' also draws attention to the lack of descriptive data on low SES classrooms with particular regard to such variables as "engaged time" across different learning contexts.

The present study investigated low SES kindergarten student behaviours across a number of lesson formats used by a teacher who was identified by certain experts who knew her as using a Direct Instructional approach. The study is attempting to clarify some of the uncertainty in the literature with regard to the relationship between kindergarten student classroom behaviour across instructional settings (lesson formats) and achievement in low SES children.

Observational Approach

Historically observation skills have been central to generating both theoretical and knowledge bases in the physical sciences. Social scientists rooted in the tradition of the physical sciences and the biological sciences have also added to human knowledge by deriving conclusions on objective observable data. Most often however these observations have been limited to the effects of an experimenter's manipulation in a lab or to the findings of contrived situations with the researcher using questionnaires, rating scales, and clinical testing techniques. The traditional experimental approach generally uses an artificially controlled

manipulation of the environment in order to gain knowledge of various phenomena and frequently empirical findings in the laboratory are not verified in naturalistic settings.

The ecological approach emphasizes the investigation of observable phenomena as they occur naturally in the environment, uncontrolled by the observer. In 1967 Wright noted that "Psychology appears to stand alone as a science without a substantial, descriptive, naturalistic ecological side" (p. 3). Perhaps in response to this critique psychologists have in the last decade increasingly explored behaviour in the natural settings of home, community or classroom (eg., Barker & Schoggen, 1973; Flanders, 1970). These researchers have shown how an observer can accurately record a broad range of natural behaviour through the use of specimen records.

The earliest systematic observations of children's behaviour in natural settings were biographies, diaries, and detailed recordings of children's behaviour (eg., Pestalozzi's (1746-1827) diary on his three and a half year old son; Piaget's (1960) observations of his children, which yielded the raw data for his now famous theory of cognitive development, Brown's (1965) observations which provided a new perspective on language development). Since the sixties the upsurge of interest in studying school learning in its natural habitat, the classroom, has increased perhaps in reaction to what Caldwell (1969) termed "premature leaps into

the laboratory." In classroom systematic observations are now used much more frequently to generate information regarding the nature and effectiveness of varying instructional strategies and student behaviours (eg., Berliner, 1976; Brophy, 1974; Spaulding, 1970; Kounin, 1970; Stallings, 1974). However at the 1974 National Leadership Training Institute on observational procedures Weinberg & Ward (1975) came to the conclusion that there is no "one best way" in observation, that each must choose the methods most appropriate to the educational problem being studied.

Flanders (1970) has provided a framework for analyzing classroom interactions by observing teacher and pupil verbal behaviours. The popularity of the Flanders Interactional Analysis Model is reflected in the growing research literature using classroom observation approaches to analyze teacher and student behaviour (Flanders, 1975; Morine, 1975). The large number of observation schedules now available to the classroom observer can be confusing although Simon & Boyer (1967, 1970) helped to evaluate many of these in their anthologies *Mirrors of Behaviour*. Overviews of observation procedures are contained in the works of Flanders (1970), Rosenshine & Furst (1973), Brophy & Good (1974), Dunkin & Biddle (1974) and Gage & Berliner (1975). Nevertheless findings from studies using different observational systems are complicated to analyse because of the different categories of behaviours.

Berliner (1976) maintained that the minimal amount of available data describing the everyday life of the classroom has resulted in categories being developed largely on the bases of theoretical speculation and has advocated ethnographic studies. Together with Tikunoff (1976) Berliner attempts to overcome this drawback by studying the daily instructional activities and student behaviours in the classroom. Trained ethnographers rather than psychologists, observed and identified certain variables such as "Attention/Time on Task," on which observational systems could be developed. This initial work led to the elaboration and development of several instruments which were used in the Beginning Teacher Education Study (BTES), one of which was employed in this study.

Forness & Guthrie (1977) addressed the issue of how many observations must be recorded and over what period of time in order to obtain truly representative data. Cobb (1972) suggested that long periods of time are required; others such as McKinney (1975) used relatively few observations. While some studies (eg., Nelson 1971) had complete observations for one single day others gathered data over several days (Forness & Esveldt, 1975). Cobb & Hops (1973) gathered data over consecutive days and others over a period of months (eg., Bryan, 1974) and yet others over an entire year (Camp & Zimmet, 1974).

In an attempt to determine the minimum number of

observation days necessary for a reliable estimate of behaviour Forness & Guthrie (1977) observed thirty kindergarten children on eighteen consecutive days for approximately one half hour per day using Forness & Esveldt's (1975) observation schedule. Results did not corroborate Cobb's thesis that longer periods of time were necessary. Correlations of .72 to .77 between daily averages and the grand mean were obtained by the fourth day of observation. Marliave et al (1977) who designed and field tested the BTES instrument used in this study recommended that the school day be used since it is generally the unit of time by which teachers plan and conduct instruction. They further claimed that time sampling data be summed over "a sufficiently long period of time so that the sampled events can be expected to provide a reliable estimate of the entire population of events from which they were sampled".

The question of the time unit to be used is not only one of length but also a function of the number of categories being sampled. Categories and codes must always be memorized before sampling begins and the observer must proceed from one preset time interval to the next whether ready or not so that when the time unit is very small as for example Flanders' system (observer records a code number every three seconds) and the categories are relatively large, the procedure can be taxing and require considerable practice. Clearly a balance between the most appropriate time unit, the number of

individuals to be observed and the number of categories to be observed is important.

The ideal number of subjects for an observational study depends somewhat on the purpose of the study but the fewer the number of subjects the better. Boehm & Wineberg (1977) advocated observing as small a number of subjects as reliably reflects the purpose of the study. They suggest that in a class group as large as twenty children that it is necessary to employ a technique that allows for systematic ordering of observations in order to focus careful attention on each individual.

The purpose of this investigation was to sample student classroom behaviours in the attempt to explain differential student achievement when teacher and learning environment are controlled. The observational approach was selected as the best research method suited to this purpose as exemplified by noted researchers in this field (eg., Berliner; Rosenshine; Brophy; Good). The instrument used was developed and field tested (Marliave et al, Technical Report #1-5, Far West Laboratory, 1977) by the BTES (Beginning Teacher Evaluation Study) team led by Berliner. The instrument was used in the BTES with grade 2 children and consequently the within category behaviours were adapted where necessary for the kindergarten children used in this study.

CHAPTER III

METHODOLOGY

Subjects

Twenty children from a kindergarten class in a low socio-economic status (SES) inner city elementary school in Montreal were subjects for this study. The population of this school was predominantly second or third generation English speaking Canadian and came from a school that was designated as low income according to the Operation Renewal criteria of the Montreal Catholic School Board. Close to 90 percent of families in this school were on welfare. Students were divided into 10 high and 10 low achievers (using the arithmetic mean as the cut off point) on the basis of their total scores on the Metropolitan Readiness Test: Form P Level 1 (Nurss & McGauvran, 1974) administered at the beginning of the kindergarten year.

Teacher and Teaching Environment

The teacher in this classroom had been teaching for 20 years and was selected partly because of her comfort with having an observer present but primarily because of her classroom management style. Prior discussions with the school principal, school consultants and certain of this teacher's peers as well as personal observation by the writer

and Dr. Farrell, whose Ministry of Education grant funded this research, confirmed that this kindergarten teacher utilized most of the strategies associated with the Direct Instructional Model. For example, her instructional manner was active and goal directed. Instruction was characterized by clear explanations of what was to be learned and followed by frequent questioning in order to elicit student participation and to provide feedback to the children. Learning activities were well structured and broken down into small units making the subject matter easier for the children to grasp. Activities such as letter and number recognition were integrated into other less structured activities such as writing mother's day greetings on cards or playing number recognition games. The teacher's control of the student's behaviour was such that there was little disruption of lessons.

In addition to the teacher, there was a teaching assistant present to assist with distributing and collecting materials, to assist with the dressing and undressing of the children for outdoor activities, cleaning up, etc.

The classroom environment was pleasant, consisting of one large bright corner room--windows on two sides--on the ground floor of a modern elementary school. The classroom had sinks and a water fountain, toilet facilities and direct access to an outdoor play area. It was well equipped with small tables and chairs and was divided into areas by low shelves on which were displayed a variety of toys, games and

learning materials. There was also a library and record corner, easels and paints, a blackboard on the wall and children's artwork decorating the room.

Instruments

The Metropolitan Readiness (Nurss & McGauvran, 1974) Form P, Level 1, was used to classify students into high or low achievement groups. This widely known and used instrument provides a composite score for each child on the basis of 6 subtests.

Children's classroom behaviours were recorded using an eight category classification system adapted from the observation instrument designed by Marliave, Fisher, Filby and Dishaw (1977) for the Beginning Teacher Evaluation Study (BTES). This classification system is presented in Table 1. The BTES was part of a large scale research effort to study teacher effectiveness and the classroom qualities related to achievement in reading and mathematics. Previous ethnographic work by Berliner (1975) provided support for such concepts as academic learning time (a combination of subject content, task difficulty and student engagement), student attention and their interaction with other classroom variables.

This observational instrument records students' engagement and non-engagement in classroom activities, the type of engagement and the setting in which the student

TABLE 1

Student Behaviors

- EO: Engaged-Oral, e.g., question, answer or discussion with teacher on task relevant material.
- EW: Engaged-Written, e.g., using a pencil/crayon in task related activities (usually seatwork)
- EL: Engaged-Listening, e.g., attentive to teacher and/or task
- ED: Engaged-Directions, e.g., putting task related materials away when asked or taking them out, turning pages, walking to blackboard when appropriate
- EC: Engaged-Constructing, e.g., building with plasticene, popsicle sticks, making Mother's Day cards
- NP: Not Engaged-Playing, e.g., socializing with peers, misbehaving, making funny faces
- NT: Not Engaged-Talking, e.g., talking with peers
- NO: Not Engaged-Off Task, e.g., eyes not on teacher or task, daydreaming

behaviour takes place. The coding procedure uses a low inference scale, classifying only observable behaviours which require a minimum of observer interpretation and excludes high inference factors relating to teacher qualities. Categories of pupil behaviours minimally overlap and are not redundant. By concentrating on observable clear categories using a low inference scale, this instrument overcomes many of the weaknesses of other observer-rated scales such as that of Cobbs (1972).

Marliave et al (1977) describe instructional settings in terms of self-paced (where the student sets his or her own pace as during independent seatwork activities) or other-paced (as during activities where the teacher takes students through problems one at a time; lectures; oral question and answer periods; flash card exercises). The present study has identified two types of self-paced activities and two types of other-paced activities which appear to reflect the organization and management of the classroom as well as representing the range of research findings on classroom groupings. These four lesson formats are presented in Table 2. Two of these lesson formats (whole group teacher led activities and seatwork) were more characteristic of the Direct Instruction Model in terms of structure and teacher supervision while the other two settings (whole group teacher supervised activities and construction) were more loosely structured and less closely teacher monitored.

Researchers such as Soar (1973) and Stallings &

TABLE 2

Lesson Format

Supervised Seatwork*:	Students work in small groups but independently on stencils, writing and number practice. Interaction is between student and learning material. Teacher supervises and monitors progress.
Whole Group Activities, Teacher-Led*:	Eg., Teacher reading a story to whole class; teacher illustrating lesson at blackboard to whole class.
Whole Group Activities, Teacher- Supervised:	Eg., Bingo-type games for letter and number recognition, circle and action games. Child leads while teacher overlooks activity.
Small Group Construction:	Children work in small groups on various projects such as building with plasticene, popsicle sticks, making greeting cards.

* These two lesson formats are typical of instructional settings as described in the Direct Instruction model.

Kaskowitz (1975) have found positive and often significant correlations between achievement and group settings where there is close adult supervision. Rosenshine (1979) has inferred from these findings that many students do not engage in on-task behaviour unless a teacher or another adult is monitoring their activities. However Kounin and Doyle (1975) in their study of kindergarten children suggested that the important factor in eliciting and maintaining student attention was the lack of distraction that certain instructional settings offered (eg., construction activities at desk where materials were already arranged; large groups with teacher reading a story).

Procedures

Two observers, one who did the data collection and another who collected data for reliability purposes learned to use the rating scale by studying training procedures outlined by Marliave et al (1977). Before collecting data for the study, both observers spent time in the classroom to accustom the children to their presence as well as to become familiar with student names and faces. Over a two day period, data was collected by both observers for inter-observer reliability which ranged between 89-95% agreement. The reliability check was obtained by dividing the number of observations in which there was agreement by the total number of ratings and multiplied by 100.

The twenty children in this half-day kindergarten class were observed at 10 second intervals during different lesson formats over an eight day period by one observer. On and off task behaviour was recorded as was the particular lesson format in which these behaviours occurred. Certain activities such as gym class, snack time, recess, were not included in the observations and since the kindergarten class is only one half-day, a minimum of 120 observations (maximum of 150) were recorded for each child over the eight day period resulting in approximately 30 observations per child for each lesson format.

The observer used a stop watch and coding sheet and positioned herself in the classroom in such a way as to permit a full face view of each target pupil. To control for order effects, observations began at the onset of each lesson with a different child located at various points on the list of 20 students. This child was observed for a 10 second period, the student behaviour and lesson format recorded and then the same procedure was repeated for each subsequent student on the list until the lesson was completed.

Analyses

Simple cross tabulation of the data was made. Findings were analyzed for significance by means of the t-test as well as by Pearson correlations. The 5 percent level of confidence was adopted as the criterion of significance.

CHAPTER 4

RESULTS

The purpose of this study was to investigate the relationship between certain student classroom behaviours (5 on-task behaviours; engaged-oral; engaged-written, engaged-listening, engaged-directions, engaged constructing; 3 off-task behaviours; not engaged-playing, not engaged-talking, not engaged-off task); four lesson formats (Supervised seatwork, whole group teacher-led activities--these 2 are samples of the Direct Instruction Model; whole group teacher-supervised activities, small group construction) and academic achievement (defined as scores above or below the mean on The Metropolitan Readiness, Form P, Level 1, Nurss & McGauyran, 1974) in an inner city kindergarten classroom (N=20; 10 high and 10 low achievers). Based on the literature, two hypotheses were elaborated. They were:

1. High achievers will exhibit significantly more time on task behaviour as compared to low achievers;
2. On-task behaviour will be significantly higher for both high and low achievers in lesson formats which typify what has been described as Direct Instruction (i.e. supervised seatwork, whole group teacher-led activities) as opposed to other types of lesson formats (i.e. whole group teacher-supervised activities; small group construction activities).

Before presenting the findings it should be noted that preliminary analysis failed to show any significant differences

between boys and girls on all categories of behaviour; therefore sex was not considered in subsequent analyses.

Table 3 presents cross tabulation of the number of observations by student behaviour by lesson format for the 20 subjects studied.

As can be seen from Table 3, a total of 2,639 observations were recorded on all the 20 subjects. Of these, 81.6 percent represent On Task behaviours of which there were 5 types and 18.4 percent represent Off Task behaviours of which three were sampled. Of the 4 lesson formats studied, Whole Group Teacher Led Activities (Direct Instructional Model) accounted for 35.1 percent of the observations with the second Direct Instruction model lesson format (Supervised Seatwork) ranking a close second with 27.8 percent of the observations. The two lesson formats which were postulated as Non-Direct Instruction examples accounted for only a little more than one third (37.1 percent) of the observations recorded in this classroom.

Among the On Task behaviours, the one which accounted for most observations was E.L. (Engaged-listening) with 36.2 percent of the total observations. Within the 4 lesson formats percentages as high as 69.8 percent in Whole Group Teacher Led Activities (Direct Instruction) and 54.2 percent in Whole Group Teacher Supervised Activities (Non-Direct Instruction) were obtained for E.L.

Of the three Off Task behaviours (which accounted for only 18.4 percent of all observations) the single behaviour

TABLE 3

Cross Tabulation and Percentages of Observations of Student Behaviour by Lesson Format for a Sample of Inner-city Kindergarten Children (N=20)

	LESSON FORMAT*				% of Total Obs.
	1	2	3	4	
Student Behaviours**	%	%	%	%	%
EO	3.0	7.8	7.9	3.1	5.3
EL	14.4	69.8	54.2	2.5	36.2
EW	36.4	2.6	0.3	0.0	11.1
EC	9.3	0.1	0.0	50.8	14.9
ED	18.3	1.2	26.5	21.4	14.1
TOTAL ON-TASK					81.6
NP	2.9	1.0	0.9	3.1	2.0
NT	6.0	2.6	2.9	11.5	5.7
NO	9.8	15.0	7.3	7.5	10.7
TOTAL OFF-TASK					18.4
COLUMN TOTAL	27.8	35.1	13.0	24.1	100
RAW OBSERVATIONS	734	926	343	636	2639

*1: Supervised Seatwork
 2: Whole Group-Teacher Led
 3: Whole Group-Teacher Supervised
 4: Construction

**EO: Engaged-Oral
 EL: Engaged-Listening
 EW: Engaged-Written
 EC: Engaged-Constructing
 ED: Engaged Directions
 NP: Not Engaged-Playing
 NT: Not Engaged-Talking
 NO: Not Engaged-Off-Task

which stood out was NO (not engaged: eyes not on teacher or task) accounting for 10.7 percent of the 18.4 percent Off-Task observations recorded. It should be noted that these observations (NO) were found mainly for the Direct Instruction lesson format "Whole Group Teacher Led Activities". The second highest Off-Task behavioural observation (5.7 percent) was NT (talking) and occurred mainly in the lesson format "construction".

Table 4 presents the means and standard deviations for On and Off-Task behaviours for the High and Low Achieving kindergarten children. Because of the uneven number of observations for individual children on the various behaviours within lesson formats it was necessary to work with proportions as the unit of measurement in order to do the t-test analysis. That is raw number of On-Task and Off-Task observations by lesson format by child were converted to proportions and the means and standard deviations calculated.

As can be seen from Table 4, Hypothesis 1 can be rejected. Mean total On-Task behaviour of high achievers in this kindergarten was higher than that for low achievers (i.e. .84 vs. .79) and came close (.06) to the level of significance stipulated, however these data indicate that differences in achievement level in this kindergarten do not significantly relate to total On-Task student behaviour.

Examining Table 4 it should be noted however that one On-Task behaviour ED (Following Directions) was significantly

TABLE 4

Means and Standard Deviations and Significance of On-Task/
Off-Task Behavioural Observations in terms of ABSOLUTE
Proportion for High and Low Achieving Inner-city Kindergarten
Students (N=20)

On-Task Behaviour*	High Achievers** (N=10)		Low Achievers (N=10)		p
	Mean	S.D.	Mean	S.D.	
EO	.06	.03	.05	.02	ns
EL	.37	.07	.34	.07	ns
EW	.11	.02	.11	.03	ns
EC	.14	.03	.17	.06	ns
ED	.16	.03	.12	.03	.018
TOTAL ON-TASK	.84	.05	.79	.06	.06
Off-Task					
NP	.02	.02	.02	.01	ns
NT	.06	.03	.06	.02	ns
NO	.08	.03	.13	.04	.007

*EO: Engaged-Oral
 EL: Engaged-Listening
 EW: Engaged-Written
 EC: Engaged-Constructing
 ED: Engaged-Directions
 NP: Not Engaged-Playing
 NT: Not Engaged-Talking
 ND: Not Engaged-Off-Task

**Defined according to composite
 score on The Metropolitan
 Readiness (Nurss & McGauvran,
 1974) Form P, Level 1.

related to level of student achievement ($p=.018$) with high achievers having a higher mean proportional number of observations (.16) than the low achievers (.12) on this behaviour.

Table 4 also indicates that high and low kindergarten achievers in this classroom also differed very significantly ($p=.007$) on one Off-Task behaviour.- NO (Eyes not on teacher or task) with a mean for high achievers of .08; and a mean low score of .13.

Table 5 presents the correlations between On-Task/ Off-Task behaviours and achievement as defined for this sample.

From Table 5 it can be seen that total On-Task behaviour correlated very significantly ($p=.003$) with achievement level in this kindergarten classroom. However only two of the five On-Task individual behaviours and one Off-Task behaviour were significantly related. The On-Task behaviour EO (engaged orally) was highly predictive of achievement level ($p=.007$) as was the Off-Task behaviour NO (eyes not on teacher or task) which was negatively correlated as might be expected ($p=.002$). To a lesser extent but still a significant predictor of achievement ($p=.047$) was the On-Task behaviour ED (following directions). All other On-Task/Off-Task behaviours did not predict achievement in this sample.

In studying the effect of lesson format (hypothesis 2), it was necessary to reduce the data for the four lesson formats into two categories: Category 1, Direct Instruction

TABLE 5

Correlation Coefficients Between Achievement and On-Task/
Off-Task Behaviours for a Sample of Inner-city Kindergarten
Children (N=20)

On-Task Behaviour*	Achievement**	
	r	p
EO	.54	.007
EL	.22	.181
EW	-.22	.172
EC	-.03	.448
ED	.39	.047
Total On-Task	.59	.003
Off-Task Behaviour		
NP	-.09	.352
NT	-.32	.081
NO	-.62	.002

*ED: Engaged-Oral
 EL: Engaged-Listening
 EW: Engaged-Written
 EC: Engaged-Constructing
 ED: Engaged-Directions
 NP: Not Engaged-Playing
 NT: Not Engaged-Talking
 ND: Not Engaged-Off-Task

**Defined according to composite
 score on The Metropolitan
 Readiness (Nurss & McGauvran,
 1974) Form P, Level 1)

formats, which included both Supervised Seatwork and Whole Group Teacher Led Activities and Category 2, Non-Direct Instruction formats which included both Whole Group Teacher-Supervised activities and Construction activities. Again the data were converted into proportions which were used as the unit of measurement for the t-test analyses.

Because it was hypothesized that high and low achievers would both have significantly higher On-Task behaviours for Direct Instruction lesson formats as opposed to Non-Direct Instruction lesson formats, an initial analysis was made to ascertain whether there were in fact significant differences between high and low achievers in terms of On-Task/Off-Task behaviour relative to each lesson format or the 2 lesson formats combined. As can be seen from Table 6 and Table 7, no significant differences were found.

Table 8 presents the means, standard deviations and significance for the On-Task student behaviours according to whether lesson format was Direct Instruction or Non-Direct Instruction lesson types.

As can be seen from Table 8 the second hypothesis was not supported in that there were no significant differences for On-Task behaviour for the total class between the two lesson formats.

The correlational analyses between On-Task behaviour in each lesson format/Direct Instruction/Non-Direct Instruction and Achievement are presented in Table 9. It can be noted that

TABLE 6

Means, Standard Deviations and Significance for High and Low Inner-city Kindergarten Achievers of On-Task Behaviour within Individual and Combined Lesson Formats

Lesson Format	On-Task Behaviours				t
	High Achievers (N=10)		Low Achievers (N=10)		
	Mean	S.D.	Mean	S.D.	
Supervised Seatwork (SS)	.84	.06	.80	.09	ns
Whole Group-Teacher Led (WGTL)	.83	.06	.80	.09	ns
Direct Inst. Lesson Format*	.83	.05	.80	.07	.198
Whole Group-Teacher Supervised (WGTS)	.91	.08	.85	.12	ns
Construction (C)	.82	.14	.75	.12	ns
Non-Direct Inst. Lesson Format**	.85	.11	.79	.08	.133

* SS and WGTL Combined

** WGTS & C Combined

TABLE 7

Means, Standard Deviations and Significance of Off-Task Behavioural Observations Within Direct Instruction Lesson Formats and Non-Direct Instruction Lesson Format for Low and High Achieving Inner-city Kindergarten Students

Lesson Format	Off-Task Behaviours				t
	High Achievers (N=10)		Low Achievers (N=10)		
	Mean	S.D.	Mean	S.D.	
Direct Instruction*	.17	.05	.20	.07	.196
Non-Direct Instruction**	.15	.11	.21	.08	.133

* Direct Instruction = Supervised Seatwork and Whole Group Teacher-Led Activities combined.

**Non-Direct Instruction = Whole Group Teacher-Supervised Activities and Construction Activities Combined

TABLE 8.

Means, Standard Deviations and Significance for Total On-Task Behaviour Within Direct Instruction Lesson Formats and Non-Direct Lesson Formats for a Sample of Inner-city Kindergarten Children (N=20)

Lesson Format	Total On-Task Behaviour			
	Mean	S.D.	t	p
Direct Instruction*	.82	.06	.88	ns
Non-Direct Instruction**	.82	.099		

* Direct Instruction = Supervised Seatwork and Whole Group Teacher-Led Activities Combined.

** Non-Direct Instruction = Whole Group Teacher-Supervised Activities and Construction Activities Combined.

TABLE 9

Correlation Coefficients Between Achievement and On-Task Behaviours in Individual Lesson Formats and Combined Lesson Formats for a Sample of Inner-city Kindergarten Children (N=20)

On-Task Behaviour Within Lesson Format	Achievement	
	r	P
Supervised Seatwork	.54	.007
Whole Group Teacher-Led	.21	.191
Direct Instruction*	.45	.025
Whole Group Teacher-Supervised	.31	.090
Construction	.43	.030
Non-Direct Instruction**	.48	.016

* Direct Instruction = Supervised Seatwork and Whole Group Teacher-Led Activities Combined

** Non-Direct Instruction = Whole Group Teacher-Supervised Activities and Construction Activities Combined..

On-Task behaviours during both Direct and Non-Direct Instruction as categories predicated achievement significantly ($p=.025$ and $p=.016$ respectively). However the analyses at the individual lesson format level in this sample showed that On-Task behaviours during Direct Instruction lesson format "Supervised Seatwork" was very significantly related to achievement ($p=.007$) whereas On-Task behaviour in the Direct Instruction lesson format "Whole Group Teacher-led Activities" was not significantly related to achievement.

On-Task behaviours for the Non-Direct lesson format "Construction" also proved to be significantly related to achievement ($p=.03$) as can be seen in Table 9, whereas On-Task behaviours for Non-Direct lesson format "Whole Group Teacher-supervised Activities" yielded a non-significant relationship with achievement in this sample.

Summary

1. No significant differences were found between high and low achievers for total On-Task behaviour although specific On-Task/Off-Task behaviours did significantly differentiate between the two achievement groups. High achievers tended to engage in significantly higher levels of the On-Task behaviour "Following Directions" while the low achievers showed significantly more of the Off-Task behaviour "NO" -- not engaged.

2. Significant correlations between specific On-Task

behaviours (EO; $p=.007$; ED; $p=.047$) and achievement for the sample as a whole were obtained.

3. Significant negative correlation was obtained between the Off-Task behaviour "Not-Engaged" and achievement ($p=.002$).

4. Total On-Task behaviour for both high and low achievers as well as for all children did not significantly differ across two combined lesson formats postulated to be Direct Instruction activities compared to two combined lesson formats which were considered to be examples of instructional settings other than that of the Direct Instruction model. On-Task behaviours within lesson formats Supervised Seatwork and Construction correlated significantly ($p=.007$; $p=.030$ respectively) with achievement in general.

CHAPTER 5

DISCUSSION

This study investigated inner city kindergarten student behaviours across four lesson formats in relation to high and low achievement. Results pertaining to the two hypotheses will be discussed separately as will findings in relation to SES.

Hypothesis I

The results do not support the first hypothesis that high achievers engage in significantly higher "On Task" behaviours than low achievers. While this finding appears inconsistent with similar research reported in the literature where other grade levels were observed, the most likely explanation may lie with the highly structured teaching in this classroom. In fact, the students in this kindergarten, showed almost four times as much On Task behaviour vs. Off Task behaviour which may well be indicative of the firm grip that the class teacher held over student behaviour. Miss X approached teaching in a highly organized and directive manner. Learning tasks had well defined goals and were broken down into clear and concise units while On Task student behaviour was strongly rewarded. All students were expected to engage in appropriate 'learning behaviours' i.e., to write when told to; listen quietly when appropriate, etc. A great deal of

effort on the part of the teacher was expended in eliciting and reinforcing certain kinds of On Task behaviour. For example, the On Task behaviour "listening" occurred close to three times more often than any other On Task behaviour (Table 3) and was very much a function of increased lesson structure and teacher supervision. It occurred most frequently in Teacher-led Whole Group activities where the attention was focussed on the teacher. However On Task "listening" may not necessarily imply meaningful learning for a number of reasons, the foremost being a mismatch between child capabilities and instructional content. The fact that a child appears to be listening is no guarantee that he/she is actively engaged cognitively. It would appear that this On Task student variable needs to be specified and operationalized better, perhaps in terms of "productive listening".

While total On Task behaviour did not significantly differentiate between high and low achievers, certain On Task/Off Task student behaviours did. "Engaged-Oral" (EO), defined as verbal engagement with the teacher about task related material, was significantly related to achievement. While this particular behaviour appeared relatively infrequently in the observations (5.3 percent), verbal competence, especially at the kindergarten level appears to be critical for academic success. At this level the child's written output cannot clearly reflect his/her grasp of pre-reading or pre-math concepts but it is through

verbal exchanges between the child and the teacher that the teacher can best assess learning gains and deficits, and actual levels of academic functioning. Through such verbal exchanges the teacher can program specific tasks for children and gear instructional sequences more to each child's needs. The fact that "Engaged-Oral" significantly differentiated between achievement groups also reinforces the findings of Soli and Devine (1976) who reported that "interacting with both teacher and peers about academic matters" proved to be most predictive amongst high achievers in their sample of third and fourth grade children. Furthermore, this finding is of particular interest because it seems to suggest the need to look at more precise learning behaviours which may be more useful to researchers than such global variables as "paying attention", previously defined in the literature as "time on task".

"Engaged-Directions" (ED) or following directions was another On Task behaviour which significantly differentiated high achievers from low achievers in this sample. This behaviour was defined as task related behaviour such as turning pages appropriately, taking out requested learning materials, cleaning up, and generally following through on all aspects of directions given by the teacher. "Engaged-Directions" (ED) accounted for 14.1 percent of observations (Table 3) and most ED observations were in non-direct lesson formats. This suggests that the children who were able to

follow directions in less structured lesson formats may have acquired some independent 'learning how to learn' skills, were probably less dependent on teacher supervision and able to cope better with the task. It is possible that children who follow directions without constant close teacher supervision may be reflecting better developed intellectual capabilities especially in the area of memory, and as a result actually benefit more from instruction regardless of lesson format.

One Off Task behaviour, "Not-Engaged" (NO), defined as "eyes not on teacher or task" significantly differentiated between high and low achievers in this sample with the low achievers having a higher mean score. "Not-Engaged" (NO) accounted for 10.7 percent of total observations (Table 3) and occurred more frequently than all other single Off Task behaviours. Perhaps this was due to the fact that this was the one Off Task behaviour that children could safely indulge in without being easily detected. At the same time the negative relationship of this behaviour with achievement strongly suggests that the children who keep their eyes on the teacher and/or task are learning more. Eye contact has traditionally been regarded as an important 'teacher skill' in managing student behaviour and maintaining classroom discipline and may be more a correlate of specific attending behaviours which are prerequisite for learning and achievement.

Hypothesis II

Results did not support the second hypothesis which stated that On Task behaviour would be significantly higher for both low and high achievers in lessons taught using the Direct Instruction format as opposed to other types of lesson formats.

Good and Beckerman (1978) reported that supervised seatwork (Direct Instruction format) was a significant variable in terms of achievement at the upper elementary grades (grade 6) as were whole group teacher-led activities (Direct Instruction format). Similarly, in his work on signal systems of various lesson formats, Kounin (1974), found student involvement to be higher in teacher led groups than in unsupervised seatwork or whole class recitation. While the results in this study do not support these other findings, there are a number of factors which might be contributing to these differences. As previously stated, research findings in regard to instructional settings have concentrated largely on reading and math subject areas in the upper elementary grades. Comparisons of achievement outcomes between structured and well-supervised reading and math lessons vs. unstructured and unsupervised reading and math lessons at these grade levels not surprisingly yielded outcomes that clearly favored increased structure and supervision in these subject areas. It may be that these subject areas at these grade levels require more

structure in order to ensure learning outcomes and differences obtained may be more a function of good or bad teacher organization of the material than student On Task behaviours per se. By contrast, in the kindergarten observed in this study, a range of curricular activities were sampled, some requiring tighter teacher initiated structure and control and others clearly not. For example, On Task behaviour was high in Construction activities which were loosely structured and not as closely supervised but perhaps provided a task sufficiently demanding and interesting to maintain a kindergarten child's interest. Kounin (1974) suggests that kindergarten children's involvement in construction activities was high due to the continuity and lack of distraction that these tasks provided.

Another factor that also may have mitigated the effects of lesson format in this classroom is teacher style. In the two Direct Instructional settings--Supervised Seatwork and Whole Group Teacher-led activities--the teacher's role was active and she closely monitored student behaviour. In the two Non-Direct Instructional settings--Whole Group Teacher-Supervised activities and Construction--the teacher took a less active role. Although present during these activities, she typically remained slightly removed from the group, often doing other work. After explaining what the activity was and handing out materials, she withdrew leaving the children to carry out the activity

which could be Bingo-type math games, letter recognition games, action games to records or construction-type tasks. Although the teacher's involvement was not central to these activities, it is quite likely that her presence and her expectations of these children to be On Task were very much felt. That is to say, that while the instructional format could be altered from structured to unstructured, the teacher's expectations and control of the student's behaviour was consistently asserted.

While differences were not obtained for On Task behaviour in Direct Instruction lesson formats as compared to Non-Direct Instruction lesson formats, analysis at the individual lesson format level showed that On Task behaviour during the Direct Instruction lesson "Supervised Seatwork" was significantly related to achievement whereas On Task behaviour in the other Direct Instruction lesson-format "Whole Group Teacher-led activities" was not related to achievement. The findings in this study suggest that specific lesson formats lend themselves more to certain types of On Task behaviour than do others. In "Whole Group Teacher-Led" activities (Direct Instruction) as well as "Whole Group Teacher-Supervised activities (Non-Direct Instruction), "EL" (Engaged-Listening) accounted for 69.8 percent of observations and 54.2 percent of observations respectively (Table 3). While "listening" is undeniably an important skill to cultivate in young children, it can be

a passive activity and does not necessarily ensure that learning is taking place. Whereas in "Supervised Seatwork" activities, the child is more actively engaged and this is likely to result in more learning. On Task behaviour for the Non-Direct lesson format "Construction" also proved to be significantly related to achievement while On Task behaviour for the Non-Direct lesson format "Whole Group Teacher-Supervised activities yielded a non-significant relationship. In the "Construction" lesson format, despite the fact that this was less teacher directed, high achievers were more likely to be more often On Task and to work more independently than the low achievers. The latter, given a Non-Directed teacher instructional setting were more likely to 'goof off', take advantage of the lack of teacher supervision to be Off Task, to procrastinate, talk with peers, walk around and therefore not really benefit from the learning experience. The fact that On Task behaviours for Whole Group Teacher-Supervised activities (e.g., Bingo games, record-movement games), the second Non-Direct lesson format studied, did not relate to achievement level in this sample might be attributed to the basic nature of the activities themselves. These activities for the high achievers could very well be of a practice nature and less of a new learning experience which would relate more to achievement. The activities were perhaps intrinsically motivating--in a game type category--and may have elicited

On Task behaviours more readily from all children irrespective of achievement level.

SES

The findings in this study garner little support from similar research reported in the literature. However, typically these other studies had been carried out primarily in reading and math subject areas, in the upper elementary grades, and on middle SES children. When comparisons were made across SES groups, results became increasingly unclear as was reported in the review of the literature.

The findings in respect to SES that did emerge in the literature were not supported in this study. For example, in a descriptive study uncontrolled for classroom environment and teaching style, Good and Beckerman (1978) suggested that middle SES students in the sixth grade in one school showed higher rates of involvement in classroom activities than did low SES students in the sixth grade in another school (82 percent and 60-68 percent respectively). By contrast, this study, which includes a fairly homogeneous group of low SES kindergarten children and was controlled for classroom environment as well as teaching style, shows a remarkably high rate of task involvement by the students (82 percent). While we can only speculate as to the nature of the relationship of low SES to task involvement in the Good and Beckerman study, the results obtained in this study may very well be

moderated by the low SES status of the sample.

The question must be raised as to why the findings in this study diverge so greatly from those in the Good & Beckerman (1978) study. One possibility is the interaction of teaching style and SES. Low SES children may be more responsive to a Direct Instructional model than middle SES children. Brophy (1976) indicated that low SES children generally appeared to benefit from tighter control although he added that they were more likely to achieve higher cognitive objectives in a less structured situation. The problem is compounded by the fact that SES represents a complexity of factors and only by further research will it be possible to disentangle the relationship between SES and learning characteristics in low SES children.

Summary Remarks

In conclusion, given the meagre research on the productive classroom learning behaviours of the kindergarten child, this study attempted to identify significant classroom variables which are predictive of academic achievement. The findings suggest that the concept of On Task/Off Task is too broad and masks important distinctions between specific student behaviours which may be relevant to kindergarten student achievement. The concept of On Task/Off Task also needs more differentiation in terms of not only the specific observable student behaviours but also in terms

of the intrinsic signal characteristics of different learning tasks. "Time on Task" is not an arbitrary concept which can be described in merely observable behaviours but is also a function of these intrinsic task demands as well as the learning acquired during the time spent on task.

"Time on Task" may very well overwhelm other important dimensions which children bring to a learning situation such as entry skills and abilities, motivation, and readiness states. The relationship between achievement and more salient student variables such as verbal engagement with the teacher about task related material and following directions certainly bear further exploration. As has been indicated, certain lesson formats lend themselves to more active On Task behaviours such as writing and constructing which are in turn related to achievement and this also indicates an area for study.

The fact that no significant relationship was found between lesson format (direct vs. non-direct types) and student On/Off Task behaviour could be due to a number of factors. Teacher style in this classroom may have moderated the findings in so far as her control was so clearly asserted that it's influence was felt for both Direct and Non-Direct Instructional settings. The statistical techniques employed in this study may have also affected the results in that a more powerful statistical test such as a MANOVA might have been more appropriate in picking up possible

interactional effects between level of achievement and lesson format.

Because this study focussed on one classroom it is not possible to generalize extensively, but it emphasizes the need for more iterative research to validate the findings on "Time on Task" at the kindergarten level. The question of the interactions between teacher style, lesson format and lesson content seem to require further study so that teachers and teachers-in-training become more aware of the relationship between their teaching styles, teaching strategies and the type of student behaviours plus concomitant academic outcomes that result from the way they organize learning tasks. Although more research and study in this area seems to be necessary for children from all SES backgrounds, such investigations would appear to be crucially important for the low income inner-city child. Very few definitive answers relative to in-school variables which moderate academic achievement are available for the low SES child.

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