DOCUMENT RESUME

ED 305 604 CS 009 599

AUTHOR Meyer, Linda A.; And Others
TITLE How Entering Ability and Instructional Settings and Not the Length of the School Day Mediate Kindergartners' Reading Performance. Technical Report No. 466.
INSTITUTION Bolt, Beranek and Newman, Inc., Cambridge, Mass.; Illinois Univ., Urbana. Center for the Study of Reading.
SPONS AGENCY Office of Educational Research and Improvement (ED), Washington, DC.
PUB DATE Mar 89
CONTRACT OEG-0087-C1001
NOTE 30p.
PUB TYPE Reports - Research/Technical (143)

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS *Classroom Environment; Classroom Research; Kindergarten; *Kindergarten Children; Multiple Regression Analysis; Naturalistic Observation; Primary Education; *Reading Comprehension; Reading Improvement; Reading Instruction; Reading Research; *Time Factors (Learning)
IDENTIFIERS Wide Range Achievement Test; Woodcock Reading Comprehension Test

ABSTRACT

As part of a longitudinal study of the acquisition of reading skills, a study tested kindergarten children at the beginning and end of their kindergarten year. The children were also observed for nine full days in their classrooms. Subjects were approximately 650 children in two cohorts. Data were collected in three school districts in Illinois, of which two had half-day kindergarten programs and one a full-day program. Descriptive findings and results from multiple regression analyses reveal strong relationships between the children's Wide Range Achievement Test (WRAT) scores upon entering kindergarten and their spring scores on three measures of reading performance, the WRAT, the Chicago, and the Woodcock Reading Comprehension paragraphs. There were also substantial and significant differences among districts on these end-of-year measures. No differences were identified for time of day (A.M. versus P.M. class) or for the interaction of teacher and time of day. Among the process variables, "confirming feedback" was most frequently significant at the teacher level, and teachers in District A collectively accounted for 60% of the significant findings with respect to process variables. Findings suggest the importance of what happens in kindergarten classrooms, not merely the length of the school day. They also raise the question of whether differences between districts at the end of kindergarten will be evident in the early and middle elementary grades. (Ten tables and two figures of data are included, and 14 references are attached.) (Author/RAE)

CENTER FOR THE STUDY OF READING

Technical Report No. 466

HOW ENTERING ABILITY AND INSTRUCTIONAL SETTINGS AND NOT THE LENGTH OF THE SCHOOL DAY MEDIATE KINDERGARTNERS' READING PERFORMANCE

Linda A. Meyer
C. Nicholas Hastings
James L. Wardrop
University of Illinois at Urbana-Champaign

Robert L. Linn
University of Colorado at Boulder

March 1989

University of Illinois at Urbana-Champaign
51 Gerty Drive
Champaign, Illinois 61820

The work upon which this publication was based was supported in part by the Office of Educational Research and Improvement under Cooperative Agreement No. OEG 0087-C1001, with the Reading Research and Education Center. The publication does not necessarily reflect the views of the agency supporting the research.

Abstract

This report presents findings from testing approximately 650 children in two cohorts at the beginning and end of their kindergarten years and from 9 full days of observations of their classrooms. Data were collected in three school districts, of which two had half-day kindergarten programs and one a full-day program. Descriptive findings and results from multiple regression analyses reveal strong relationships between the children's Wide Range Achievement Test scores upon entering kindergarten and their spring scores on three measures of reading performance, the WRAT, the Chicago, and the Woodcock Reading Comprehension paragraphs. There were also substantial and significant differences among districts on these end-of-year measures. No differences were identified for time of day (AM versus PM class) or for the interaction of teacher and time of day.

Among the process variables, "confirming feedback" was most frequently significant at the teacher level, and teachers in District A collectively accounted for 60% of the significant findings with respect to process variables. These results suggest the importance of what happens in kindergarten classrooms, not merely the length of the school day. They also raise the question of whether differences between the districts at the end of kindergarten will be evident in the early and middle elementary grades.

HOW ENTERING ABILITY AND INSTRUCTIONAL SETTINGS AND NOT THE LENGTH OF THE SCHOOL DAY MEDIATE KINDERGARTNERS' READING PERFORMANCE

Many school districts are currently debating whether to adopt whole-day kindergarten programs for some or all students. Despite this current interest in kindergarten, there are very few reports of observational studies that link student performance to students' kindergarten instruction. As a part of a longitudinal study of the acquisition of reading skills, we have collected aptitude and achievement data from approximately 650 children in two cohorts at the beginning and end of their kindergarten years, along with 9 full days of observation of their classroom activities. This research is being conducted in three school districts, two of which have half-day kindergarten programs and one which has a full-day program. The data collected during the kindergarten year are relevant to the issue of whole- versus half-day programs.

Durkin (1985) with the help of two graduate students observed 42 kindergarten classrooms in the state of Illinois. Each classroom was observed twice. Observations were spread throughout the school year with some pairs taking place in the fall, others in the winter, and the remainder in the spring. Durkin's study focused on three major questions: (a) What is done, and for what amount of time, to prepare kindergartners for reading and/or to teach reading itself? (2) What accounts for what is or is not done? (3) How do differences in children's abilities affect what is done? Durkin conducted interviews as well as observations to address these questions. Her findings were that slightly over one-fifth (21.6%) of teachers' time was spent on reading and reading-related activities. Most of the reading time was spent on phonics instruction delivered to entire classes to cover workbook lessons. No measurement of student ability was reported in this study. Other researchers have assessed the effects of whole-day and half-day programs somewhat globally.

Jarvis and Molnar (1983) studied whole-day and half-day kindergartens in New York City to determine the effect of the length of the kindergarten day on cognitive growth as measured by the Brigance K and 1 Screen and the Language Assessment Battery (LAB). A comparison of place of birth for those students revealed that close to twice as many (14.5 to 7.5%) of the half-day students had been born outside the United States. Therefore, whereas 40% of the whole-day students came from non-English speaking homes, over half (57.5%) of the half-day students came from homes where English was not the native language, thereby making more of the half-day students more educationally disadvantaged at the beginning of kindergarten than children in full-day classes.

Jarvis and Molnar analyzed effects separately for English and non-English speakers and found all-day students had significantly higher performance on the Brigance than half-day students regardless of language group.

Johnson (1974), Winter and Klein (1970), and Oliver (1980) have all reported carefully conducted studies with random assignment to address the issue of benefits from whole-day kindergarten classes, though none of these researchers included observational data on the actual instruction children received. Johnson compared three small cohorts (20 students per year) in half- and full-day kindergarten programs. Marginally positive results were found for the first and third cohorts of full-day students on the posttest though no significant differences were found between groups on the Walker Readiness Test when it was administered as a pretest. Reading group placement in first grade was not found to be related to length of kindergarten program.

Winter and Klein report two studies in which on the basis of pretest scores students received an additional 90 minutes of kindergarten instruction. These studies were conducted with a very small sample of children. There were 13 disadvantaged students in one study, for example. Two tests were administered: Metropolitan Readiness, Stanford Achievement (kindergarten and first grade). Disadvantaged children showed significant differences at the end of kindergarten on only the

Metropolitan Readiness Test. No significant differences were found for either group of advantaged children.

Oliver's 1980 dissertation clearly identifies differences in readiness instruction for full-day students (585 minutes per week versus 419 minutes per week for half-day program students). Students were matched and assigned to whole-day or half-day classes. Just under 160 students participated in this study. Using the Clymer-Barrett and the Murphy-Durrell prereading inventories as posttests, Oliver found full-day classes to exceed half-day classes significantly.

In reviewing these and other studies of whole-day and half-day kindergarten programs Karweit (1987) concludes by asking, "To what extent is this finding due to differences in the sheer amount of time in school or due to differences in program emphasis and focus?" (p. 31). This is a timely topic for discussion since almost all (about 93%) (Chorvinsky, 1982) 5-year-olds in the United States currently attend kindergarten and some states are considering beginning formal schooling for 4-year-olds.

Kindergarten programs may vary substantially from district to district dependent upon the goals and philosophy for working with 5-year-olds. At this time most programs (67%) are half-day sessions with teachers typically teaching two classes. Some districts, however, offer parents choices of either half-day or full-day programs while other districts offer alternate full-day programs. It is the hypothesis of this paper that kindergarten programs vary substantially from each other and that the differences between programs do not necessarily stem from the length of their school day. In other words, full-day classes may not necessarily yield more instructional time or teachers' interactions that lead to differences in students' academic performances than half-day classes. It is beyond the scope of this report to enter into the debate about what should be taking place in kindergarten. A major goal of this report, however, is to describe kindergarten programs in place in three school districts with two cohorts of children who are participating in a longitudinal study of reading comprehension and science concept development. This report will focus on the results from a battery of instruments administered to the children during their first week of kindergarten instruction, descriptions of their classrooms, results of testing completed at the end of kindergarten and ways that teachers' instruction appear to mediate children's performance.

Setting and Subjects

Three school districts in Illinois participate in this program of research. In two of these districts, every child and teacher in the appropriate grade levels participates in the study, while in the third district, all children and teachers in one school are involved. Two cohorts of children are involved in the study. Cohort 1 consists of children who entered kindergarten in 1983, and Cohort 2 of children who entered in 1984. The districts represent a variety of geographic and cultural settings and utilize a variety of instructional approaches.

District A is a somewhat self-contained small town in the center of the state. In this district, there were approximately 90 students in each of the two cohorts in this study. In each cohort, there were four kindergarten classes, two morning (AM) and two afternoon (PM) classes. Each of the two kindergarten teachers taught one AM and one PM class. This district is well-known for its high student performance in reading comprehension.

District B is in a small town that is about a 25-minute drive from the larger community in which many of its citizens work. In Cohort 1, the district had seven kindergarten classes totaling about 160 children. Four of these were AM classes and three were PM. Three of the participating teachers each taught an AM and a PM class, and the fourth teacher taught the remaining AM class. In Cohort 2, each of the three teachers taught one AM and one PM class, for a total of six half-day classes.

The school participating in this study from District C bears some resemblance to urban schools because of the ethnic diversity of its student population. The children are of mixed backgrounds.

Black, Hispanic, and White children attend this school. There were approximately 65 children per cohort in three full-day kindergarten classes in this school. Bilingual students in this school receive instruction in Spanish as well as English beginning in kindergarten.

Methodology

This is a study in the process-product tradition. It utilizes data from both fall and spring test administrations and from the nine rounds of classroom observation. The data reported here are but a small portion of the full array of information that has been collected. For this analysis, we have used scores on the Wide Range Achievement Test (WRAT) administered in both the fall and spring of the kindergarten year; the Chicago, a test of letter sounds, word endings, word families, and random words; and the Woodcock Reading Comprehension passages. The data presented here for two cohorts of students in three school districts have been extracted from over 46,170 minutes of classroom observations and 5,200 hours of testing.

Instrumentation

The classroom observation instrument, developed for this longitudinal study and used with cohorts every year, is patterned after instruments used by Anderson, Evertson, and Brophy (1979), Barr (1983), Fisher, Berliner, Filby, Marliave, Cahen, and Dishaw (1980), and Stallings and Kaskowitz (1974). The instrument used was expanded from other instruments in order to have activity, interaction, and feedback categories to capture full-day observations of entire classrooms, and to have data on all students. The other instruments have typically been used for shorter observational periods of less than whole classes, and have not included all the categories of classroom behavior in which we are interested.

The Wide Range Achievement Test (WRAT) decoding subtest is an individually administered word recognition test. Its norms span from prekindergarten through 12th grade. We selected this test to use as a predictor because of its relationship to other measures and because of the variance in student performance on it as an entry measure. The Chicago provides a measure of letter sounds, word endings, word families, and random words. It is also individually administered. This instrument is particularly sensitive to beginning reading instruction. Therefore, there was substantial variation among students on this instrument by the end of kindergarten. The Woodcock Reading Comprehension Passages are individually administered cloze phrases or passages. Like the WRAT and the Chicago, the Woodcock has a stopping criterion based upon students' abilities to supply an acceptable word for each item. Early items include line drawings as well as words or phrases. This instrument was selected because of the opportunity students had to score between 0 and 85 points and the criterion for stopping as well as for the range and type of items it includes. Both the WRAT and the Woodcock are instruments that can be used each year of the longitudinal study.

Procedures for Data Collection

The primary goal of this observation system is to measure the amount of time teachers spend in various activities throughout their typical school days and to record sequentially each teacher-initiated instructional interaction and to whom it was delivered. In order to accomplish this type of data collection, each student in each class has a unique identification number. Likewise, each instructional group also has a number that designates the number of groups in the classroom, whether the groups are homogeneous or heterogeneous, the group's rank in the series of classroom groups, and whether or not the group meets daily. A 913 group, for example, is homogeneous, the lowest performing group of three groups in the classroom, whereas an 8138 group is heterogeneous and does not meet daily though it is one of three groups. Interactions to entire classes are also coded as such so that it is possible to tally the number of interactions to any given child and how that instruction was delivered--how many interactions were individual, small group, or whole-class turns. Feedback teachers give after initiating an interaction is also recorded. A list of the activity, interaction, and feedback categories used in the

kindergarten observations appears as Figure 1. The goal of this system is to be able to classify each activity, interaction, and feedback that takes place on typical kindergarten school days during science and literacy-related instruction.

[Insert Figure 1 about here.]

All observations were tape-recorded. The tapes were used primarily as back-ups to the transcripts observers made while completing the actual classroom observation. In half-day classes observations lasted for 2.5 hours (150 minutes). In whole-day classes, observations lasted 330 minutes. Observations were scheduled in each class nine times each school year at roughly 2 1/2 week intervals between October and April. Care was taken to schedule the observations for different days of the week. Each class was observed by at least three observers. Inter-rater reliability was above .88 on each of the four times it was checked throughout the year with either paired observations, staff practice on selected audio tapes, or double-coded transcripts.

In addition, each teacher was interviewed at the conclusion of each observation and asked: Was this a typical day? If today was not typical, what made it unusual? Have there been any interruptions (have you been absent) since you were last observed? Have there been any roster changes or new groupings of children since your last observation? Are you using any new instructional materials?

Measures of cognitive performance. The WRAT was administered as a part of the "entry level" battery used at the beginning of kindergarten, and the WRAT, Chicago, and Woodcock were a part of the end-of-the-year battery of tests. Testing was done on an individual basis with each of these instruments.

Results

The major questions that will be focused on in this part of the paper are, How do kindergarten teachers in these three school districts typically spend their time? How do they interact with students when teaching reading and in teacher-directed centers? How do these allocations of time and interactions mediate student performance?

First, the descriptive results of the classroom observations and the descriptive results of the fall and spring kindergarten testing will be presented by teacher and district. Then, results of multiple regression analyses will be given to show how teachers' behaviors mediate the students' performances.

How Do Kindergarten Teachers Spend Their Time?

Time in activities. Table 1 shows by teacher and cohort the average number of minutes each teacher spent in the major 11 kindergarten activities coded during the 9 full days of observations. With the exception of Teacher 4 from District B, each teacher was observed for 2 consecutive years with two cohorts of children. The categories listed on the table include non-instructional time which is a combination of opening and closing exercises, and transition time between activities and free play because these activities, while not instructional, are prevalent in one or more of these three districts. Generally, teachers in District A spend less time in non-instructional activities than teachers in either District B or District C. In fact, District C teachers often spend close to three times the number of minutes in non-instructional time as the teachers from District A who have just a bit over half the number of minutes that District C teachers have of school each day. Free play existed only in Districts A and C except for a very few minutes allocated to this activity by Teacher 3 with her Cohort 1 afternoon class in District B. Art and Music minutes also fluctuate substantially from district to district with District C students receiving by far the greatest number of minutes in these areas and District B students overall the least amount of time. Time in science and health ranges substantially from cohort to cohort and from district to district. Cohort 2 students received much greater time in science and health than did Cohort 1 students in each district, and District C students tended to receive more instruction in this area than students from the other districts.

Time allocated to reading instruction is much greater in District A than in the other two districts. In fact, District A students average at least three to four times the number of minutes in reading as students in District B. They average about six times the number of minutes in reading as the District C students. Teacher assigned centers are an activity that take up a substantial amount of time in District B, and they are utilized for only a few minutes a day by some teachers in District A. They are also seen for large amounts of time with Cohort 2 students by Teachers 1 and 2 in District C.

Show and Tell is a common and fairly lengthy activity in Districts B and C kindergartens and one that lasted for very short periods of time in District A. Adult reading, on the other hand, is a fairly short activity in Districts A and B and a much longer activity in District C where teachers read on the average from 15-30 minutes each day. Language is a short activity in the few classrooms in which it occurred at all in Districts A and B. Language had more time allocated to it as an activity in District C than in the other two districts. Workbook assignments averaged anywhere from 1 to 10 minutes per day in District A, about 4 minutes if at all in District B except for Teacher 3 with Cohort 2 who spent over 26 minutes per day on the average on workbook assignments. Language experience tasks such as making and reading charts did not exist as a teacher-directed activity except in District C classrooms observed over these 2 years.

[Insert Table 1 about here.]

Table 2 shows district averages for the same 11 activities shown in Table 1. This table shows rather clearly the tendency for non-instructional and free play time as well as show and tell, adult reading, and language to take up more minutes in District C than in the other two districts. Reading instruction and teacher-assigned centers are much more prevalent in Districts A and B than they are in District C.

[Insert Table 2 about here.]

Figure 2 shows a running schedule for a typical day from a classroom in each of the three districts. There are substantial differences in the flow of activities between districts as well as the amount of time spent in various activities in each district. District C spends almost twice as much time as District A or B in Opening Exercises, for example. There are only two transition periods in District A whereas there are three in District B and eight in District C. District A's schedule reveals two decoding periods, one at the beginning and one at the end of the day. District B has two teacher-directed centers, in contrast, and they last for 15 and 3 minutes, respectively. District C has a total of 5 minutes of decoding and over an hour of Activity Time which involves children playing in the classroom in addition to morning and afternoon recess time which totals 36 minutes more.

[Insert Figure 2 about here.]

How do Teachers Interact During Reading Instruction and Time in Teacher Assigned Centers?

Table 3 shows results that address this question with four categories of interactions: total interactions; decoding; comprehension; and reading interactions. Total interactions are all interactions the teacher initiated during these activities. Therefore, they include procedural instruction such as: "Open your books. Find the row of pictures at the top of the page." etc. The total interactions column also includes decoding interactions such as "tell me the sounds you hear in the word mat," and "what word is this?" or "what is the name of this letter?" Comprehension interactions are those times teachers ask children what a word means or ask them to answer a question about something they (the children) had just read. The reading interaction column is simply a tally of the decoding and comprehension columns.

[Insert Table 3 about here.]

Table 3 shows that District A teachers have by far the greatest numbers of total decoding, comprehension, and reading interactions. District B teachers have easily the second largest number of interactions in each of these categories and District C teachers by far the fewest overall interactions.

Table 4 shows district means and standard deviations for the same four categories of interactions shown at the teacher level in Table 3. There are rather stable and clear differences between districts when looking at the categories at the district level in Table 4.

[Insert Table 4 about here.]

Decoding and comprehension interactions are the main types of interactions of interest during reading and teacher-assigned center time. The feedback teachers give after student responses is also of interest. Table 5 shows frequencies for four types of teacher feedback. Sustaining feedback is the type of feedback teachers give that continues interactions with students until the students have given the correct answer. To sustain feedback, teachers might lead a child, model the way to come up with the correct answer, or give a hint to help a child figure out the answer. Terminating feedback ends interactions with one child. A teacher might call on another child or ignore a child's incorrect response to terminate feedback. Confirming feedback includes a teacher's repetition of the child's response to confirm it, or a simple statement of "yes," or "aha" after a child's response. Many teachers appear to give confirming feedback in an almost automatic way after correct responses. Other kinds of feedback include homework assignments or written feedback.

[Insert Table 5 about here.]

In Table 5 again there are fairly clear differences between teachers and districts for the four types of feedback. Overall, kindergarten teachers in District A provide the most sustaining feedback. The only exception is Teacher 3 in District B, who also gave a substantial amount of sustaining feedback with her first cohort, but not her second. On the other hand, District A teachers also gave the most terminating feedback. Terminating feedback is so uncommon that it is negligible in District C, whereas it occurs with about the same frequency as sustaining feedback in District B. Confirming feedback is given the most often by far in District A, less often in District B, and least often in District C. Other feedback is given seldom in any of the districts.

Table 6 shows district means and standard deviations by cohort for the same four kinds of feedback shown for each teacher in Table 5. This table shows District A teachers to use sustaining feedback around six times as often as District C teachers and two to three times as frequently as District B teachers. The same general pattern holds for the frequency of terminating, confirming, and other feedback.

[Insert Table 6 about here.]

How Do Allocations of Time and Types of Interaction Relate to Student Performance?

Measures of how teachers allocate time for a variety of activities and how they interact with students during reading and teacher-assigned center time, work together to present a picture of how kindergarten classes in these three districts vary. Of equal interest is how entering and end of kindergarten students perform in these quite different settings.

Entering kindergarten scores. Table 7 shows means and standard deviations at the classroom level for entering fall WRAT scores of decoding, spring WRAT scores and spring scores on the Chicago, a test of letter sounds, word endings, word families, and random words as well as for the Woodcock Reading Comprehension passages. An analysis of variance indicated that there were no significant differences among districts on the fall WRAT.

[Insert Table 7 about here.]

End of kindergarten scores. Spring results reveal a different pattern. District A students perform consistently higher across measures with the greatest differences apparent on the Chicago. In addition, teachers' scores for cohorts taught at the same time (AM and PM classes in Cohort 1, for example) generally have scores that are less than half a point or so apart on the spring WRAT with the exception of Teacher 3 in District B with Cohort 2. Chicago scores show more variability between AM and PM classes for both District A and District B teachers than was seen on the WRAT. In addition, District A students score at least 15 points higher on the Chicago than students in District B. District C students' performances are much closer to those of District A students. Teacher 2 in District A's Cohort 2 classes perform at an overall lower level than any of the other classrooms in that district when looking at both cohorts. Woodcock results show great variability among teachers and classes at different times of day. On the average, the highest performance is found in District A, but the overall highest performance is in District C with Teacher 3's Cohort 2 class although performance in that class varies substantially as seen in the standard deviation that is almost one-and-a-half times the size of the mean.

Regression Analyses

Table 8 shows the results of regression analyses conducted with effect codes to test for differences predicted by the fall WRAT scores, district affiliation, individual teachers nested within districts, time of day of class (AM/PM designation), and the interaction of teacher with time of day for both cohorts. The homogeneity of the regression slopes and residuals are also reported. Overall, the results are fairly comparable for both cohorts. The fall WRAT scores explained approximately 37% of the variance in spring Chicago scores for Cohort 1 students and 39% of the variance for Cohort 2 students. District affiliation explained an additional 15% and 12% of the variance, approximately, for Cohort 1 and Cohort 2, respectively. Teachers within districts explained only about 2% more of the variance in students' spring Chicago scores for Cohort 1 and less than 2% for Cohort 2. The test for homogeneity of regression slopes (Chicago on fall WRAT) indicated that the slopes differed among teachers, so that analyses of process variables should be done separately for each teacher, rather than using pooled within-teacher results for the total sample. Analyses for time of day of class (AM versus PM) revealed non-significant effects for both cohorts thereby leading to the conclusion that analyses at the teacher level rather than the classroom level were justified.

[Insert Table 8 about here.]

Teacher-level results. Because of the rather small sample sizes for each teacher (ranging from 21 to 42) and concerns about multicollinearity among the process variables, we chose to look at the effects of these variables one by one rather than attempting to enter multiple variables into a single regression analysis. The one exception is shown in the final row of Table 9, where both comprehension interactions and sustained feedback were used. Table 9 presents the results of multiple regression analyses for the spring Chicago on the fall WRAT and then the spring Chicago on the fall WRAT with each of the 10 process variables. The N at the top of the table represents the total number of kindergarten children per cohort that each teacher in District A and Teachers 1 through 3 of District B had together in their combined AM and PM classes for Cohorts 1 and 2. The second line in the table reports the regression of the spring Chicago on the fall WRAT alone. The significant changes in R^2 are reported for each of the 10 process variables.

Confirming feedback produced significant changes in R^2 with 4 of the 10 teachers whereas the number of decoding interactions, comprehension interactions, and reading interactions resulted in significant changes in the R^2 for 3 of the 10 teachers. Total interactions, sustained and terminal feedback as well as the combination of comprehension interactions and sustained feedback were significant just twice. Fourteen of the 23, or about 61% of the significant changes in R^2 come from the two teachers in District A, especially Teacher 1 with her second cohort.

[Insert Table 9 about here.]

Process variables with the entire sample. Table 10 presents the results of regression analyses conducted for the 10 process variables and the entire sample of students in Cohorts 1 and 2. These results reveal that all of the interactions (total, decoding, comprehension, and reading) produced significant changes in R^2 at the .001 level with both cohorts. These instructional characteristics explain an additional 6-12% of the variance in student performance. Comprehension interactions explain approximately 12% of the variance for Cohort 1 and over 11% of the variance for Cohort 2 students. Time spent in reading activities produced a significant change in R^2 for both cohorts as did sustained, terminal, and confirming feedback and the combination of comprehension interactions and sustained feedback.

Discussion

This portion of the report will focus on the relationship of length of school day to student performance on reading measures at the end of kindergarten, district characteristics that seem to be apparent in this study, and the inherent choices teachers and districts seem to make quite independent of their choice of length of school day.

Length of school day. It is quite clear from this naturalistic study of kindergartens in three school districts that the length of the school day did not seem to contribute to the reading performance at the end of kindergarten for the children in these two cohorts. In fact, with just one exception, District A students who participated in a half-day program performed higher than students in District C's full-day program. District C students generally performed higher than the District B students who were half-day students.

The frequency of teachers' decoding and comprehension interactions in District A and the significant changes in R^2s they produced suggests that what teachers do while in school is more important than the length of the actual school day. The combination of significant findings for the two teachers in District A suggests a highly interactive profile that resulted in their students performing higher than students from the other two districts. The significant results from the regression analyses for total, decoding, comprehension, and the combination of decoding and comprehension interactions then called reading interactions, as well as time in reading activities, as well as sustained, terminal, and confirming feedback, reveal more specific characteristics of teachers' behaviors that result in significant changes in students' performance in reading from the beginning to the end of kindergarten.

Choices by districts and teachers. Districts A and B have text-based kindergarten curricula that their teachers then translate by their instruction. It is apparent that kindergarten experiences differ substantially for children in these districts as District A is fairly clearly focused on beginning phonics and word recognition through letter sound instruction whereas District C teachers spend little time in this activity but schedule substantial periods of teachers' reading to students and free play. It remains to be seen in the longitudinal results of this program of research which if any of these kindergarten curricula results in lasting changes in children's abilities to comprehend what they read.

References

Anderson, L. M., Evertson, C. M., & Brophy, J. E. (1979). An experimental study of effective teaching in first-grade reading groups. *Elementary School Journal, 79,* 193-223.

Barr, R. (1983, April). *A sociological approach to classroom instruction*. Paper presented at the annual meeting of the American Educational Research Association, Montreal, Canada.

Barr, R. (1983). *Chicago Reading Test*. Unpublished instrument. Evanston, IL: National College of Education.

Chorvinsky, M. (1982). *Preprimary enrollment 1980*. Washington, DC: National Center for Education Statistics.

Durkin, D. (1985, December). *A classroom observation study of kindergarten programs*. Paper presented at the Board of Visitors Meeting, Center for the Study of Reading, University of Illinois at Urbana-Champaign.

Fisher, C. W., Berliner, D. C., Filby, N. N., Marliave, R., Cahen, L. S., & Dishaw, M. M. (1980). Teaching behaviors, academic learning time, and student achievement: An overview. In C. Denham & A. Lieberman (Eds.), *Time to learn*. Washington, DC: USOE/NIE Printing.

Jarvis, C., & Molnar, J. (1983). *All-day kindergarten program effects on student growth* (O.E.A. Evaluation Report). New York: Central Board of Education.

Jastak, J. F., Bijou, S. W., & Jastak, S. (1976). *Wide Range Achievement Test*. Wilmington, DE: Guidance Associates of Delaware, Inc.

Johnson, E. (1974). *An experimental study of the comparison of pupil achievement in the all-day kindergarten and one half-day control group* (ERIC ED 115 361). Walden University.

Karweit, N. L. (1987). *Full or half-day kindergarten–Does it matter?* (Report No. 11). Baltimore, MD: The Johns Hopkins University, Center for Research on Elementary and Middle Schools.

Oliver L. S. (1980). *The effects of extended instructional time on the readiness for reading of kindergarten children*. Unpublished doctoral dissertation, Boston University.

Stallings, J. A., & Kaskowitz, D. (1974). *Follow through observation evaluation, 1972-1973*. Menlo Park, CA: Stanford Research Institute.

Winter, M., & Klein, A. (1970). *Extending the kindergarten day: Does it make a difference in the achievement of educationally advantaged and disadvantaged pupils?* Washington, DC: Bureau of Elementary and Secondary Education. (ERIC Document Reproduction Service No. ED 087 534)

Woodcock, R. W. (1973). *Woodrock Reading Mastery Tests (Form A)*. Circle Pines, MN: American Guidance Service, Inc.

Author Notes

The authors acknowledge the substantial efforts of Betty Boyd, Lorraine Crummey, Marlene Engberg, Eleanor Hopke, and Paul Mayberry who assisted the first author with classroom observations. Janelle Weinzerl helped with the review of research. Brenda Ritzhaupt and Mary Zwoyer worked on the raw data files and other aspects of the data analysis. We are indebted to the principals and teachers in these three schools who must remain anonymous. And, we thank Delores Plowman for typing this entire manuscript.

Table 1
Means and Standard Deviations of Kindergarten Teachers' Allocated Minutes

District	Cohort	Teacher	Time of Day	Non-Instruc. M	Non-Instruc. SD	Free Play M	Free Play SD	Art/ Music M	Art/ Music SD	Science/ Health M	Science/ Health SD	Reading M	Reading SD	T Assign. Center M	T Assign. Center SD	Show & Tell M	Show & Tell SD	Adult Rdg. M	Adult Rdg. SD	Wkbk. Lang. M	Wkbk. Lang. SD	Assign. M	Assign. SD
A	1	1	AM	45.33	(11.36)	1.00	(3.00)	11.56	(12.40)	0.00	(0.00)	46.89	(15.41)	0.00	(0.00)	0.89	(2.67)	4.89	(5.23)	0.78	(2.33)	2.56	(7.67)
150	1	1	PM	41.22	(10.71)	0.78	(2.33)	11.44	(18.06)	0.00	(0.00)	43.00	(10.50)	4.56	(9.45)	0.11	(0.33)	6.78	(4.32)	1.78	(5.33)	1.44	(4.33)
Min./	2	1	AM	38.00	(9.99)	2.56	(5.13)	5.22	(8.66)	7.78	(9.65)	35.33	(12.03)	0.00	(0.00)	0.78	(2.33)	7.00	(5.66)	0.00	(0.00)	7.44	(13.28)
Day	2	1	PM	44.56	(6.65)	5.67	(6.91)	7.89	(10.80)	2.00	(6.00)	30.67	(15.45)	0.00	(0.00)	0.22	(0.67)	4.67	(7.05)	0.00	(0.00)	10.56	(16.09)
	1	2	AM	39.33	(10.81)	18.11	(14.57)	19.56	(15.39)	1.89	(5.67)	36.78	(9.23)	0.00	(0.00)	0.00	(0.00)	4.00	(3.35)	1.44	(4.33)	2.89	(4.51)
	1	2	PM	38.22	(12.93)	18.78	(13.36)	16.78	(16.72)	1.56	(4.67)	36.22	(9.32)	0.00	(0.00)	0.00	(0.00)	7.00	(5.36)	0.67	(2.00)	2.89	(4.40)
	2	2	AM	31.67	(8.85)	13.89	(12.43)	20.33	(16.36)	0.00	(0.00)	34.44	(12.84)	4.44	(13.33)	0.00	(0.00)	4.56	(4.85)	0.00	(0.00)	4.89	(9.37)
	2	2	PM	36.89	(9.25)	10.56	(12.05)	16.33	(14.02)	1.28	(5.33)	39.44	(13.71)	4.00	(12.00)	0.00	(0.00)	3.67	(4.36)	0.00	(0.00)	3.67	(7.02)
B	1	1	AM	71.78	(9.44)	0.00	(0.00)	7.67	(7.05)	1.00	(3.00)	14.78	(10.56)	14.11	(14.44)	9.56	(3.00)	11.56	(4.56)	0.00	(0.00)	0.00	(0.00)
150	1	1	PM	60.78	(6.08)	0.00	(0.00)	7.22	(6.12)	0.89	(2.67)	15.22	(12.33)	14.33	(13.57)	8.11	(3.79)	7.67	(5.87)	0.00	(0.00)	0.00	(0.00)
Min./	2	1	AM	65.22	(26.52)	0.00	(0.00)	7.67	(5.24)	4.89	(7.67)	9.22	(7.64)	17.56	(17.31)	12.56	(5.41)	10.33	(7.14)	0.00	(0.00)	4.67	(9.38)
Day	2	1	PM	55.78	(9.51)	0.00	(0.00)	7.78	(6.00)	3.78	(6.30)	8.22	(6.87)	14.22	(11.19)	9.89	(3.22)	9.22	(3.42)	0.00	(0.00)	4.22	(8.38)
	1	2	AM	56.33	(9.72)	0.00	(0.00)	5.56	(11.26)	1.78	(5.33)	10.44	(9.40)	36.00	(23.99)	8.89	(4.26)	6.78	(5.36)	1.78	(5.33)	0.00	(0.00)
	1	2	PM	59.89	(9.56)	0.00	(0.00)	4.67	(6.73)	0.00	(0.00)	10.00	(7.05)	31.22	(24.99)	10.44	(5.36)	5.00	(5.00)	2.89	(8.67)	0.00	(0.00)
	2	2	AM	54.63	(4.14)	0.00	(0.00)	1.63	(4.60)	5.63	(7.17)	9.00	(8.02)	19.75	(12.59)	17.75	(9.27)	2.75	(3.88)	0.00	(0.00)	4.38	(9.04)
	2	2	PM	61.22	(10.32)	0.00	(0.00)	2.00	(4.09)	4.56	(7.86)	6.56	(7.72)	16.33	(12.22)	13.11	(5.80)	2.67	(5.02)	0.00	(0.00)	4.11	(8.61)
	1	3	AM	44.89	(8.99)	0.00	(0.00)	9.89	(14.23)	0.00	(0.00)	2.11	(4.26)	41.44	(27.75)	13.44	(6.95)	3.33	(5.00)	0.00	(0.00)	0.00	(0.00)
	1	3	PM	43.89	(10.33)	2.33	(7.00)	6.67	(9.71)	0.00	(0.00)	0.00	(0.00)	46.56	(33.42)	8.78	(6.78)	5.44	(4.69)	0.00	(0.00)	0.00	(0.00)
	2	3	AM	65.11	(11.94)	0.00	(0.00)	9.11	(10.11)	1.00	(3.00)	5.00	(13.23)	2.22	(6.67)	3.67	(4.58)	4.22	(5.33)	0.67	(2.00)	26.33	(22.26)
	2	3	PM	60.22	(10.07)	0.00	(0.00)	9.56	(9.66)	0.00	(0.00)	3.33	(9.27)	2.67	(8.00)	3.44	(4.64)	2.33	(3.50)	0.33	(1.00)	27.11	(26.88)
	1	4	AM	60.00	(7.37)	7.33	(10.27)	19.00	(22.44)	0.00	(0.00)	0.44	(1.33)	30.78	(26.49)	7.56	(2.79)	8.67	(3.16)	0.00	(0.00)	0.00	(0.00)
C	1	1		135.00	(24.76)	73.00	(21.48)	35.78	(17.82)	0.00	(0.00)	6.33	(11.64)	0.00	(0.00)	6.11	(9.75)	30.78	(8.84)	2.67	(5.29)	0.00	(0.00)
330	2	1		131.33	(28.78)	45.67	(45.80)	35.78	(12.47)	6.89	(10.39)	3.00	(9.00)	26.22	(40.41)	15.56	(4.03)	14.89	(7.17)	0.00	(0.00)	0.00	(0.00)
Min./	1	2		114.00	(18.10)	54.56	(16.04)	37.11	(24.13)	5.33	(8.06)	6.89	(4.26)	1.78	(4.32)	10.67	(16.07)	31.44	(13.68)	9.67	(11.69)	0.00	(0.00)
Day	2	2		146.00	(25.41)	10.78	(13.32)	56.11	(15.10)	10.67	(7.12)	7.44	(10.11)	39.78	(25.89)	10.22	(9.58)	28.00	(11.14)	4.67	(8.47)	1.11	(3.33)
	1	3		117.67	(31.07)	75.56	(15.52)	44.11	(18.04)	1.44	(2.88)	3.00	(9.00)	1.78	(5.33)	3.33	(10.00)	14.44	(5.70)	0.11	(0.33)	0.00	(0.00)
	2	3		127.22	(39.23)	74.11	(33.38)	45.11	(19.46)	12.44	(16.39)	5.22	(8.21)	5.33	(16.00)	9.56	(14.56)	16.22	(12.54)	3.67	(7.62)	2.00	(6.00)

Note. N = 27 classes

Table 2
Means and Standard Deviations of Districts' Allocated Minutes

District	Cohort	Non-Instruc. M SD	Free Play M SD	Art/ Music M SD	Science/ Health M SD	Reading M SD	T Assign. Center M SD	Show & Tell M SD	Adult Rdg. M SD	Lang. M SD	Wkbk. Assign. M SD
A	1	41.03 (3.13)	9.67 (10.14)	14.83 (4.01)	0.86 (1.00)	40.72 (5.13)	1.14 (2.28)	0.25 (0.43)	5.67 (1.46)	1.17 (0.53)	2.44 (0 68)
A	2	37.78 (5.30)	8.17 (5.04)	12.44 (7.08)	2.89 (3.38)	34.97 (3.60)	2.11 (2.44)	0.25 (0.37)	4.97 (1.42)	0.00 (0.00)	6.44 (3.05)
B	1	56.79 (9.74)	1.38 (2.77)	8.67 (4.85)	0.52 (0.71)	7.57 (6.62)	30.63 (12.50)	9.54 (1.96)	6.92 (2.70)	0.67 (1.18)	0.00 (0.00)
B	2	60.36 (4.49)	0.00 (0.00)	6.29 (3.55)	3.31 (2.28)	6.89 (2.37)	12.12 (7.71)	10.07 (5.65)	5.25 (3.58)	0.17 (0.28)	11.80 (11.56)
C	1	122.22 (11.22)	67.70 (11.46)	39.00 (4.48)	2.26 (2.76)	5.41 (2.10)	1.19 (1.03)	6.70 (3.70)	25.56 (9.63)	4.15 (4.95)	0.00 (0.00)
C	2	134.85 (9.87)	43.52 (31.72)	45.67 (10.18)	10.00 (2.84)	5.22 (2.22)	23.78 (17.35)	11.78 (3.29)	19.70 (7.22)	2.78 (2.46)	1.04 (1.00)

Table 3

Means and Standard Deviations of Teachers' Interactions During Reading and Teacher Assigned Center Time

District	Cohort	Teacher	Time of Day	T In.er M	T In.er SD	Decoding Inter M	Decoding Inter SD	Comp Inter M	Comp Inter SD	Rdg Inter M	Rdg Inter SD
A	1	1	AM	219.67	(118.27)	77.67	(53.28)	34.33	(23.40)	112.00	(64.61)
	1	1	PM	234.11	(111.50)	63.33	(43.28)	42.33	(18.57)	105.67	(48.87)
	2	1	AM	240.11	(90.19)	74.89	(50.93)	62.00	(43.20)	136.89	(74.14)
	2	1	PM	227.00	(108.63)	67.56	(47.45)	69.67	(62.52)	137.22	(75.01)
	1	2	AM	192.44	(55.53)	74.00	(35.37)	21.11	(17.50)	95.11	(38.25)
	1	2	PM	188.44	(62.73)	73.33	(38.54)	17.89	(17.50)	91.22	(42.69)
	2	2	AM	174.44	(78.95)	73.89	(49.91)	28.00	(21.23)	101.89	(61.56)
	2	2	PM	203.33	(72.60)	77.89	(46.64)	31.78	(22.33)	109.67	(54.32)
B	1	1	AM	97.89	(53.34)	24.67	(23.70)	5.67	(4.92)	30.33	(24.05)
	1	1	PM	93.33	(59.20)	26.56	(29.18)	7.44	(4.07)	34.00	(30.47)
	2	1	AM	62.89	(50.79)	18.22	(25.62)	4.67	(8.00)	22.89	(27.74)
	2	1	PM	55.11	(41.43)	17.11	(29.31)	1.56	(2.40)	18.67	(31.04)
	1	2	AM	46.56	(37.75)	24.22	(21.07)	0.11	(0.33)	24.33	(21.24)
	1	2	PM	45.00	(27.07)	24.89	(14.63)	1.22	(3.67)	26.11	(15.37)
	2	2	AM	82.50	(81.47)	33.13	(40.38)	0.63	(1.19)	33.75	(41.35)
	2	2	PM	62.78	(83.93)	19.56	(26.29)	0.33	(0.50)	19.89	(26.59)
	1	3	AM	101.89	(73.00)	49.22	(48.16)	6.67	(8.85)	55.89	(52.99)
	1	3	PM	93.56	(70.11)	23.67	(27.83)	4.11	(6.47)	27.78	(31.34)
	2	3	AM	33.33	(77.06)	1.44	(4.33)	0.89	(2.67)	2.33	(4.80)
	2	3	PM	21.44	(43.48)	0.67	(2.00)	0.56	(1.67)	1.22	(2.44)
	1	4	AM	87.78	(69.19)	25.78	(24.61)	9.22	(12.31)	35 00	(34.04)
C	1	1		16.67	(25.53)	11.22	(17.72)	0.44	(0.73)	11.67	(18.28)
	2	1		9.56	(22.38)	1.11	(3.33)	1.56	(4.67)	2.67	(8.00)
	1	2		27.11	(19.08)	14.11	(9.82)	4.44	(4.48)	18.56	(11.66)
	2	2		56.44	(78.10)	8.00	(15.35)	3.11	(6.39)	11.11	(16.17)
	1	3		11.22	(33.29)	5.22	(15.67)	4.11	(12.33)	9.33	(28.00)
	2	3		17.22	(25.62)	6.00	(10.69)	6.22	(11.84)	12.22	(18.44)

Table 4

Means and Standard Deviations of Districts' Interactions During Reading and Teacher Assigned Centers

District	Cohort	T Inter M SD	Decoding Inter M SD	Comp Inter M SD	Rdg Inter M SD
A	1	208.67 (21.91)	72.08 (6.14)	28.92 (11.43)	101.00 (9.54)
	2	211.22 (28.86)	73.56 (4.35)	47.86 (21.04)	121.42 (18.34)
B	1	80.86 (24.36)	28.43 (9.22)	4.92 (3.32)	33.35 (10.68)
	2	53.01 (22.14)	15.02 (12.27)	1.44 (1.64)	16.46 (12.56)
C	1	18.33 (8.07)	10.19 (4.53)	3.00 (2.22)	13.19 (4.79)
	2	27.74 (25.15)	5.04 (3.54)	3.63 (2.38)	8.67 (5.23)

Table 5

Means and Standard Deviations of Teachers' Feedback During Reading and Teacher Assigned Centers

District	Cohort	Teacher	Time of Day	Sustaining M SD	Terminating M SD	Confirming M SD	Other M SD
A	1	1	AM	10.67 (13.82)	12.78 (6.44)	33.44 (23.40)	0.44 (0.73)
	1	1	PM	13.56 (21.49)	9.56 (7.78)	37.22 (32.50)	0.56 (1.33)
	2	1	AM	24.56 (30.00)	10.22 (6.96)	103.89 (51.82)	3.00 (7.19)
	2	1	PM	26.22 (24.88)	8.78 (7.38)	92.89 (51.70)	4.44 (10.14)
	1	2	AM	10.00 (6.73)	7.11 (6.01)	37.11 (17.16)	0.78 (1.39)
	1	2	PM	9.89 (8.96)	9.33 (9.15)	42.67 (20.04)	0.33 (0.50)
	2	2	AM	8.67 (12.12)	6.33 (6.40)	63.33 (26.88)	3.89 (7.72)
	2	2	PM	9.33 (13.61)	7.78 (4.60)	76.22 (30.95)	3.00 (9.00)
B	1	1	AM	1.67 (0.71)	1.00 (1.58)	16.00 (18.90)	0.00 (0.00)
	1	1	PM	3.00 (3.61)	1.67 (2.50)	14.00 (9.54)	0.11 (0.33)
	2	1	AM	2.22 (3.23)	0.56 (0.73)	13.67 (13.41)	3.22 (7.60)
	2	1	PM	1.11 (0.93)	0.89 (1.05)	11.22 (8.74)	1.33 (2.69)
	1	2	AM	4.22 (3.90)	2.89 (2.89)	14.22 (12.29)	1.11 (2.26)
	1	2	PM	2.89 (3.30)	4.22 (3.46)	14.22 (8.90)	0.22 (0.67)
	2	2	AM	3.63 (5.10)	1.63 (2.26)	9.25 (18.80)	0.13 (0.35)
	2	2	PM	4.33 (5.70)	2.67 (4.87)	7.89 (15.19)	0.00 (0.00)
	1	3	AM	10.67 (17.87)	3.44 (5.10)	11.89 (8.16)	3.89 (4.20)
	1	3	PM	11.44 (19.44)	2.89 (2.71)	12.22 (13.40)	3.78 (3.96)
	2	3	AM	2.22 (4.97)	4.33 (11.20)	5.89 (10.59)	0.67 (2.00)
	2	3	PM	2.11 (5.60)	2.00 (4.09)	5.44 (9.65)	1.11 (3.33)
	1	4	AM	3.44 (2.83)	3.11 (3.26)	22.22 (22.80)	6.44 (6.91)
C	1	1		3.56 (6.52)	0.67 (1.41)	5.33 (9.15)	0.00 (0.00)
	2	1		1.00 (3.00)	0.00 (0.00)	2.44 (7.33)	2.44 (5.08)
	1	2		0.67 (0.87)	1.78 (2.11)	7.44 (5.22)	0.00 (0.00)
	2	2		2.67 (4.06)	2.89 (3.62)	13.56 (13.54)	5.89 (11.04)
	1	3		0.56 (1.67)	0.22 (0.67)	2.67 (8.00)	0.00 (0.00)
	2	3		2.22 (4.84)	0.22 (0.44)	6.00 (9.84)	0.33 (1.00)

Table 6

Means and Standard Deviations of Districts' Feedback During Reading and Teacher Assigned Centers

District	Cohort	Sustaining M	Sustaining SD	Terminating M	Terminating SD	Confirming M	Confirming SD	Other M	Other SD
A	1	11.03	1.72	9.69	2.33	37.61	3.80	0.53	0.19
	2	17.19	9.49	8.28	1.64	84.08	17.91	3.58	0.71
B	1	5.33	3.99	2.75	1.08	14.97	3.48	2.22	2.51
	2	2.60	1.17	2.01	1.37	8.89	3.17	1.08	1.18
C	1	1.59	1.70	0.89	0.80	5.15	2.39	0.00	0.00
	2	1.96	0.86	1.04	1.61	7.33	5.67	2.89	2.80

Table 7

Means and Standard Deviations of Fall and Spring WRAT, Chicago, and Woodcock Scores by Classroom (N = 27 classes)

District	Cohort	Teacher	N	WRAT, Fall M SD	WRAT, Spring M SD	Chicago, Spring M SD	Woodcock, Spring M SD
A	1	1 AM	22	17.09 (6.60)	28.23 (4.43)	43.32 (21.09)	1.64 (3.11)
	1	1 PM	19	18.79 (8.41)	29.53 (5.36)	50.16 (26.40)	4.05 (4.59)
	2	1 AM	18	20.54 (12.03)	31.33 (12.79)	45.11 (27.44)	4.17 (9.49)
	2	1 PM	22	20.55 (7.84)	31.09 (8.30)	55.45 (23.59)	5.32 (8.89)
	1	2 AM	20	20.35 (5.91)	30.55 (9.62)	48.90 (24.37)	3.70 (4.95)
	1	2 PM	21	20.48 (9.45)	30.29 (7.68)	47.86 (28.69)	5.24 (5.97)
	2	2 AM	20	21.25 (5.23)	27.15 (3.48)	37.55 (17.51)	1.65 (2.39)
	2	2 PM	19	17.21 (5.89)	26.95 (4.31)	36.58 (22.66)	2.42 (2.24)
B	1	1 AM	22	19.50 (6.42)	28.55 (5.77)	27.86 (21.97)	2.14 (2.83)
	1	1 PM	21	18.52 (8.80)	28.62 (5.99)	22.57 (22.76)	1.81 (3.33)
	2	1 AM	22	23.82 (6.68)	28.91 (8.37)	33.59 (23.17)	2.73 (6.20)
	2	1 PM	20	18.30 (6.57)	26.00 (3.37)	21.95 (17.26)	1.85 (2.35)
	1	2 AM	18	16.06 (6.58)	25.44 (3.62)	21.44 (11.77)	0.78 (1.35)
	1	2 PM	17	19.65 (6.03)	26.35 (2.96)	24.29 (17.78)	2.65 (3.08)
	2	2 AM	20	21.10 (6.21)	27.95 (3.27)	29.70 (18.37)	1.85 (3.34)
	2	2 PM	20	17.70 (5.99)	25.60 (3.72)	19.85 (15.83)	1.40 (1.79)
	1	3 AM	22	21.23 (4.86)	27.05 (2.66)	21.00 (15.37)	1.59 (2.30)
	1	3 PM	18	18.56 (7.69)	27.50 (6.29)	26.06 (21.94)	1.94 (2.82)
	2	3 AM	21	24.19 (5.46)	29.19 (5.46)	29.24 (20.09)	3.57 (3.74)
	2	3 PM	19	21.32 (4.12)	25.00 (6.84)	21.42 (20.20)	1.63 (1.86)
	1	4 AM	21	19.95 (6.64)	26.81 (5.09)	24.90 (20.87)	1.62 (3.17)
C	1	1	35	16.54 (8.36)	24.17 (7.00)	17.60 (20.18)	1.89 (2.40)
	2	1	20	17.60 (10.72)	24.45 (8.04)	28.70 (28.67)	2.30 (2.99)
	1	2	25	22.28 (5.98)	27.92 (9.75)	33.56 (26.95)	3.04 (4.20)
	2	2	22	17.86 (10.19)	27.64 (12.27)	31.55 (32.12)	5.82 (10.31)
	1	3	25	18.88 (6.53)	25.72 (8.81)	37.12 (33.58)	2.48 (3.57)
	2	3	19	26.63 (14.53)	32.37 (15.68)	39.21 (32.91)	8.47 (12.13)

Note: N = size of class or number of children.

Table 8

Results of Multiple Regressions Run with Effect Codes for Spring Chicago Scores on Fall WRAT, District, Teachers within District, Time of Day, and Teacher x Time of Day for Cohorts 1 & 2

Source	df	Change R^2	R^2/df	F	Probability
WRAT-F					
Co 1	1	.3678	.3678	252.40	< .001
Co 2	1	.3865	.3865	204.23	< .001
Districts					
Co 1	2	.1500	.0750	51.50	< .001
Co 2	2	.1162	.0581	30.70	< .001
Teachers (Dist.)					
Co 1	6	.0201	.00335	2.30	< .05
Co 2	5	.1413	.02826	14.93	< .001
AM/PM					
Co 1	1	.0002	.0002	0.14	—
Co 2	1	.0016	.0016	.84	—
Tchrs x AM/PM					
Co 1	4	.0079	.001975	1.36	< .25
Co 2	3	.0007	.000233	1.23	—
Homogeneity of Regression Slopes					
Co 1	13	.0489	.0037615	2.58	< .01
Co 2	11	.0195	.0017727	.94	—
Residual					
Co 1	278	.4051	.0014572		
Co 2	238	.4504	.0018924		

Table 9

Significant Changes in R^2 for Spring Chicago Predicted by the Fall WRAT and Process Variables Reported by Teacher

Predictors	District A						District B						District C					
	Co 1 T1	Co 2 T1	Co 1 T2	Co 2 T2	Co 1 T1	Co 2 T1	Co 1 T2	Co 2 T2	Co 1 T3	Co 2 T3	Co 1 T4	Co 1 T1	Co 2 T1	Co 1 T2	Co 2 T2	Co 1 T3	Co 2 T3
N = Predictor	40	39	40	38	42	41	34	39	39	39	21	35	20	25	22	25	19
Fall WRAT	.5879	.4277	.4216	.3443	.4920	.3452	.4426	.5023	.3476	.3949	.5662	.3662	.6893	.4346	.6499	.5501	.4536
Total Interactions		.20				.10											
Decoding Interactions		.17	.08			.10											
Comprehension Interactions		.10		.08								.09					
Reading Interactions		.21	.08			.08											
Time in Rdg Activities		.16															
Sustained Feedback		.12												.14			
Terminal Feedback		.10												.14			
Confirming Feedback		.20	.06					.09				.14					
Other Feedback				.21													
Comp Inter + Sus FB		.16												.17			

Note. All changes in R^2 reported in this table are significant < .05.

Table 10

Changes in R^2 for Spring Chicago Predicted by the Fall WRAT and Process Variables for Entire Sample

Predictors	Cohort 1 (N = 306) R^2	R^2	Cohort 2 (N = 262) R^2	R^2
Fall WRAT +	.3678	.3678**	.3865	.3865**
Total Interactions	.4848	.1170**	.4850	.0985**
Decoding Interactions	.4632	.0954**	.4470	.0605**
Comprehension Interactions	.4883	.1205**	.4994	.1129**
Reading Interactions	.4827	.1149**	.4778	.0913**
Time in Rdg. Act.	.4266	.0588**	.4683	.0818**
Sustained Feedback	.4106	.0428**	.4620	.0755**
Terminal Feedback	.4552	.0874**	.4466	.0601**
Confirming Feedback	.4879	.1201**	.4990	.1125**
Other Feedback	.3789	.0111*	.3955	.0090
Comp. Inter. & Sus. Fb.	.4895	.1217**	.5031	.1166**

**These changes in R^2 are significant < .001.

* This change in R^2 is significant < .025.

Figure 1

OBSERVATIONAL CATEGORIES AND CODES

Activities

10 Non-Instructional Time
- 11 snack, lunch, rest, recess, bathroom
- 12 free play (children choose)
- 13 open/close exercises
- 14 transition

20 Teacher-Directed Instruction
- 21 Art, Music, Cut & Paste, P.E.
- 22 Science
- 23 Decoding
- 24 Math
- 25 Social Studies (incl holidays)
- 26 Writing
- 27 Language
- 28 Small Group Decoding
- 29 Small Group Reading
- 30 Workbook Assignments
- 31 Teacher-Assigned Centers
- 32 Show & Tell
- 33 Adult Reading
- 34 Independent Work Preparation
- 35 Test-taking practice
- 36 Library
- 37 Spelling

40 Independent Work

50 Other
- 51 Movie, party, rehearsal, etc.
- 52 Testing

Interactions

10 Text-Tied Comprehension
- 11 Background Knowledge
- 12 Vocabulary
- 13 Text Explicit
- 14 Text Implicit
- 15 Opinion
- 16 Sequencing, Prediction
- 17 Word Comprehension
- 18 Sentence Comp: TE
- 19 Sentence Comp: TI
- 20 Summaries
- 21 Procedural Q's or Instruc's

30 Story Grammar Referents
- 31 Setting: TE
- 32 Plot: TE
- 33 Character: TE
- 34 Theme: TE
- 35 Setting: TI
- 36 Plot: TI
- 37 Character: TI
- 38 Theme: TI

40 Other
- 41 General Probe
- 42 General Review
- 43 Correcting Work

50 Decoding
- 51 Letter Sounds
- 52 Whole Word
- 53 Letter Naming
- 54 Spelling
- 55 Rhyming
- 56 Sounding Out Words
- 57 Sentence Reading
- 58 Paragraph Reading
- 59 Blending

60 Oral Language Development
- 61 Word Repetition
- 62 Phrase or Sentence Repetition
- 63 Word Production
- 64 Phrase or Sentence Production

70 Grammar
- 71 Parts of Speech
- 72 Usage
- 73 Capital Letters
- 74 Punctuation

Feedback

11 Calls on Another, Ignores
12 Repeats, Reconfirms, Lauds
13 Negates
14 Repeats Question/Direction
15 T Models or Gives Answer
16 T Leads
17 Gives Rule
18 Encourages, Gives Hint
19 Homework Assign or Written Feedback
20 Quality Dependent
21 Asks for Explanation
22 Teacher Extends
23 Teacher Suggests Re-examine

Figure 1 (Continued)

Activity Flow of a Typical Day in Each District

DISTRICT A (150 MIN)	DISTRICT B (150 MIN)	DISTRICT C (330 MIN)
OPENING EXERCISES 8 MIN	OPENING EXERCISES 9 MIN	OPENING EXERCISES 15 MIN
DECODING 22 MIN	MUSIC 6 MIN	LANGUAGE 4 MIN
TRANSITION 9 MIN	SOCIAL STUDIES 8 MIN	DECODING 5 MIN
CASUAL CONVERSATION 3 MIN	TRANSITION 10 MIN	LANGUAGE 13 MIN
LIBRARIAN READING 8 MIN	T-DIRECTED CTRS 15 MIN	SOCIAL STUDIES 4 MIN
LIBRARY BOOK SELECTION 9 MIN	TRANSITION 12 MIN	ACTIVITY TIME 30 MIN
TRANSITION 6 MIN	MUSIC 5 MIN	TRANSITION 7 MIN
INDEPEND WK PREP 13 MIN	T-DIRECTED CTRS 13 MIN	HOUSEKEEPING 2 MIN
INDEPENDENT WK & FEEDBACK 17 MIN	RECESS 20 MIN	SNACK 7 MIN
SNACK 13 MIN	T-DIRECTED CTRS 3 MIN	TCHR RDG STORY 7 MIN
DECODING 30 MIN	TRANSITION 3 MIN	SCIENCE 16 MIN
CLOSING EXERCISES 12 MIN	SHOW & TELL 9 MIN	TRANSITION 6 MIN
	PARTY 14 MIN	RECESS 23 MIN
	TCHR RDG STORY 14 MIN	TRANSITION 3 MIN
	CLOSING EXERCISES 9 MIN	LUNCH & NAP 65 MIN
		TRANSITION 6 MIN
		MATH 16 MIN
		ACTIVITY TIME 20 MIN
		TRANSITION 6 MIN
		TEACHER RDG STORY 7 MIN
		TRANSITION 5 MIN
		RECESS 13 MIN
		TRANSITION 2 MIN
		ACTIVITY PREP 9 MIN
		ACTIVITY TIME 20 MIN
		TRANSITION 6 MIN
		PARTY 5 MIN
		CLOSING EXERCISES 8 MIN

Figure 2