DOCUMENT RESUME

ED 226 044 TM 830 079

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TITLE The Educational Environment and Students' Responding Times as a Function of Students' Teacher-Perceived Academic Competence.
INSTITUTION Minnesota Univ., Minneapolis. Inst. for Research on Learning Disabilities.
SPONS AGENCY Department of Education, Washington, DC.
REPORT NO IRLD-RR-86
PUB DATE Aug 82
CONTRACT 300-80-0622
NOTE 121p.; Appendices are marginally legible due to small and/or faint print.
AVAILABLE FROM Editor, IRLD, 350 Elliott Hall, 750 East River Road, University of Minnesota, Minneapolis, MN 55455 ($3.00).
PUB TYPE Reports - Research/Technical (143)

EDRS PRICE MF01/PC05 Plus Postage.
DESCRIPTORS *Academic Achievement; *Classroom Observation Techniques; Conceptual Tempo; Educational Environment; Elementary Education; Evaluation Methods; *Informal Assessment; Performance; Reaction Time; Student Behavior; Time Factors (Learning); *Time on Task
IDENTIFIERS Coding; Interval Time Sampling; Peabody Individual Achievement Test

ABSTRACT

The use of time in school, specifically the portion of time defined as active responding time, has been shown to correlate significantly with achievement. The comprehensive observational methodology of the academic engaged time studies provides the basis for systematically investigating student responding time and elements of the educational environment. Thirty third- and fourth-grade students were observed over two entire school days to examine the educational environment and students' responding times as a function of whether the students had been ranked by their teachers as high, middle, or low in academic competence. Only one statistically significant difference was found among groups: high academic group students engaged in academic talk for a greater amount of time than did low academic group students. In contrast to previous studies, no differences were found in the amounts of teacher praise and criticism or in student time engaged in academic versus inappropriate behaviors. Correlational analyses of engaged times and achievement were inconsistent. Definitions and examples of code for instructional structure and student academic response events and optical scanner coding sheets are appended. (Author/PN)

University of Minnesota

Research Report No. 86

THE EDUCATIONAL ENVIRONMENT AND STUDENTS' RESPONDING TIMES AS A FUNCTION OF STUDENTS' TEACHER-PERCEIVED ACADEMIC COMPETENCE

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Institute for Research on Learning Disabilities

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The Institute for Research on Learning Disabilities is supported by a contract (300-80-0622) with the Office of Special Education, Department of Education, through Title VI-G of Public Law 91-230. Institute investigators are conducting research on the assessment/decision-making/intervention process as it relates to learning disabled students.

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August, 1982

Abstract

Thirty third and fourth grade students were observed over two entire school days to examine the educational environment and students' responding times as a function of whether the students had been ranked by their teachers as high, middle, or low in academic competence. Only one statistically significant difference was found among groups: high academic group students engaged in academic talk for a greater amount of time than did low academic group students. In contrast to previous studies, no differences were found in the amounts of teacher praise and criticism or in student time engaged in academic versus inappropriate behaviors. Correlational analyses of engaged times and achievement were inconsistent. The implications of the findings for altering the educational environment and students' responding times are discussed.

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The Educational Environment and Students' Responding Times as a Function of Students' Teacher-Perceived Academic Competence

Across America, an estimated 40,700,000 students attend school, taught by over 2,100,000 teachers. Children spend a significant portion of their lives in school, but the extent to which they are spending sufficient time learning and the extent to which they are achieving adequately has been the subject of controversy (cf. Copperman, 1978). Parents as consumers of education, legislators deciding on educational dollars, and educators facing declining budgets are questioning how well students are achieving and the ways in which educational resources are allocated.

Educational researchers recently have recognized the importance of considering the time a student spends learning as a crucial variable affecting the student's achievement (cf. Borg, 1980; Graden, Thurlow, & Ysseldyke, 1982a; Rosenshine, 1978; Rosenshine & Berliner, 1978). The use of time in school, specifically the portion of time defined as active academic responding time, has been shown to correlate significantly with achievement (Greenwood, Delquadri, Stanley, Terry, & Hall, 1981; Hall, Delquadri, Greenwood, & Thurston, 1980). Additionally, researchers have suggested that one reason that all students, particularly low-achieving students, are not learning adequately may be that they are not spending sufficient amounts of school time engaged in academic practice and responding (Baer & Bushell, 1981; Hall et al., 1980).

The study of time as a variable in learning has been the focus of several investigations (e.g., Berliner, 1980; Borg, 1980; Fisher,

Berliner, Filby, Marliave, Cahen, & Dishaw, 1980; Greenwood et al., 1981; Hall et al., 1980; Lomax & Cooley, 1979; Rosenshine, 1980). Although these investigations used different definitions, measurement procedures, and techniques of analysis for studying time spent engaged in learning, their major findings were consistent. Generally, it has been reported that (a) students spend only a small portion of school time engaged in learning, (b) individual students differ widely in time engaged in learning, and (c) time engaged in learning is a significant predictor of achievement. Studies of academic engaged time or academic responding time have not addressed the extent to which students at different levels of academic competence, as perceived by their teachers, differ in time spent engaged in academic responding.

Related investigations have found that students of differing academic competence do differ in other instructional variables, such as interactions with the teachers. Brophy and Good conducted several observational investigations of elementary level teacher-student interactions as a function of the teacher's ranking of students' achievement (Brophy & Good, 1970, 1974; Good & Brophy, 1971, 1972; Good, Cooper, & Blakey, 1980). They found consistently that higher achieving students received more teacher praise. Further, higher achieving students initiated more contacts with the teacher, while lower achieving students received more teacher-initiated contacts and more criticism.

Teacher interactions with students ranked into different groups also were observed by Silberman (1969); Good and Brophy (1972)

attempted to replicate Silberman's study. Good and Brophy found that students whom teachers preferred tended to be high-achieving students; these "preferred" students received the most teacher contact and praise. Low-achieving students who also were ranked as problem students received the greatest number of behavioral contacts and criticism from teachers, but received fewer opportunities to respond. Low-achieving students who were not ranked as problem students received fewer teacher contacts overall, both in academic opportunity to respond and in behavioral contacts.

Other studies have been directed at assessing differences in classroom behaviors displayed by students at different achievement levels (Good & Beckerman, 1978; Soli & Devine, 1976). These studies found that students ranked high in achievement spent significantly more time "on task." Although these studies did not use the comprehensive, in-depth observation methodology of academic engaged time studies, they do suggest that high achieving students may spend more time engaged in academic responding than low-achieving students.

The comprehensive observational methodology of the academic engaged time studies (Greenwood et al., 1981; Hall et al., 1980) provides the basis for systematically investigating student responding time and several elements of the educational environment (such as time allocated to various activities, tasks and materials, teaching structures, teacher positions, and teacher responses). Previous investigations of academic responding time did not assess differences in time spent learning by students considered by their teachers to differ in academic competence. Studies that did look at differences

among groups of students at different achievement levels assessed only teacher-student interactions or broad "time on task" variables. Most of the investigations observed students for only a part of the school day.

This investigation used the comprehensive observation system of academic engaged time studies to examine the extent to which there are differences in the educational environment and student responding for students ranked by their teachers as high, middle, or low in academic competence. Observations were conducted over entire school days to obtain accurate pictures of the educational environment and student responding times. Nine specific research questions were addressed:

1. To what extent are there significant differences between students at varying levels of teacher-perceived academic competence in time allocated to various activities?

2. To what extent are there significant differences between students at varying levels of teacher-perceived academic competence in time allocated to academic versus non-academic activities?

3. To what extent are there differences between students at varying levels of teacher-perceived academic competence in time allocated to various tasks?

4. To what extent are there significant differences between students at varying levels of teacher-perceived academic competence in time allocated to various teaching structures?

5. To what extent are there significant differences between students at varying levels of teacher-perceived academic competence in time allocated to various teacher positions?

6. To what extent are there significant differences between students at varying levels of teacher-perceived academic competence in time allocated to various teacher activities?

7. To what extent are there significant differences between students at varying levels of teacher-perceived academic competence in time engaged in various student responses?

8. To what extent are there significant differences between students at varying levels of teacher-perceived academic competence in time engaged in academic, task management, and inappropriate responses?

9. What is the typical school day like for the student regardless of teacher-perceived academic competence?

The first six questions focused on allocated times--these times were measured by direct observations of how much time actually is spent in various class activities, tasks, structures, teacher positions, and teacher activities. These times should be distinguished from scheduled times, which are derived from teacher or school reports of how much time is planned for activities. The time spent by each target student making each response also was assessed by direct observation; these times are referred to as engaged times. Only those engaged times that involved active, observable learning responses are referred to as active academic responding times.

Method

Subjects

Thirty students from 10 classrooms in five elementary schools in a suburban school district served as subjects. In each school, three students were selected from each of two classrooms. The teachers in these classrooms included eight females (four third grade, four fourth grade) and two males (two fourth grade). Overall, 12 of the students (four classrooms) were third graders and 18 (six classrooms) were fourth graders. In each school, three boys were selected from one classroom and three girls were selected from the other, so that half

of the students were male and half were female.

All teachers and students were volunteer participants in the observational study. At the beginning of the school year, the school district sent consent forms to all teachers and to the parents of all students within the target grade levels in the five designated schools. Homeroom classes from which target students would be chosen were randomly selected from those in which teachers had signed consent forms.

In response to a school district request, students within the 10 participating classrooms had been rated earlier by their teachers in terms of their academic competence in the classroom from top (most competent) to bottom (least competent). Boys and girls were ranked together, providing a subject pool of three academic groups in each classroom--high, middle, and low. One student was randomly selected from each academic group in each of the 10 classrooms, with the restriction that all students from one classroom be of the same sex.

Observation System

The CISSAR (Code for Instructional Structure and Student Academic Response) observation system was used in this study. The version of the system employed was developed by the Juniper Gardens Children's Project in Kansas City, Kansas (Greenwood, Delquadri, & Hall, 1978). Rather than sampling activities of several students, in this system one target student was observed over the entire school day and six event areas were recorded: (a) activity (12 codes), (b) task (8 codes), (c) teaching structure (3 codes), (d) teacher position (6 codes), (e) teacher activity (5 codes), and (f) student response (19

codes). Seventeen stop codes also were used to record reasons for termination of observation. The definitions of the event areas and the specific events recorded within each area are summarized in Table 1. Detailed definitions and examples are presented in Appendix A. Excluding the stop codes, a total of 53 different events could be recorded with the CISSAR system.

Insert Table 1 about here

An interval time sampling technique was used to direct the recording of events in 10-second intervals over the entire school day while the student was in the classroom. Coding was structured into consecutive blocks of seven 10-second intervals. During the first 10-second interval, activity, task, and teaching structure were recorded. During each of the next 10-second intervals, teacher position, teacher activity, and student response were recorded. This pattern was maintained throughout the observation.

An auditory electronic timer attached to a clipboard was used to signal the 10-second intervals. The timer was equipped with an earplug so that only the observer could hear the signal (a short beep sound). The clipboard was used to hold coding sheets and to provide a hard surface for marking events.

The coding sheets, modeled after those used by the Juniper Gardens Children's Project (Stanley & Greenwood, 1980) were designed at Minnesota's Institute to be read automatically by an optical scanner (see Appendix B). To be read correctly by the scanner, the

circles on the coding sheet had to be very dark and completely filled. In addition to spaces for coding student identification and start and stop times, each sheet contained three blocks representing 70 seconds each. Each completed sheet represented 3.5 minutes of observation time.

Observers

Thirteen individuals served as observers; ten of the observers were responsible for the majority of the observations, and the other three observers were substitutes who filled in for reasons of sickness, make-up observations, and so on. These substitute observers were Institute staff members who conducted observer training sessions and monitored the regular observers. The regular observers were all females who had been selected from a pool of 50 female applicants who had responded to an ad in a local newspaper. To minimize biases that might be brought to the classroom setting, a prerequisite for consideration was that the applicant not have a background in education. Additional selection criteria included average or above average reading ability and performance on selected parts of a general office skills test. A personal interview with one of two IRLD staff members comprised the final step of selection.

Of the 10 selected observers, three had attended college for at least one year and one had a BA. Two others had completed a business or vocational school program. Previous employment varied greatly, including sales, clerical, foster parent, own business, and social worker. All but two observers had a child or children in elementary or secondary school. Observers did not work in schools in which their

children were enrolled.

Procedures

Observer training. Training of observers in the observation system was accomplished through the use of an Observer and Trainer's Manual (Stanley & Greenwood, 1980). The manual presented eight units that, according to the authors, were sequenced in terms of the complexity of the recording skills covered. Training required observers to read materials and then practice coding small numbers of events through the use of a variety of other media, including flashcards, overheads, and videotapes. Exercises or quizzes were presented throughout the manual. Mastery (100%) of the material in each unit was required before continuing in the training to the next unit.

Training in the system was conducted by four Institute staff members. Two weeks of half-day training sessions were required to cover the material presented in the manual. This was followed by two to three days of practice coding within actual classrooms.

Data collection. The trained educational observers coded activities on either a whole-day (one observer all day) or half-day (one observer for morning, another for afternoon) basis. Typically, observers did not code continuously for a period of more than 1 1/2 to 2 hours because of breaks within the school day. Observations were not conducted during breaks, such as those for lunch, recess, and bathroom. Also, observers did not code during physical education, music, or special assembly programs since the observation system did not apply to these situations. Observers followed target students

when they left their homerooms to go to other classrooms for other subjects (typically reading and/or mathematics). Coding was conducted in these classrooms in the same manner as in homerooms. Regardless of the physical setting, observers attempted to position themselves to be unobtrusive and to avoid revealing the identity of target students to the teachers, the target students themselves, or to other students.

Use of the optical scanner coding sheets typically required observers to mark only slashes in the appropriate circles while observing because the 10-second interval did not provide enough time for circles to be darkened sufficiently to be read accurately by the optical scanner. As a result, observers darkened the slashed circles after the actual observation was completed, either during break periods, in the evenings, or on the weekends. This procedure tended to reduce errors in the coding of data.

Each target student was observed for two full school days by observers. The decision to collect two days of data on each student was based on stability analyses presented by Greenwood et al. (1981), in which they found one day of observation predicting 62% of the variance for activity and 92% of the variance for student response. Observations were conducted in all schools at approximately the same time (2 days in school 1, 2 days in school 2, etc.). The order of observation of students within a class was random; classrooms were scheduled for observation so that observers would be present in the classroom on different days of the week. Observers were blind as to the classification of the students they observed. For each classroom, students' names were listed alphabetically and observers signed up for

observation of students on a random basis. In addition, teachers were not informed as to the identity of the students being observed. Observers located their target students by means of either a seating chart or by name tags on students' desks in the homeroom.

Since three students were observed in each classroom, schedules were arranged so that two observers coded in each classroom on each day of observation. This allowed for the observation of two students during each day in a particular classroom. All observations (2 days for 30 students) were completed during the fall of the year.

Reliability. Reliability checks were conducted throughout the study to detect any inconsistencies in coding among observers or between an observer and the established code definitions. The reliability checks were conducted by the observer pairs within each room; one of the two observers, designated randomly as the reliability observer, stopped observing her target student and coded events on the same student as the other observer in the classroom for approximately 14 minutes (4 pages of observation). During the study, 41 reliability checks were completed.

Two types of reliability were checked: (a) behavioral, and (b) sequential. Behavioral reliability was a measure of observer agreement on a specific event being observed; behavioral reliabilities were calculated for (a) teacher position, (b) teacher activity, and (c) student response. The second type of reliability, sequential reliability, was a measure of observer agreement on a sequence of items; this measure was designed to document that observers were coding in the sequence required by the observation system. According

to the CISSAR training manual, the desired levels of reliability were 90% for behavioral reliability and 85% for sequential reliability. Table 2 is a summary of the reliabilities obtained during the present study.

Insert Table 2 about here

To maintain adequate levels of reliability throughout the study, meetings were held to discuss coding problems, reliability disagreements, and so on. These were held on a weekly basis for the first two weeks of the study, and then on a biweekly basis after that. At the meetings, definitions were reviewed and any disagreements were resolved.

Achievement testing. At the end of the school year, 21 of the observed students (70.0%) were administered the Peabody Individual Achievement Test (PIAT; Dunn & Markwardt, 1970) by trained testers. The remaining students were not tested either because they had moved or because parental permission for testing was not given. The students for whom parental permission was not obtained generally were from the lower behavioral group; all upper behavioral group subjects were tested.

Data Analysis

Total amounts of time each student spent in the 53 observed events and in five event composites (academic activities, non-academic activities, academic student responses, task management student responses, inappropriate student responses) over the two days of

observation comprised the dependent measures that were analyzed in this study. However, for descriptive purposes, these times were transformed to represent the time spent in each event during one school day. Because the observation system was designed to record as much data as possible during each 10-second interval, the activity, task, and structure were coded once every 70 seconds, while the teacher position, teacher activity, and student response were coded six times every 70 seconds. Thus, transformations of times from the recording system produced slight overestimates of the time spent in each activity, task, and structure, and slight underestimates of the time spent in each teacher position, teacher activity, and student response. The transformed times appear in all figures and tables, but were not used in the actual data analyses.

All data were analyzed using analyses of variance (ANOVAs) to identify significant differences ($p < .05$) between group means. Further, because some of the significant results might occur by chance due to the large number of ANOVAs conducted, only those findings that exceeded the number that would be expected by chance for each research question (5%) are reported. Follow-up tests on significant ANOVAs were conducted using the Student-Newman-Keuls procedure. Additionally, students' end-of-the-year PIAT data were correlated with their student response times.

Results

Comparisons of Student Groups

Activity. The average amounts of time allocated to activities within a school day for each academic group are given in Table 3. No

statistically significant differences were found among the three groups in the time allocated to any of the activities.

Insert Table 3 about here

Activity composites. In order to examine the amounts of time allocated to academic and non-academic activities, composite times were calculated. The academic activities included reading, math, spelling, handwriting, language, science, and social studies. The non-academic activities included arts/crafts, free time, business management, and transition. The average amounts of time allocated to these two categories of activity for each of the groups are presented in Table 4. For both composites, differences among groups were not statistically significant.

Insert Table 4 about here

Task. Table 5 is a list of the various tasks that were observed during all activities, and the amounts of time devoted to each task for each academic group. None of the differences in times among groups was statistically significant.

Insert Table 5 about here

Teaching structure. The three structures in which students received instruction, listed in Table 6, were Entire Group, Small

Group, and Individual. No statistical differences emerged in the allocation of time to any of these instructional arrangements for the three academic groups.

Insert Table 6 about here

Teacher position. Teacher positions in relation to students in the three academic groups are summarized in Table 7. For about 1/3 of the day the teacher was in front of the students and for another third among the students. No statistically significant differences among groups were found.

Insert Table 7 about here

Teacher activity. Five categories were used to code the teacher's activity in relation to the observed students. Table 8 is a list of the categories and the observed times for students at different levels of academic competence. Time allocated to each teacher activity did not differ significantly for the three groups of students.

Insert Table 8 about here

Student response. Student responses that were observed included ones that were academic (e.g., writing, asking a question), ones related to task management (e.g., raising hand, looking for

materials), and ones that were inappropriate (e.g., disruption, working on an inappropriate task). Table 9 is a list of the 19 student responses and the times observed for each group. One statistically significant difference among groups emerged (Talk about Academics), $F(2,27)=4.55$, $p=.020$. The follow-up test indicated that students in the high academic group engaged in academic talk for a greater amount of time (4.8 minutes) than did students in the low academic group (1.7 minutes). No other statistically significant differences in times engaged in specific responses were found.

Insert Table 9 about here

Student response composites. Analyses also were conducted to compare the amounts of time students in the three groups engaged in academic responses overall, task management responses overall, and inappropriate responses overall. The academic responses included writing, playing academic games, reading aloud, reading silently, talking about academics, answering academic questions, and asking academic questions. Task management responses included passive responding, raising hands, looking for materials, moving to a new academic station, and playing appropriately (teacher-approved play). Inappropriate responses included disruption, playing inappropriately, working on inappropriate tasks, talking about non-academics, being in an inappropriate locale, looking around, and self-stimulation. The average amounts of time students in the three groups engaged in these response composites are presented in Table 10.

Insert Table 10 about here

A statistically significant difference was found for the academic response composite, $F(2,27)=3.66$, $p=.039$. However, the follow-up test failed to identify where the differences existed, which suggests that the finding of a statistically significant difference is questionable (Winer, 1971). The amounts of time the students in the three groups engaged in task management responses and in inappropriate responses were not statistically different.

A Typical School Day

The data obtained from the observation of students perceived by their teachers as high, middle, and low in academic competence indicated that the instructional environment for these students was essentially the same. The only difference among the groups was in the amount of the time they talked about academics, with the high group doing so for a greater amount of time than the low academic group. As a result, the observational data provide an excellent picture of a typical school day for students of all levels of academic competence in the third and fourth grades. The picture that emerges will be presented in detail here.

Activity. Figure 1 is a graphic representation of how the typical school day breaks down into time allocated to academic, non-academic, and unobserved activities. Clearly, during the time students were observed, much more time was devoted to academic activities (180.3 minutes) than to non-academic activities (36.3

minutes). However, it must be noted that nearly one-half of the school day was not devoted to either of these. The observed students were in school for 390 minutes (6 1/2 hours) per day. Those times not observed during the school day included recess/playground activity, lunch, physical education, music, transition between classrooms, and bathroom breaks. These activities amounted to about 173 minutes (2 hours 50 minutes).

Insert Figure 1 about here

The breakdown of time allocated to academic activities is presented in Figure 2. Reading was the activity to which the most time (66.2 minutes) was allocated, followed by math (42.3 minutes), language (22.9 minutes), and social studies (19.3 minutes). Fifteen minutes or less were allocated to each of the other academic activities.

Insert Figure 2 about here

The amounts of time allocated to each of the non-academic activities are depicted in Figure 3. Most of the time allocated to non-academic activities was devoted to transitions (12.9 minutes) and to arts/crafts (12.5 minutes). Less than eight minutes were allocated to each of the other non-academic activites.

Insert Figure 3 about here

The times presented in Figures 1-3 are averages. Table 11 is a list of these average times and the ranges of times observed for individual students. For each activity, variability in times allocated to the activities for individual students was great. For example, only 12.2 minutes were allocated to reading for one student while 95.6 minutes were allocated to reading for another student. Total time allocated to academic activities varied from 109.6 minutes (1 hour 48 minutes) for one student to 229.2 minutes (3 hours 48 minutes) for another student.

Insert Table 11 about here

Task. Time allocated to various tasks is represented in Figure 4. The greatest amount of time was allocated to the use of readers (71.0 minutes), followed by other media such as flashcards, tape recorders, etc. (36.6 minutes), worksheets (34.5 minutes), and workbooks (26.4 minutes). Less than 10 minutes, on the average, were allocated to teacher-student discussion and to listening to teacher lectures.

Insert Figure 4 about here

Table 12, which is a summary of average times and ranges of times

for tasks, again shows the large variability that existed among students. For example, although students used readers an average of 71.0 minutes, one student used readers for only 13.3 minutes while another used readers for almost two hours (118.3 minutes). At least one student spent 35.0 minutes getting materials out and putting them away.

Insert Table 12 about here

Teaching structure. The average times allocated to entire group, small group, and individual teaching structures are depicted in Figure 5. Students spent almost all of their time in entire group teaching structures (175.2 minutes). Considerably less time was allocated to small group instruction (39.1 minutes), and minimal time was devoted to individual instruction for each observed student (2.1 minutes).

Insert Figure 5 about here

The variability among students was great (see Table 13), with one student receiving no individual instruction and one student receiving no small group instruction. Time allocated to entire group teaching varied from 65.8 minutes for one student to 260.8 minutes (4 hours, 21 minutes) for another student.

Insert Table 13 about here

Teacher position. The position of the teacher in relation to the student being observed most often was in front of the class (63.4 minutes) and sitting or standing among the students (60.8 minutes), followed by being at his/her desk (40.6 minutes). These times are presented in Figure 6 and Table 14. The teacher spent less than 10 minutes in the back of the class or out of the classroom, and less than 3 minutes beside the student being observed. While the teacher was beside one student for only 12 seconds, the teacher was beside another student for 14.8 minutes. Similar variations in time existed for each teacher position category (see Table 14).

Insert Figure 6 and Table 14 about here

Teacher activity. On the average, the observed student received specific teaching responses from the teacher for just over one hour per day (see Figure 7); for one student the actual time was 37.8 minutes and for another the actual time was 116.8 minutes. Teaching was coded whenever teaching activities were directed either to the specific student or to the group in which the student was a member. Teaching time was exceeded by no response time (103.5 minutes), during which the teacher was not making any overt response to the student. Teacher disapproval of the target student occurred infrequently, ranging from no time to 3.1 minutes (see Table 15). Teacher approval was observed only rarely; the student given the most approval received only 36 seconds of it.

Insert Figure 7 and Table 15 about here

Student response. Figure 8 is a graphic representation of the average amounts of time students engaged in academic responses, task management responses, and inappropriate responses. Students clearly spent most of their time making task management responses (111.2 minutes); these responses accounted for 62% of the students' total responding time during one school day. During approximately 23% of the observed school day, the student engaged in active academic responding (41.3 minutes), and during approximately 15% of the school day, the student engaged in inappropriate responding (26.9 minutes).

Insert Figure 8 about here

Although seven active academic responses were coded (see Figure 9), only writing occurred with much frequency (26.2 minutes); this was followed by reading silently (8.7 minutes). Students engaged in oral reading for less than one-half minute on the average. Variability among students was great (see Table 16), as is evidenced by the fact that one student read silently for only 1.6 minutes while another read silently for 16.9 minutes.

Insert Figure 9 and Table 16 about here

Five task management responses were coded. The average time in

which students engaged in each of these, excluding passive responding, was about 5 minutes (see Figure 10). Passive responses included such behaviors as waiting in line and looking at the teacher; in other words, this was coded when the student was not engaged in an active observable response. The amount of time students were involved in passive responding ranged from less than one hour (42.9 minutes) to over two hours (134.6 minutes).

Insert Figure 10 about here

Seven inappropriate student responses were coded; all but looking around and play inappropriate were observed for less than five minutes per day (see Figure 11). Inappropriate responses in which students engaged most often consisted of looking around (12.7 minutes). One student spent nearly one-half hour (25.8 minutes) looking around, while one did so for only 4.0 minutes. Variability was evident in all student response times (see Table 16).

Insert Figure 11 about here

Achievement Test Data

Achievement test data were collected at the end of the school year for 21 of the 30 students observed. Table 17 is a list of the scores for the high, middle, and low academic groups. Differences among groups were found on two subtests (Reading Comprehension and General Information) and the Total PIAT score. These differences

corresponded to the ranks given to the students by the teachers.

Insert Table 17 about here

Correlations were calculated between the times students engaged in various responses and their achievement scores (see Table 18). Many of the obtained correlations were not in expected directions. Unexpected findings included the negative correlations between some of the active academic responses (read silently, answer question, ask question) and PIAT scores. Expected negative correlations occurred between inappropriate student responses (disruption, play inappropriate, inappropriate task) and PIAT scores. In addition, looking for materials, a task management response, was negatively correlated with the math score. Also, the inappropriate response composite showed negative correlations with math and general information.

Insert Table 18 about here

Additional correlational analyses were completed to determine whether similar patterns of negative and positive correlations would emerge within the high, middle, and low academic groups. Again, not all the relationships were as expected. In general, the high group showed the most mixed results. While play inappropriate and talk non-academic were correlated negatively with math achievement scores, so were talk academic and ask academic question. The high group

composite scores on task management responses correlated positively to spelling, reading, and the total score (see Table 19).

Insert Table 19 about here

For the middle group, inappropriate task and inappropriate locale correlated negatively with math and reading comprehension scores, and disruption correlated negatively with reading comprehension. However, a strong negative correlation emerged between writing and reading comprehension (r=-.80) as well as between reading aloud and reading comprehension (r=-.82). These and other significant correlations for the middle group are listed in Table 20.

Insert Table 20 about here

Only a few significant correlations were found for the low academic group; most of them were predictable (see Table 21). For example, academic games correlated positively with math scores, reading recognition scores, and total scores. Inappropriate locale and look around correlated negatively with the information score. The inappropriate response composite also correlated negatively with the information score. The active academic response of answering questions correlated negatively with both the math subtest score and the total score.

Insert Table 21 about here

Discussion

A surprising result of this study was that students perceived by teachers to be at different levels of academic competence did not differ significantly in how instruction occurred or how they spent their time in school. High, middle, and low academic group students received equal amounts of teacher praise and criticism and were engaged in academic, task management, and inappropriate behaviors for about the same amounts of time. These results are contrary to previous findings of studies of teacher-student interactions or time on task for students of different achievement rankings.

Several factors may account for the differences between previous findings and the results obtained in this study. First, earlier studies used different observation schedules and different definitions from those used in this study to assess both teacher and student behaviors. In the current study, teacher behaviors were defined in a more general and global manner than in previous investigations. Therefore, subtle differences in types of praise or criticism may have been overlooked. However, it is still important to note that the total amounts of praise and criticism did not differ among the three groups. In contrast to previous studies, the present investigation used more specific and precise observations of the amounts of time students were engaged in various responses; the procedure used here is considered to have produced a more accurate representation of student

engaged time.

A second factor accounting for differences in the results of this study and previous ones is that the present findings were based on observations conducted over the entire time students were in the classroom rather than during some portion of the school day. This factor is important since some types of student responses appear to occur with greater frequency during specific parts of the school day. Clearly a more accurate picture of how students were engaged and how instruction occurred is obtained by examining these over the total context of a typical school day.

The results of correlational analyses between time spent engaged in various student responses and student achievement also were unexpected. While previous investigations (e.g., Greenwood et al., 1981) have found positive correlations between academic responses and achievement, and negative correlations between inappropriate behaviors and achievement, the results from the current study were mixed. Among the unexpected results were the positive correlations between task management responses and achievement scores and between inappropriate behaviors and achievement scores, as well as the negative correlations between some academic responses and achievement. One explanation for these inconsistent results is that the present study sampled students across the entire range of academic competence; students at the extremes may have affected correlations differently. Other explanations relate to the small sample size and the choice of the achievement measure (which was not specifically related to the content covered in the classroom).

Perhaps the most striking finding of this study was the small amount of time that all students, regardless of academic ranking, spent engaged in learning. This finding is consistent with the results of previous investigations of academic engaged time (e.g., Borg, 1980; Fisher et al., 1980; Graden, Thurlow, & Ysseldyke, 1982b; Greenwood et al., 1981; Hall et al., 1980; Rosenshine, 1980; Thurlow, Graden, Greener, & Ysseldyke, 1982); only a small portion of the school day was spent actually engaged in academic responding. It appears that even though school district policy outlines specific amounts of time that are to be devoted to certain academic subjects each day, these do not translate into active engaged time in the classroom.

Of the 390 minute school day, about 180 minutes were allocated to academic activities, and only about 42 minutes per day (about 10% of the time students were in school) were spent actively engaged in academic responding. At this rate, over the course of a 160 day school year, a student, on the average, would spend 112 hours making academic responses. Of this 112 hours of academic responding, only about one hour per year would be spent reading aloud and only 23 hours per year would be spent reading silently. . In contrast, over the course of the year, about 296 hours would be spent in task management responding.

The finding of the small amount of time students spent engaged in learning supports the assertion by Baer and Bushell (1981) and Hall et al. (1980) that students are not spending adequate amounts of school time engaged in learning. The additional finding that, regardless of

academic rank, students spent equally low amounts of time engaged in academic responding, suggests several possible conclusions. First, it is possible that although high and low academic group students did not differ in total time spent engaged in academics, they differed in the quality or use of the total time. For example, while all students spent only about nine minutes per day in silent reading, higher students may have read twice as many pages as lower students, they may have read more difficult material, or they may have understood more of what they read. These qualitative aspects of academic responding time were not assessed in the present investigation yet are undoubtedly important in a complete understanding of variables in student learning.

Second, it is possible that while there were no differences in engaged times among groups when they were in school, students perceived by their teachers to be high in academic competence may spend significantly more time out of school engaged in academic practice (e.g., homework, help from parents or siblings). Finally, achievement differences between high and low achieving students cannot be explained totally by time engaged in academic responding. Variables such as cognitive abilities, interests, and motivation also are important. Still, active academic responding time does account for a significant portion of achievement variance (Fisher et al., 1980; Greenwood et al., 1981). The fact that students spend only limited amounts of time engaged in academic responding clearly has important implications.

The results of this and other recent investigations (e.g.,

Berliner, 1980; Cooley & Leinhardt, 1980; Fisher et al., 1980; Graden et al., 1982b; Greenwood et al., 1981; Hall et al., 1980; Rosenshine, 1980; Thurlow et al., 1982; Zigmond, Vallecorsa, & Leinhardt, 1980) point to the need to consider academic responding time as an important instructional variable. Academic responding time is a useful concept for instructional interventions because time is an alterable variable (Bloom, 1980)--a variable that educators can change and manipulate to have direct and significant impact on student learning. Further, time as an instructional variable is important because time is a resource available equally to all students. Efforts are needed to design, implement, and evaluate various strategies to increase the amount and appropriateness of time spent engaged academically for all students.

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Acknowledgments

Many people cooperated to make this research possible. Personnel in the participating school district, including the Assistant Superintendent, the Director of Special Services, the Director of Elementary Education, principals, teachers, parents, and students, extended considerable effort to facilitate activities required to complete this research. The educational observers who gave time and commitment to research they believed would result in improved education opportunities were: Deborah DeCoux, Barbara Flykt, Eileen Mevissen, Donna Miller, Rose Marie Plant, Cheryl Randklev, Judith Rygwall, Yvonne Shafranski, Wendy Studer, and Geraldine Webster.

Appreciation is extended to Dr. Charles Greenwood and Dr. Sandra Stanley for allowing use of the CISSAR Coding System which they developed.

Catherine Walters created graphics designs to illustrate the data, thereby making the information visually understandable. Other IRLD staff members gave invaluable help in various steps of the research, including Bob Algozzine, Matt McGue, and Jing-Jen Wang in data analysis and Sandra Christenson in observer training. Psychometric assistants who helped summarize the data were Barbara Anderson, Lisa Boyum, Yetta Levine, and Catherine Walters. Audrey Thurlow and Marilyn Hyatt are due special thanks for typing numerous drafts of this report.

Table 1

CISSAR Event Areas and Specific Events Coded[a]

Event Area	Specific Events Coded
Activity - type of instruction being provided/established by teacher	R - Reading M - Math S - Spelling H - Handwriting L - Language Sc - Science Ss - Social Studies Ac - Arts/Crafts Ft - Free Time Bm - Class Business/ Management Tr - Transition Ct Can't Tell
Task - curriculum task or verbal instruction mode in which student is expected to engage	Rr - Readers Wb - Workbooks Ws - Worksheets Pp - Paper and Pencil Li - Listen to Teacher Lecture Om - Other Media Trd - Teacher-Student Discussion Fp - Fetch/Put Away
Teaching Structure - physical arrangement of student in class	Eg - Entire group Sg - Small group I - Individual
Teacher Position - location of teacher	IF - In Front of Class AD - At Desk AS - Among Students O - Out of Room S - Side B - Back
Teacher Activity - response of teacher to target student	NR - No Response T - Teaching OT - Other Talk A - Approval D - Disapproval
Student Response - behavior in which student is engaged	W - Writing G - Playing Academic Game RA - Reading Aloud RS - Silent Reading TA - Talking About Academics AnQ - Answers Academic Question ASK - Asks Academic Question AT - Passive Response RH - Raising Hand LM - Looking for Materials M - Moving to New Academic Station PA - Play Appropriate DI - Disruption PI - Play Inappropriate IT - Inappropriate Task TNA - Talking About Non-academics IL - Inappropriate Locale LA - Look Around SST - Self-Stimulation

[a]Based on Stanley & Greenwood's (1980) CISSAR: Code for instructional structure and student academic response: Observer's manual. Within the Student Response Event Area, the AT event, which was designated as "Attending" by Stanley and Greenwood, was renamed as "Passive Response" in the present investigation to avoid inappropriate connotations of the responses included within that event.

Table 2

Summary of Reliabilities Calculated During the Study[a]

Reliability	Mean	Range
Behavioral		
Teacher Position	92.5	69-100
Teacher Activity	94.4	72-100
Student Response	89.0	60-100
Sequential	93.6	85-99

[a]All reliabilities are expressed as percentages.

Table 3

Time Allocated to Activities for Students at Three Levels of Academic Competence[a]

Activity	High		Middle		Low		Sig Level[b]
Reading	66.8	(30.7)	69.3	(31.5)	62.6	(29.4)	ns
Math	42.6	(19.6)	41.6	(18.9)	42.7	(20.1)	ns
Spelling	9.8	(4.5)	9.7	(4.4)	8.3	(3.9)	ns
Handwriting	7.1	(3.3)	9.1	(4.1)	7.7	(3.6)	ns
Language	20.4	(9.4)	25.7	(11.7)	22.7	(10.7)	ns
Science	11.4	(5.2)	10.5	(4.8)	15.0	(7.0)	ns
Social Studies	22.2	(10.2)	17.8	(8.1)	17.8	(8.4)	ns
Arts/Crafts	10.8	(5.0)	13.6	(6.2)	13.0	(6.1)	ns
Free Time	2.7	(1.2)	2.8	(1.3)	4.1	(1.9)	ns
Business Management	10.5	(4.8)	4.6	(2.1)	8.1	(3.8)	ns
Transition	13.3	(6.1)	15.0	(6.8)	10.5	(4.9)	ns
Total	217.6		219.8		212.6		ns

[a]Entries are mean numbers of minutes, and percentages of total minutes (in parentheses), for one day, based on 10 students in each group.

[b]Significance levels are from one-way ANOVAs on the mean times over two days.

Table 4

Activity Composite Times at Three Levels of Academic Competence[a]

Activity Composite	High		Middle		Low		Sig Level[b]
Academic	180.4	(82.9)	183.7	(83.6)	176.9	(83.2)	ns
Non-Academic	37.2	(17.1)	36.1	(16.4)	35.7	(16.8)	ns
Total	217.6		219.8		212.6		ns

[a]Entries are mean numbers of minutes, and percentages of total minutes (in parentheses), for one day, based on 10 students in each group.

[b]Significance levels are from one-way ANOVAs on the mean times over two days.

Table 5

Time Allocated to Tasks for Students at Three Levels of Academic Competence[a]

Task	High		Middle		Low		Sig Level[b]
Readers	75.2	(34.6)	72.5	(33.0)	65.3	(30.8)	ns
Workbooks	26.1	(12.0)	29.1	(13.2)	23.9	(11.2)	ns
Worksheets	30.2	(13.9)	35.4	(16.1)	37.8	(17.8)	ns
Paper & Pencil	12.1	(5.6)	11.8	(5.4)	12.5	(5.9)	ns
Listen to Lecture	6.9	(3.2)	10.3	(4.7)	11.6	(5.5)	ns
Other Media	38.8	(17.8)	33.9	(15.4)	37.0	(17.4)	ns
Teacher-Student Discussion	9.9	(4.6)	9.0	(4.1)	10.4	(4.9)	ns
Fetch & Put Away	18.1	(8.3)	17.4	(7.9)	13.7	(6.4)	ns
Total	217.5		219.6		212.3		ns

[a]Entries are mean numbers of minutes, and percentages of total minutes (in parentheses), for one day, based on 10 students in each group.

[b]Significance levels are from one-way ANOVAs on the mean times over two days.

Table 6

Time Allocated to Teaching Structures for Students at Three Levels Academic Competence[a]

Structure	High		Middle		Low		Sig Level[b]
Entire Group	189.2	(87.0)	169.9	(77.4)	166.5	(78.5)	ns
Small Group	27.7	(12.7)	47.0	(21.4)	42.6	(20.1)	ns
Individual	0.6	(0.3)	2.6	(1.2)	3.0	(1.4)	ns
Total	217.4		219.4		212.1		ns

[a]Entries are mean numbers of minutes, and percentages of total minutes (in parentheses), for one day, based on 10 students in each group.

[b]Significance levels are from one-way ANOVAs on the mean times over two days.

Table 7

Time in Various Teacher Positions for Students at Three Levels of Academic Competence[a]

Teacher Position	High		Middle		Low		Level[b]
In Front	69.6	(38.5)	58.0	(31.6)	62.5	(35.4)	ns
At Desk	38.4	(21.2)	47.4	(25.8)	36.0	(20.4)	ns
Among Students	56.9	(31.5)	62.6	(34.1)	63.0	(35.6)	ns
Beside Student	1.4	(0.8)	2.4	(1.3)	2.8	(1.6)	ns
Back	7.6	(4.2)	5.6	(3.0)	5.2	(2.9)	ns
Out	7.0	(3.9)	7.5	(4.1)	7.3	(4.1)	ns
Total	180.8		183.6		176.7		ns

[a]Entries are mean numbers of minutes, and percentages of total minutes (in parentheses), for one day, based on 10 students in each group.

[b]Significance levels are from one-way ANOVAs on the mean times over two days.

Table 8

Time in Various Teacher Activities for Students at Three Levels of Academic Competence[a]

Teacher Activity	High		Middle		Low		Sig Level[b]
No Response	98.0	(54.2)	112.4	(61.1)	100.1	(56.6)	ns
Teaching	74.0	(40.9)	63.2	(34.5)	69.4	(39.3)	ns
Other Talk	7.4	(4.1)	6.1	(3.3)	5.6	(3.2)	ns
Approval	0.3	(0.2)	0.2	(0.1)	0.2	(0.1)	ns
Disapproval	1.1	(0.6)	1.5	(0.8)	1.3	(0.7)	ns
Total	180.8		183.4		176.7		ns

[a]Entries are mean numbers of minutes, and percentages of total minutes (in parentheses), for one day, based on 10 students in each group.

[b]Significance levels are from one-way ANOVAs on the mean times over two days.

Table 9

Student Response Time for Students at Three Levels of Academic Competence[a]

Student Response	High		Middle		Low		Sig Level[b]
Writing	23.4	(13.0)	31.0	(16.9)	24.3	(13.8)	ns
Play Acad Game	1.2	(0.7)	1.2	(0.6)	1.7	(1.0)	ns
Read Aloud	0.3	(0.2)	0.2	(0.1)	0.6	(0.3)	ns
Read Silently	6.9	(3.8)	10.4	(5.7)	8.9	(5.0)	ns
Talk Academics	4.8	(2.6)	3.4	(1.8)	1.7	(1.0)	.020
Answer Acad Question	0.6	(0.3)	0.9	(0.5)	1.0	(0.6)	ns
Ask Acad Question	0.4	(0.2)	0.6	(0.3)	0.6	(0.3)	ns
Passive Response	93.0	(5.15)	84.3	(46.0)	89.0	(50.4)	ns
Raise Hand	4.6	(2.5)	4.3	(2.3)	4.5	(2.6)	ns
Look for Materials	5.5	(3.0)	6.9	(3.8)	4.9	(2.8)	ns
Move to New Acad Sta	5.0	(2.8)	5.4	(2.9)	4.6	(2.6)	ns
Play Appropriate	10.5	(5.8)	5.0	(2.7)	5.7	(3.2)	ns
Disruption	0.0	(0.0)	0.2	(0.1)	0.1	(0.1)	ns
Play Inappropriate	2.7	(1.5)	7.5	(4.1)	8.0	(4.5)	ns
Inappropriate Task	1.6	(0.9)	1.7	(0.9)	0.7	(0.4)	ns
Talk Non Academics	5.0	(2.8)	4.2	(2.3)	3.8	(2.2)	ns
Inappropriate Locale	1.5	(0.8)	2.4	(1.3)	2.4	(1.4)	ns
Look Around	11.3	(6.2)	13.3	(7.2)	13.6	(7.7)	ns
Self Stimulation	0.2	(0.1)	0.4	(0.2)	0.4	(0.2)	ns
Total	180.6		183.4		176.4		ns

[a]Entries are mean numbers of minutes, and percentages of total minutes (in parentheses), for one day, based on 10 students in each group.

[b]Significance levels are from one-way ANOVAs on the mean times over two days.

Table 10

Student Response Composite Times at Three Levels of Academic Competence[a]

Student Response Composite	High		Middle		Low		Sig Level[b]
Academic	39.5	(21.9)	47.6	(26.0)	38.7	(21.9)	.039
Task Management	118.7	(65.7)	106.0	(57.8)	108.7	(61.6)	ns
Inappropriate	22.4	(12.4)	29.8	(16.2)	29.0	(16.4)	ns
Total	180.6		183.4		176.4		

[a]Entries are mean numbers of minutes, and percentages of total minutes (in parentheses), for one day, based on 10 students in each group.

[b]Significance levels are from one-way ANOVAs on the mean times over two days.

Table 11

Average Times and Ranges in Time Allocated to Activities[a]

Activity	$\bar{X}$	Range
Reading	66.2	12.2 - 95.6
Math	42.3	23.8 - 51.8
Spelling	9.2	0.0 - 20.3
Handwriting	8.0	0.0 - 26.2
Language	22.9	0.0 - 42.7
Science	12.3	0.0 - 42.7
Social Studies	19.3	0.0 - 47.2
Arts/Crafts	12.5	0.0 - 37.4
Free Time	3.2	0.0 - 15.0
Business Management	7.7	0.0 - 58.4
Transition	12.9	2.4 - 28.7
Academic Activity Composite	180.3	109.6 - 229.2
Non-Academic Activity Composite	36.3	7.7 - 90.0

[a]Means and ranges are average numbers of minutes for one day, based on 30 students.

Table 12

Average Times and Ranges in Time Allocated to Tasks[a]

Task	X	Range
Readers	71.0	13.3 - 118.3
Workbooks	26.4	0.7 - 69.0
Worksheets	34.5	14.0 - 72.8
Paper and Pencil	12.1	0.0 - 32.2
Listen to Lecture	9.6	0.7 - 29.8
Other Media	36.6	4.2 - 83.3
Teacher-Student Discussion	9.8	2.4 - 20.0
Fetch and Put Away	16.4	7.0 - 35.0

[a]Means and ranges are average numbers of minutes for one day, based on 30 students.

Table 13

Average Time and Ranges in Time Allocated to Teaching Structures[a]

Structure	X	Range
Entire Group	175.2	65.8 - 260.8
Small Group	39.1	0.0 - 84.7
Individual	2.1	0.0 - 12.2

[a]Means and ranges are average numbers of minutes for one day, based on 30 students.

Table 14

Average Times and Ranges in Time in Teacher Positions[a]

Teacher Position	$\bar{X}$	Range
In Front	63.4	23.2 - 119.8
At Desk	40.6	1.6 - 91.9
Among Students	60.8	11.9 - 114.0
Beside Student	2.2	0.2 - 14.8
Back	6.1	0.1 - 48.4
Out	7.3	0.6 - 19.0

[a]Means and ranges are average numbers of minutes.

Table 15

Average Time and Ranges in Time in Teacher Activities[a]

Activity	X	Range
No Response	103.5	59.8 - 130.8
Teaching	68.9	37.8 - 116.8
Other Talk	6.4	1.1 - 13.2
Approval	0.2	0.0 - 0.6
Disapproval	1.3	0.0 - 3.1

[a]Means and ranges are average numbers of minutes for one day, based on 30 students.

Table 16

Average Times and Ranges in Student Responding[a]

Student Response	X	Range
Write	26.2	8.6 - 46.5
Play Academic Game	1.4	0.0 - 6.2
Read Aloud	0.4	0.0 - 3.4
Read Silently	8.7	1.6 - 16.9
Talk Academics	3.3	0.0 - 10.0
Answer Academic Question	0.8	0.1 - 2.8
Ask Academic Question	0.5	0.0 - 2.4
Passive Response	88.8	42.9 - 134.6
Raise Hand	4.5	.8 - 10.0
Look for Materials	5.8	1.9 - 11.6
Move to New Academic Station	5.0	1.0 - 11.2
Play Appropriate	7.1	0.1 - 32.8
Disruption	0.1	0.0 - 1.4
Play Inappropriate	6.1	0.1 - 21.4
Inappropriate Task	1.3	0.0 - 6.9
Talk Non-Academic	4.3	1.0 - 13.4
Inappropriate Locale	2.1	0.2 - 5.1
Look Around	12.7	4.0 - 25.8
Self Stimulation	0.3	0.0 - 2.2
Academic Composite	41.3	13.2 - 56.1
Task Management Composite	111.2	56.2 - 154.8
Inappropriate Composite	26.9	10.2 - 46.0

[a]Means and ranges are average numbers of minutes for one day, based on 30 students.

Table 17

PIAT Standard Scores[a]

	High		Middle		Low	
	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
Math	111.9	10.0	101.2	8.4	104.3	13.3
Reading Recognition	113.0	12.9	114.0	2.3	102.7	8.4
Reading Comprehension*	110.9	10.7	106.2	2.6	96.2	13.3
Spelling	111.1	10.3	109.2	16.5	95.5	9.2
General Information*	116.2	6.3	100.6	8.9	106.3	12.9
Total*	114.4	7.4	107.6	6.3	101.2	8.7

[a]Significant differences among groups ($p < .05$) are indicated by *.

Table 18

Significant PIAT Correlations

Observation Variable	with PIAT Subtest	r	p
Academic Game	Reading Recognition	.47	.016
Read Silently	Math	-.40	.035
Talk About Academics	Spelling	.43	.026
Answer Academic Question	Math	-.51	.009
Answer Academic Question	Spelling	-.44	.022
Answer Academic Question	General Information	-.50	.010
Answer Academic Question	Total	-.57	.004
Ask Academic Question	Math	-.55	.005
Ask Academic Question	Reading Recognition	-.41	.033
Ask Academic Question	Total	-.40	.038
Look for Materials	Math	-.45	.021
Look for Materials	Reading Recognition	.39	.039
Play Appropriate	Reading Comprehension	.44	.022
Play Appropriate	Total	.48	.015
Disruption	Reading Recognition	-.39	.041
Disruption	Total	-.38	.044
Play Inappropriate	Total	-.37	.048
Inappropriate Task	Reading Comprehension	.46	.019
Inappropriate Task	Spelling	.42	.028
Talk About Non-Academics	Spelling	.39	.040
Inappropriate Locale	Reading Recognition	-.40	.037
Inappropriate Locale	General Information	-.51	.009
Inappropriate Locale	Total	-.50	.011
Composites			
Inappropriate	Math	-.38	.043
Inappropriate	General Information	-.42	.030

*N=21 for all correlations except those with Reading Comprehension, for which N=20.

Table 19

Significant PIAT Correlations for High Academic Group

Observation Variable	PIAT with Subtest	r	p
Academic Game	Reading Recognition	.56	.046
Talk Academic	Math	-.84	.001
Ask Question	Math	-.78	.004
Passive Response	Total	.80	.003
Passive Response	Reading Recognition	.72	.009
Passive Response	Spelling	.74	.007
Look for Materials	Math	-.59	.037
Look for Materials	Info	.61	.031
Disruption	Info	-.65	.022
Play Inappropriate	Math	-.57	.044
Inappropriate Task	Reading Comprehension	.58	.040
Inappropriate Task	Total	.72	.010
Inappropriate Task	Spelling	.69	.014
Talk Non-Academic	Math	-.72	.009
Inappropriate Locale	Total	-.54	.054
Look Around	Total	.55	.050
Look Around	Info	.62	.029
Composites			
Academic	Math	-.61	.030
Task Management	Reading Comprehension	.66	.018
Task Management	Total	.93	.001
Task Management	Reading Recognition	.77	.005
Task Management	Spelling	.76	.006

Table 20

Significant PIAT Correlations for Middle Academic Group

Observation Variable	Subtest	r	p
Writing	Reading Comprehension	-.80	.051
Reading Aloud	Reading Comprehension	-.82	.044
Raising Hand	Reading Recognition	-.92	.013
Raising Hand	Info	.84	.037
Look for Materials	Reading Comprehension	.84	.039
Play Appropriate	Math	-.85	.031
Play Appropriate	Info	-.84	.037
Disruption	Reading Comprehension	-.85	.032
Play Inappropriate	Reading Recognition	.92	.013
Inappropriate Task	Math	-.80	.050
Inappropriate Task	Reading Recognition	.87	.028
Inappropriate Locale	Reading Comprehension	-.84	.036
Self Stimulation	Total	.90	.018

Table 21

Significant PIAT Correlations for Low Academic Group

Observation Variable	Subtest	r	p
Academic Game	Total	.76	.040
Academic Game	Math	.74	.045
Academic Game	Reading Recognition	.76	.041
Answer Question	Total	-.77	.036
Answer Question	Math	-.85	.016
Inappropriate Locale	Info	-.97	.001
Look Around	Info	-.88	.010
Composites			
Inappropriate	Info	-.86	.014

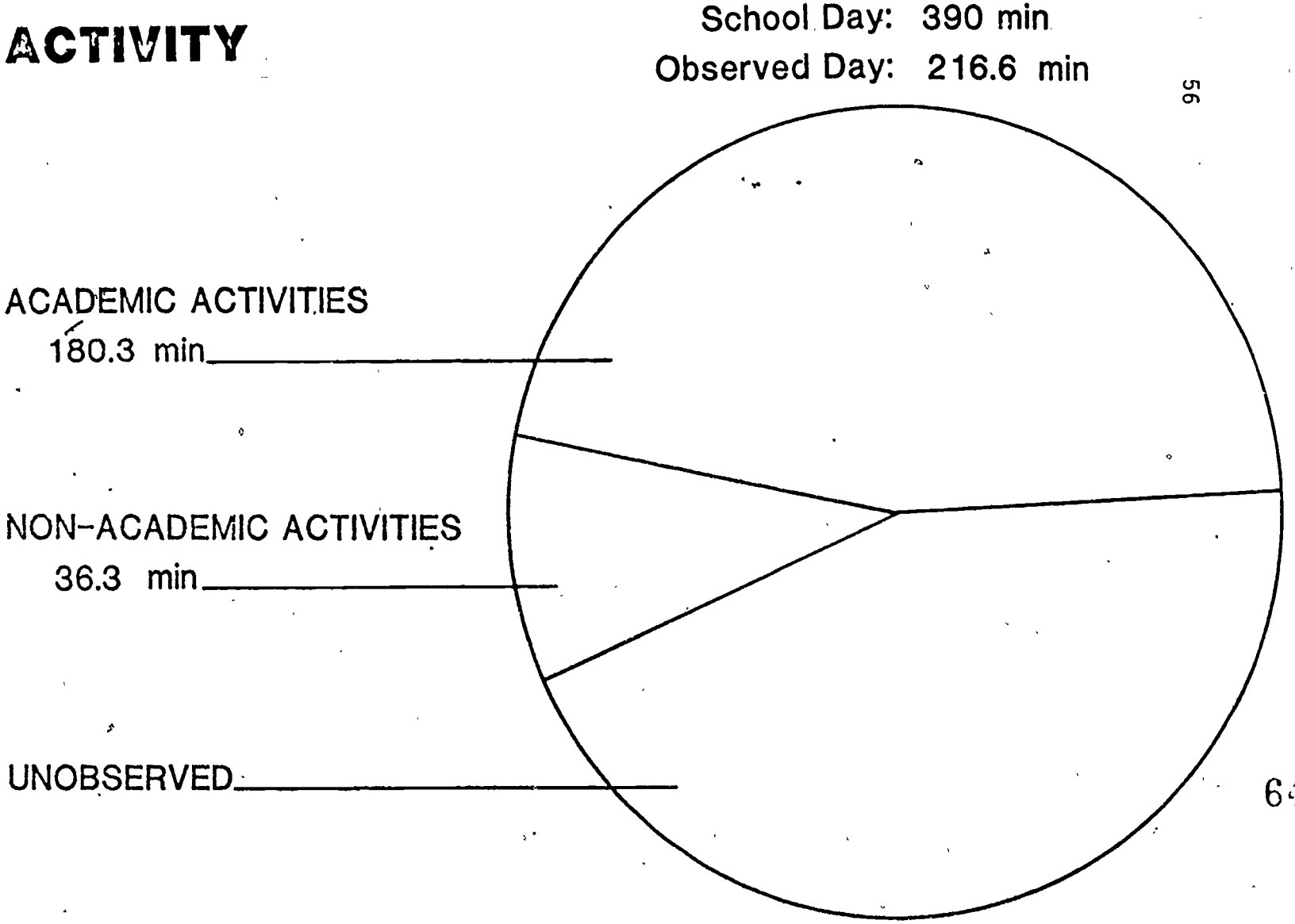

Figure 1. Time Allocated to Academic and Non-Academic Activities for Third and Fourth Grade Students of High, Middle, and Low Academic Competence Combined.

ACTIVITY

School Day: 390 min Observed Day: 216.6 min

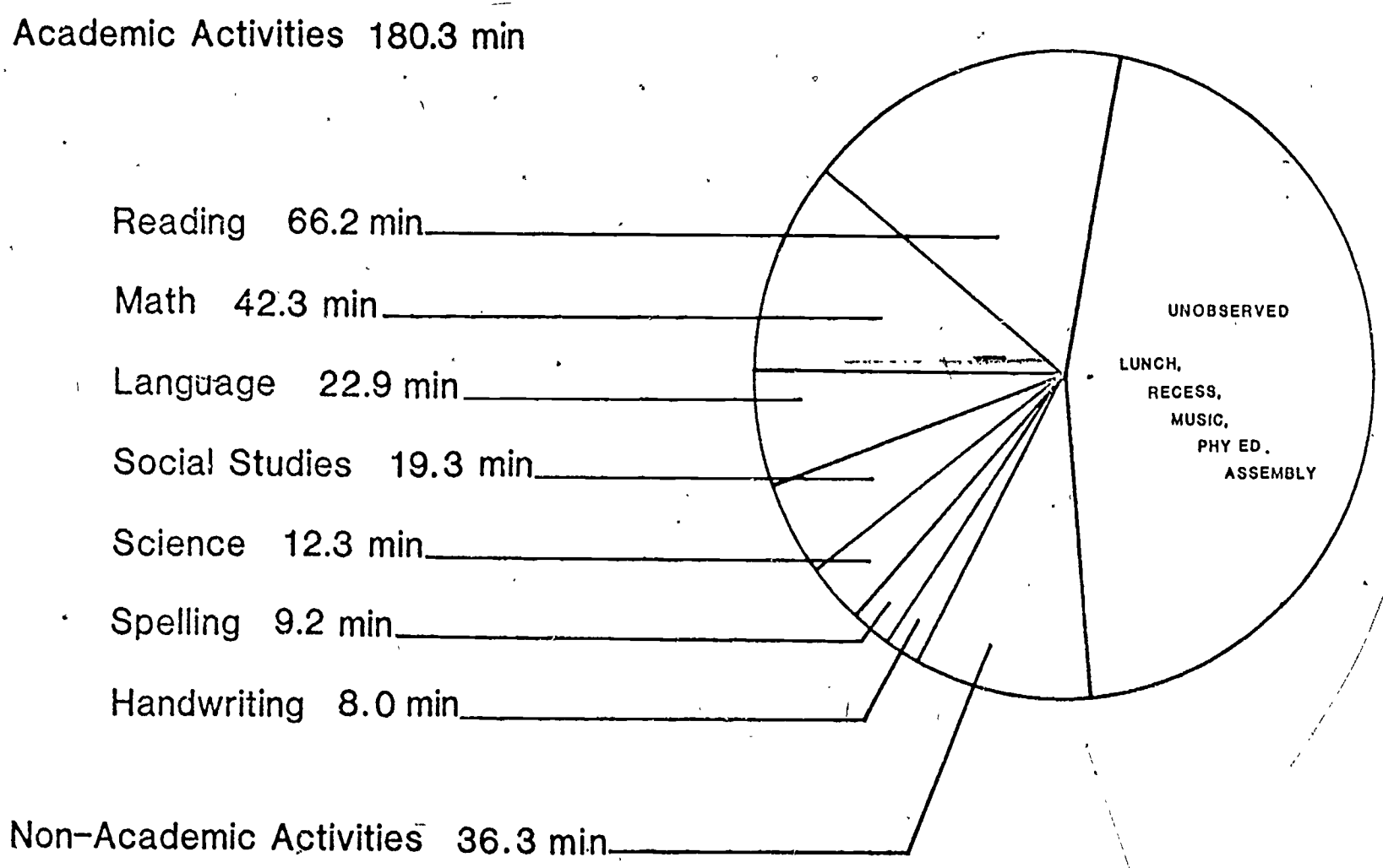

Figure 2. Time Allocated to Specific Academic Activities For Third and Fourth Grade Students of High, Middle, and Low Academic Competence Combined.

ACTIVITY

School Day: 390 min Observed Day: 216.6 min

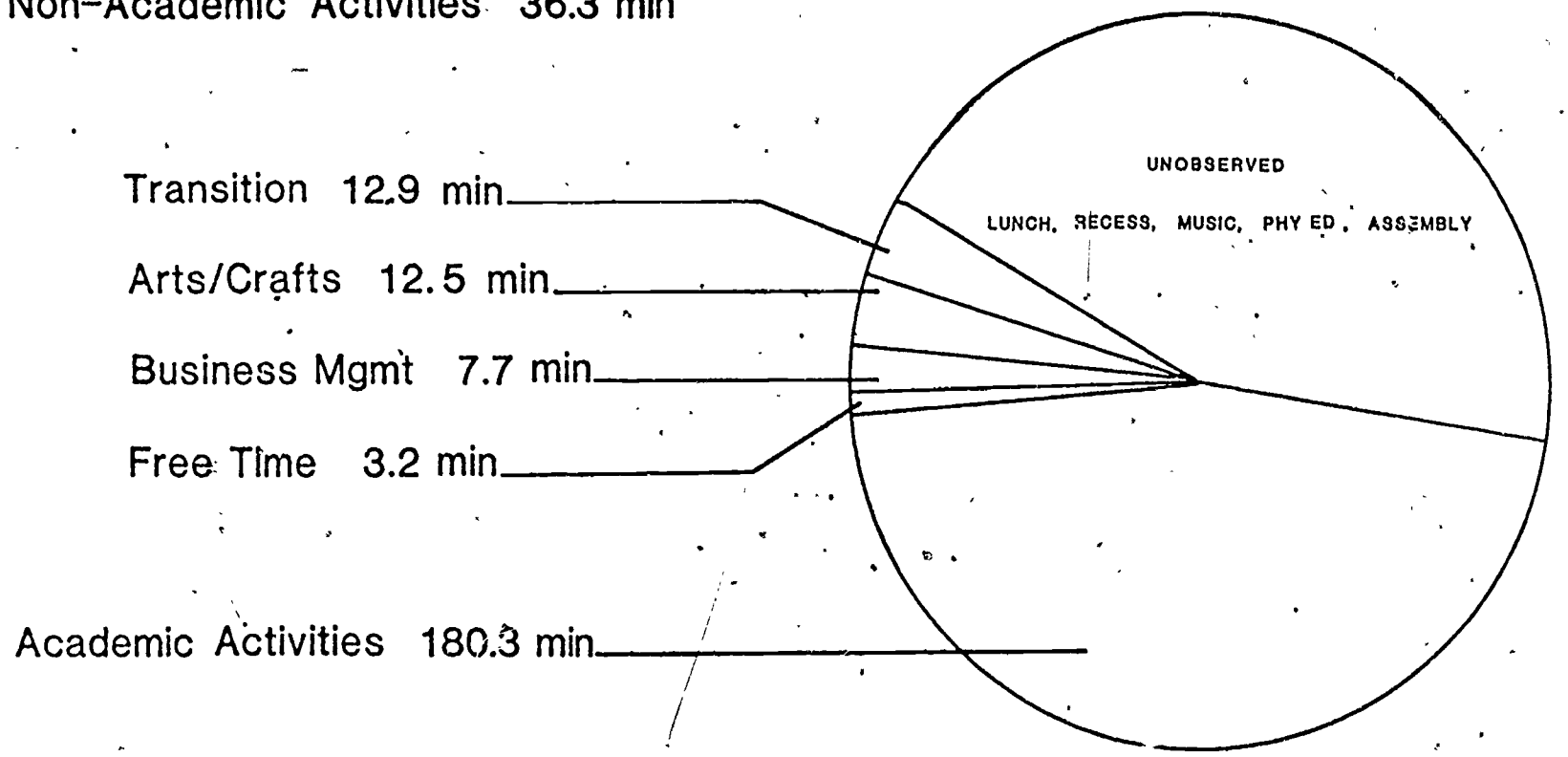

Figure 3. Time Allocated to Specific Non-Academic Activities For Third and Fourth Grade Students of High, Middle, and Low Academic Competence Combined.

TASK

School Day: 390 min Observed Day: 206.8 min

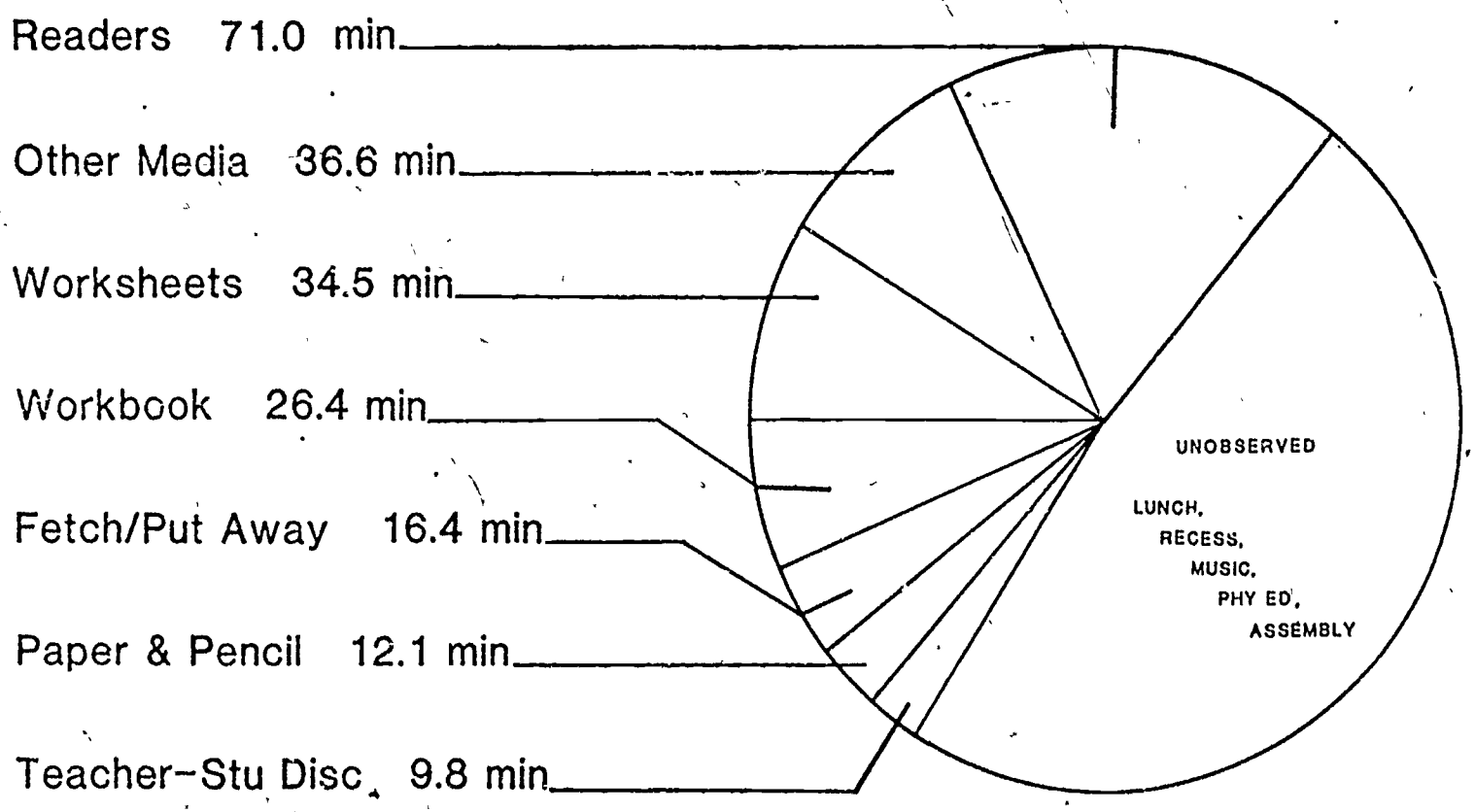

Figure 4. Time Allocated to Tasks for Third and Fourth Grade Students of High, Middle, and Low Academic Competence Combined.

STRUCTURE

School Day: 390 min Observed Day: 216.4 min

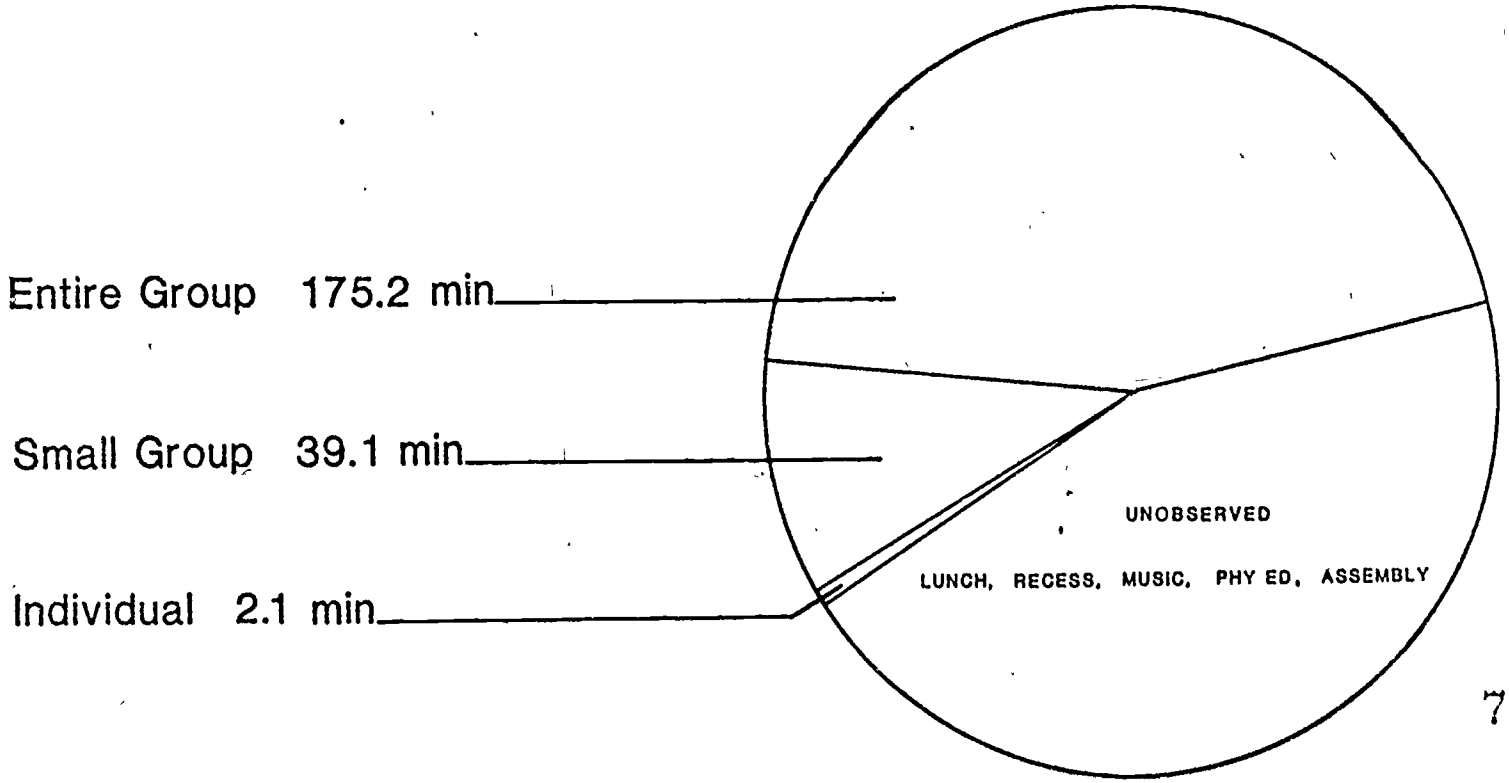

Figure 5. Time Allocated to Teaching Structures for Third and Fourth Grade Students of High, Middle, and Low Academic Competence Combined.

TEACHER POSITION

School Day: 390 min Observed Day: 180.4 min

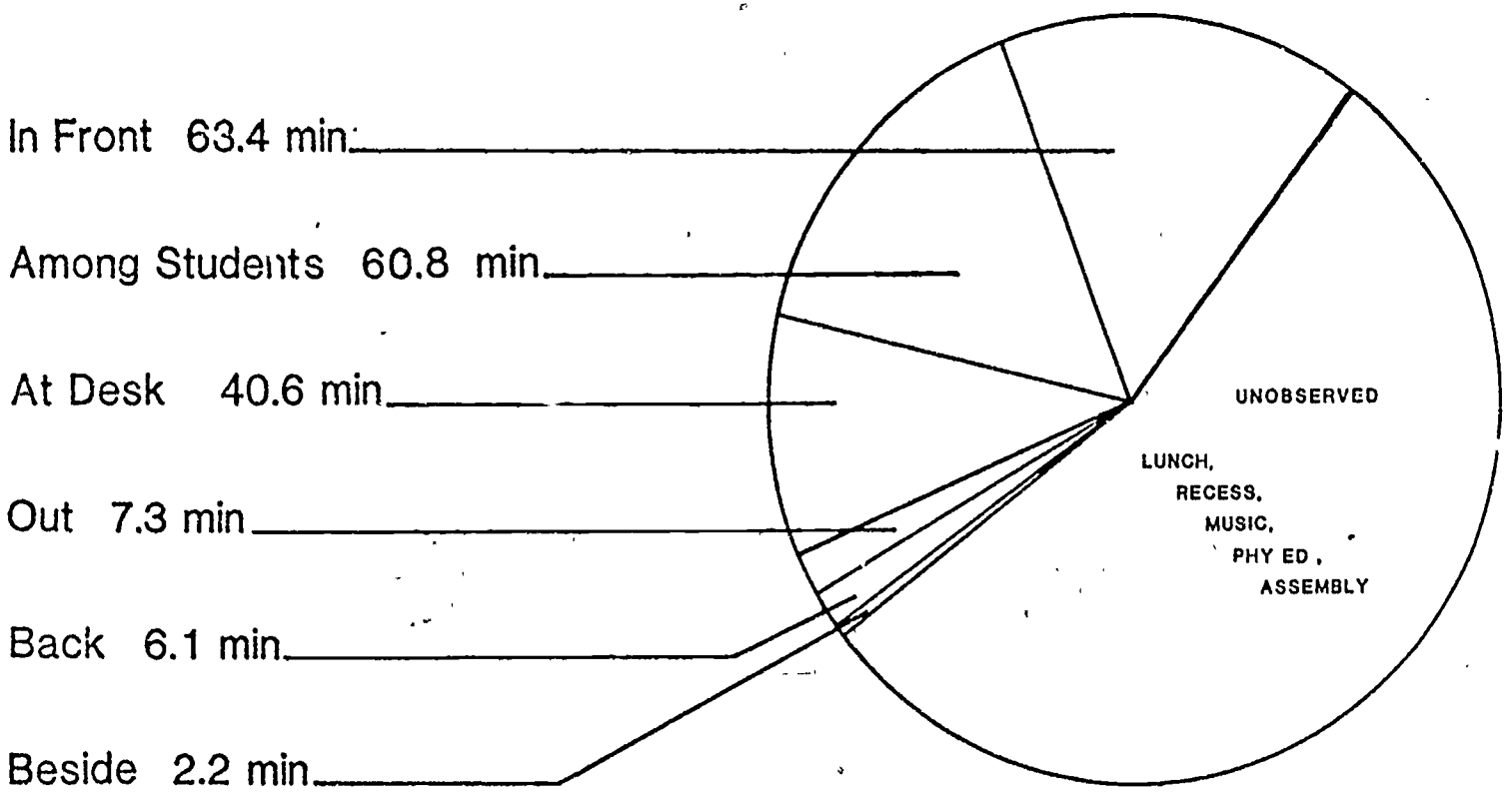

Figure 6. Time Allocated to Teaching Structures for Third and Fourth Grade Students of High, Middle, and Low Academic Competence Combined.

TEACHER ACTIVITIES

School Day: 390 min Observed Day: 180.3 min

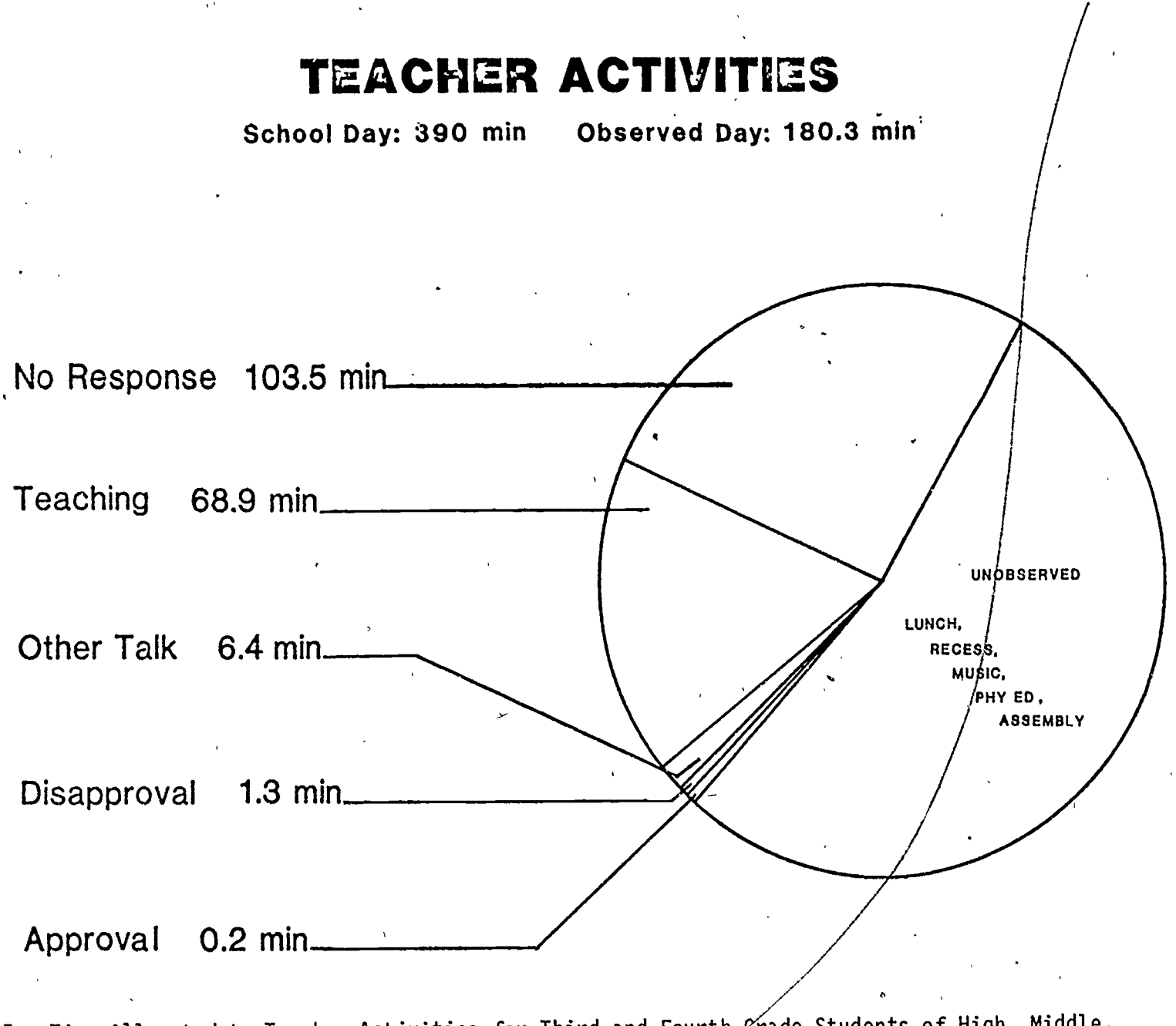

Figure 7. Time Allocated to Teacher Activities for Third and Fourth Grade Students of High, Middle, and Low Academic Competence Combined.

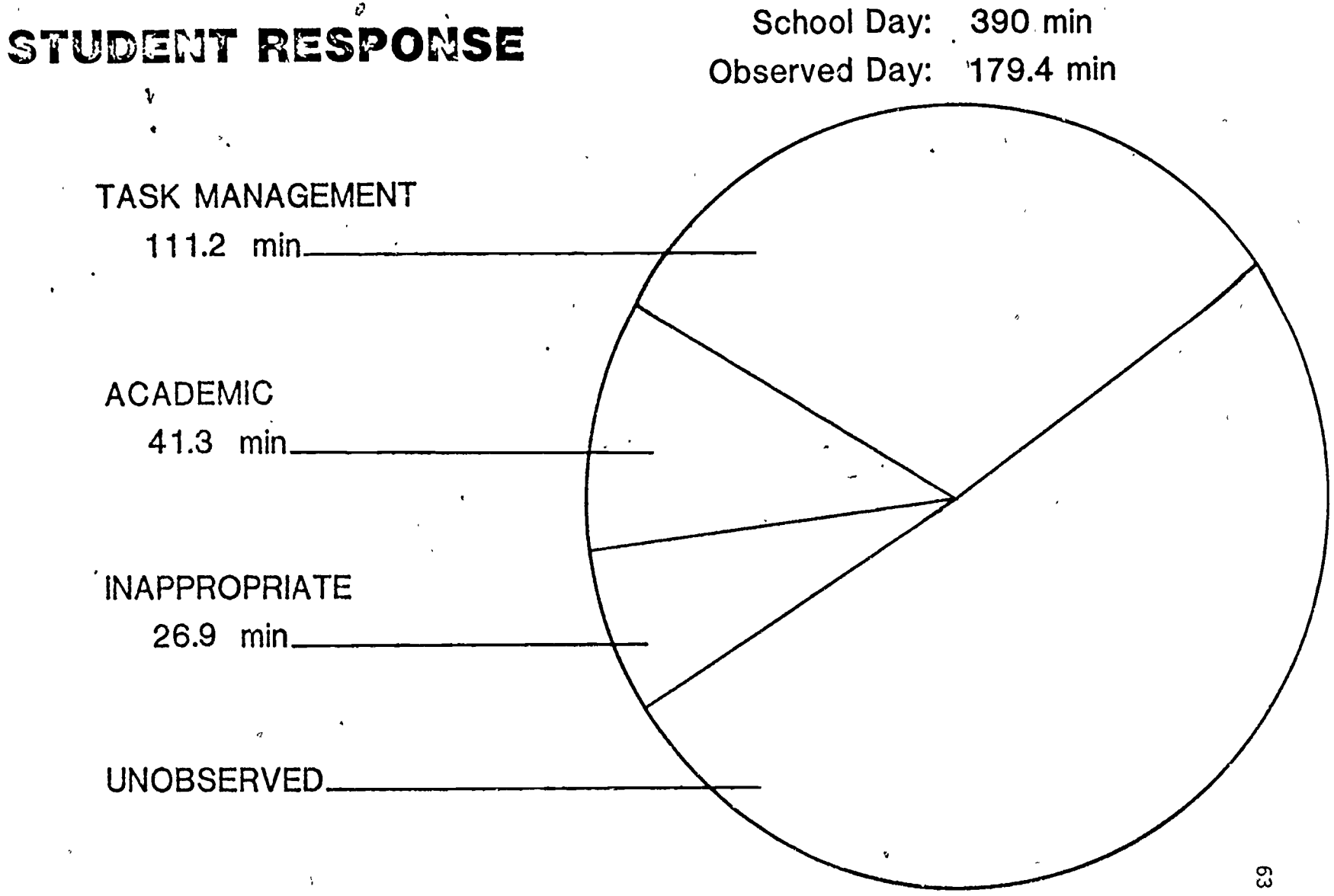

Figure 8. Time Third and Fourth Grade Students of High, Middle, and Low Academic Competence Combined Engaged in Academic, Task Management, and Inappropriate Responses.

STUDENT RESPONSE

School Day: 390 min Observed Day: 179.4 min

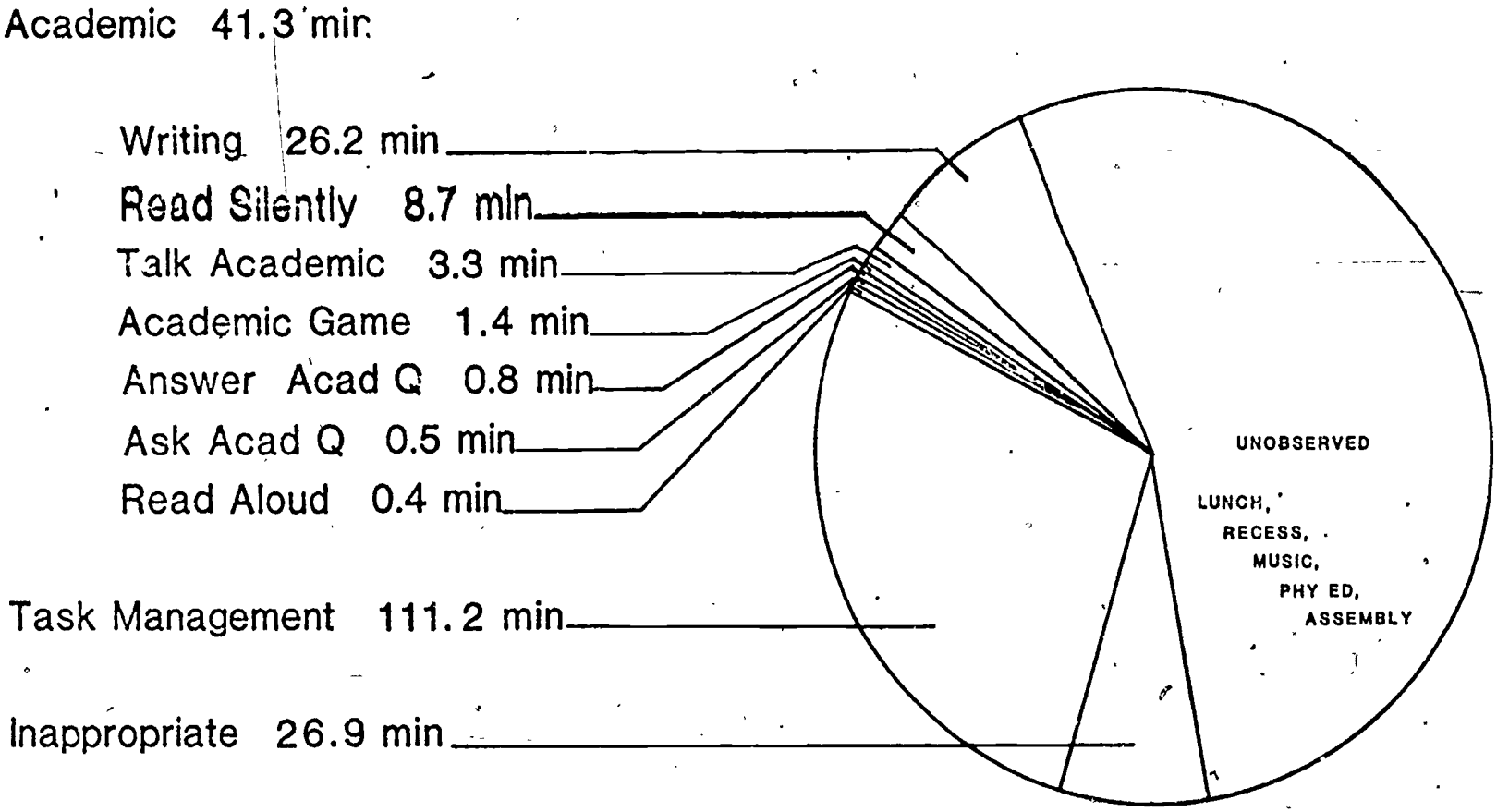

Figure 9. Time Third and Fourth Grade Students of High, Middle, and Low Academic Competence Combined Engaged in Academic Responses.

STUDENT RESPONSE

School Day: 390 min Observed Day: 179.4 min

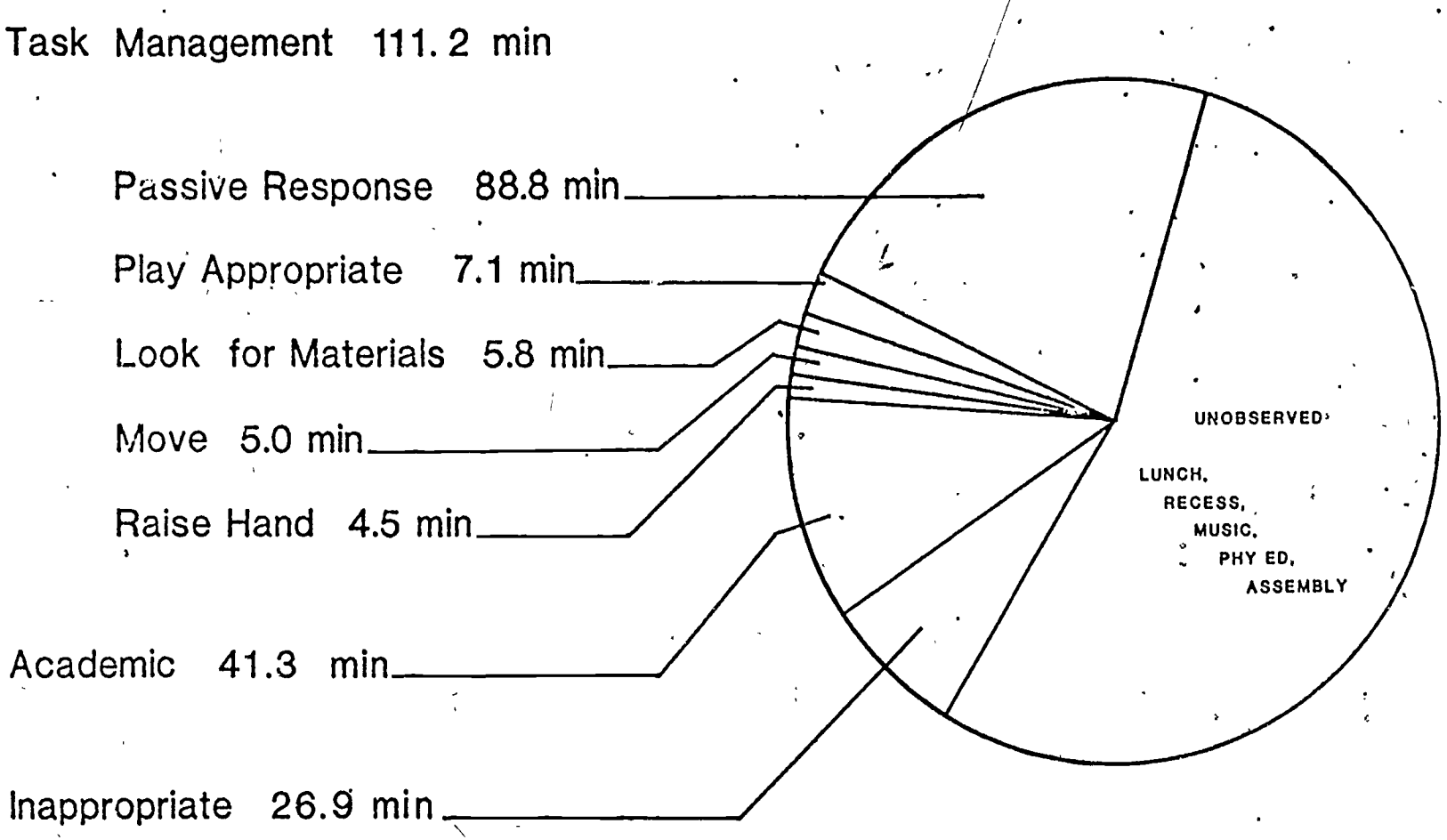

Figure 10. Time Third and Fourth Grade Students of High, Middle, and Low Academic Competence Combined Engaged in Task Management Responses.

STUDENT RESPONSE

School Day: 390 min Observed Day: 179.4 min

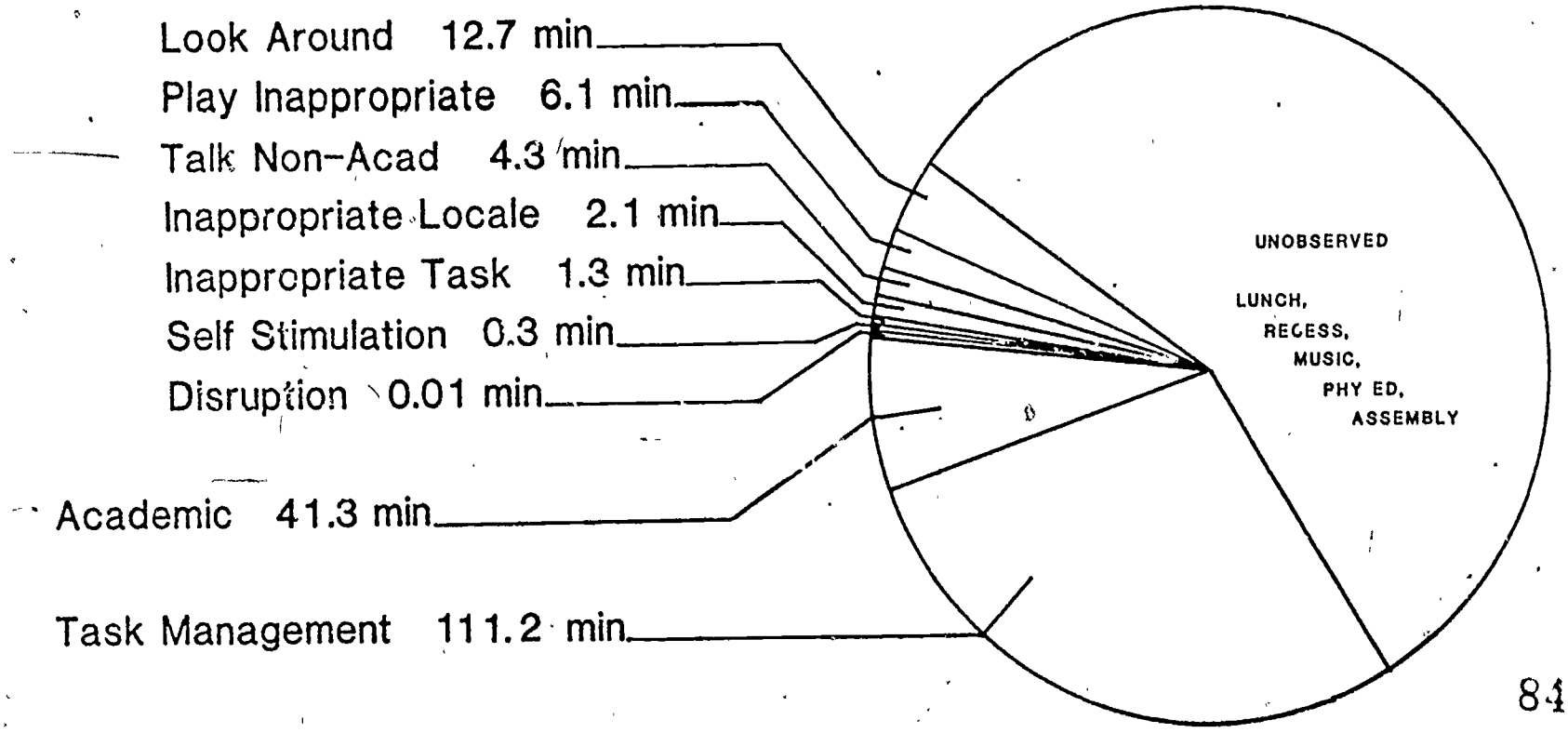

Figure 11. Time Third and Fourth Grade Students of High. Middle, and Low Academic Competence Combined Engaged in Inappropriate Responses.

APPENDIX A

Definitions and Examples of CISSAR Events

Instructional Activity

(Subject area of learning experience being provided to target student by teacher, aide, or peer tutor or by target student to tutee.)

Note: Anytime the activity changes, move to a new coding block

Activity/Code	Definition	Examples	Special Notes
Reading (R)	Reading instructions or activity; oral and silent reading from books, discussion of words, sounds, vowels, consonants, phonics	reading library book talking about ch sound sitting at reading table draw picture about story	Include: • how to use dictionary, encyclopedia,...(reference books) • learning ABC's (but, not when learning how to write) • draw picture of what read; act out story
Math (M)	Math instructions or activity; numbers, geometry, time, weights, metrics, measurement, story problems	working time worksheet measuring each other's height writing math problem on board finds examples of "less than" find number of days in 2 years	
Spelling (S)	Spelling instruction or activity; copying spelling work, spelling test	taking spelling test playing spelling bee game looking up correct spelling of missed word	Include: • use of dictionary to find spelling of word
Handwriting (H)	Handwriting instruction or activity; focus on mechanics of writing letters or words (print, cursive, etc.); how to hold pencil, how to move arm, discussion of size of letters, lines on paper	practice penmanship matches capital and lower case letters	

A-1

Instructional Activity - cont.

Activity	Definition	Examples	Special Notes
Language (L)	Language instruction or activity; focus on speech, vocabulary, and language meaning (words, physical relationships, etc.); creative writing; listening exercises; other languages	writing book report on story in reader points to "on top," "under," etc. learns how to say "thank you" in 5 languages	Include: • book reports (writing or reading) • looking up definition in dictionary • public speaking exercises
Science (Sc)	Science instruction or activity; science-related opics (chemistry, electricity, space travel, electronics, nature, insects, weather, mammals, body, exercise, personal hygiene)	discuss weather perform experimentation on electricity school nurse talks about hygiene reads Weekly Reader article about insects	Include: • watching or doing experiment • exercises in classroom • sex education (physical aspects-not relationships) • speakers on drugs/alcohol • science article in Weekly Reader
Social Studies (Ss)	Social studies instruction or activity; cultures, ways of life, jobs, roles; maps; music topics (instruments, singing, scales, notes)	talk about sex biases sing Thanksgiving songs label map of U.S. listen to lecture on Civil War	Include: • sex education - relationships in general • unit on friendships • special education topics - relations with handicapped • customs; holidays • history
Arts/Crafts (Ac)	Art-related instruction or activity; coloring, drawing, cutting, pasting	make poster of primary colors draw picture of self watch slides of sculptures	Include: • viewing art (own or others) • decorating (bulletin board, classroom) Within Ac time, putting away or getting new materials is still Ac; only change to Tn at beginning or end of Ac time.

Instructional Activity - cont.

Activity	Definition	Examples	Special Notes
Free Time (Ft)	Period during which student may choose activity - can be academic; study time	works math when told to do anything wants to do after student finishes assignment, is in library area reading	Include: • extra-credit work If everyone has free time, but target student is told what he/she must do, do not code Ft. Code the subject area which he is required to do.
Class Business/ Management (Bm)	Activity focused on scheduling, discipline, rules; usually occurs regularly at start of day; show and tell	picks up lunch tickets class talks about fight on playground during recess say "here" during attendance check	Include: • Pledge of Allegiance, morning songs • sex, relationships, drugs, etc. when related to specific problem in school • taking attendence
Transition (Tn)	Time between two other activities; teacher signals end of one (put away) and time to prepare for new activity. Ends when teacher starts instruction in new activity	class breaks into groups line up to go to recess put away readers and get out math books	For arts/crafts, Tn is coded only before and after entire activity
Can't Tell (CT)	Activities that do not seem to fit in other categories. See coordinator to discuss - must change to another code.		Make note of activity on separate sheet so will remember events to discuss with coordinator

Academic Task

(Materials used by target student for instructional activity)

Note: Any time the task changes, move to a new coding block

Task/Code	Definition	Examples	Special Notes
Readers (Rr)	Printed book, bound material	library book math textbook comic book	Include: • magazines, Weekly Reader • reference books (dictionary, encyclopedia)
Workbooks (Wb)	Paperback material in which student could write (even if student is required by teacher to write on separate paper or in notebook)	spelling workbook language workbook handwriting workbook	
Worksheets (Ws)	Separate prepared teacher sheets (usually ditto or photocopy) on which students write; blackboard writing by student	student practices letters on blackboard dittoed crossword puzzle	Include: • 1 page torn from workbook • writing Weekly Reader exercise • teacher made or printed tests
Paper and Pencil (Pp)	Tasks where student writes on paper using pencil, pen, crayon, etc.; includes writing in notebook	piece of notebook paper for spelling test	If students are taking notes during teacher lecture to remember points, code Ll
Listen to Teacher Lecture (Ll)	Teacher talking or writing on board, and student expected to look and listen	watches teacher demonstrate exercises listens to teacher talk about telling time takes notes as teacher presents ideas for field field trip	Code Ll even if student is taking notes

Task/Code	Definition	Examples	Special Notes
Other Media (Om)	Special materials; film, tape recorder, game, arts and crafts materials, clocks, telephone, play/drama	watches movie listens to tape recorder works on calculator acts out story part	Include: • calculator • animals
Teacher-student Discussion (Tsd)	Student talking with teacher; ask-answer question All other tasks take precedence	student answers teacher question students in class talk with teacher about friends student tutors another on ABC's student reads book report to class	Include: • peer tutoring unless using other materials • student verbal presentations (including reading book report) All other tasks take precedence over Tsd. Take cue from teacher for change from Ll to Tsd.
Fetch/Put away (Fp)	Students changing materials-putting away and getting, cleaning up	line up for lunch picks up materials to throw away before completing art project student hands out worksheets	When student has absolutely no materials, and is not supposed to have any materials (such as when has free time), code Fp.

Structure

(How student is grouped for instructional activity)

Note: Any time the structure changes, move to a new coding block

Structure/Code	Definition	Examples	Special Notes
Entire Group (Eg)	Student receiving instruction with all other students in classroom	class lecture class freetime	For Eg, teaching (or free time is for <u>everyone</u>) Number is <u>not</u> the criterion - if class has 5 students and instruction is directed to all of them, code Eg
Small Group (Sg)	Student is in part of class that has been separated from rest	reading group discussion group students in pairs	Include: • two students working together away from rest of class
Individual (I)	Student is alone (in corral, at table) or working one-to-one with teacher or aide	student working on science experiment alone while other read from text aide tutors student	Does <u>not</u> occur during free time <u>except</u> when free time was created especially for student

Teacher Position

(Place of teacher in relation to all students)

Teacher Position/ Code	Definition	Examples	Special Notes
In Front/IF	in front of majority of students	- standing at blackboard - at front bulletin board	
At Desk/AD	standing or seated at teacher's desk	- looking in desk for note-book - at desk collecting lunch money	
Among Students/AS	standing or seated among students	- walking around class checking student work - seated with reading group	
Side/S	standing to the side of students and not AS	- student leaning over child's desk - talking to student at his desk	- working individually with a student
Back/B	standing or sitting in back of classroom away from majority of students	- working at isolated desk in back of room -putting up art pictures on back bulletin board	
Out of Room/O	out of the room	- in hall talking to parent - in teacher's lounge	

Teacher Activity

(Coded in relation to target student or group in which he is a member)

Teacher Behavior/ Code	Definition	Examples	Special Notes
No Response/NR	makes no observable response	- at desk grading papers - out of room	- working individually with another student
Teaching/T	instruction or giving a lesson to students child must have opportunity to learn	- explaining at blackboard - asking question - talking about academics, e.g. giving directions	- key is active involvement by teacher
Other Talk/OT	- talking about class business, rules, schedules, future activities - all teacher talk that is not approval, disapproval, or teaching	- talking about recess - talking about mother's hospital stay - collecting lunch money	
Approval/A	expresses praise for student work or conduct	- teacher hugs student - teacher smiles - "Your map looks great"	- includes verbal comments, gestures, physical behaviors
Disapproval/D	expresses dislike or disgust with student work, appearance or conduct	- frowns at student - that is the wrong answer - "You're not trying"	- includes verbal comments, gestures, and physical behaviors

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Student Response

(Academic response, task management, or inappropriate behavior of target student)

Student Response/ Code	Definition	Examples	Special Notes
Academic Responses	student responses made to academic task	- erasing	
Writing/W	students observed marking academic materials with pen, pencil, crayon	- marks answers on ditto sheet with crayon - completes math problems from workbook	- does not include drawing pictures, scribbling - used for tests
Academic Game/G	engaged with an academic media task played individually or with peer	- includes flashcards, word games, coloring, abacus - student responses are verbal, manipulatory or social in nature - 4 students are playing a spelling game	- includes calculator - flashcards when with a classmate or as a practice tool
Read Aloud/RA	when student looking at reading material and saying aloud what is written in print	- student reads a paragraph to rest of reading group -reads a sentence aloud to "sound out" unfamiliar words	- used when teacher checks student's knowledge of flashcard

Student Response continued

Student Response/ Code	Definition	Examples	Special Notes
Reading Silent/RS	looking at reading material for at least 2 seconds, and/or eye movements indicate scanning materials on desk (3' radius) or held in student's hands. Readers must be open to a page.	- student is reading directions in language workbook - student is scanning workbook for familiar words - student reads to self a set of numbers from math book	- reading words or numbers - not rapid flipping - only code when reading materials include several pages (not worksheet)
Talk About Academics/ TA	talk back and forth about academic materials or assignment	- student tells classmate answer to math question - student talks during show and tell - student recites a poem he's memorized	- child may be talking to himself or a peer - coded only when target student talking, not when listening - when reciting a poem or story from memory - student doing all work in limelight
Answer Academic Question/ANQ	student either verbally or gesturally responds to teacher's academic question	- student says "I don't know" to teacher's question - student spells a word for teacher	- answer may be correct or incorrect - answer should be almost immediate
Ask Academic Question/ Ask	verbally ask the teacher a question related to academics	"Is 3 + 4 = to 7?"	- must be an academic question: When is it time for lunch? is not ASK

Student Response continued

Student Response/ Code	Definition	Examples	Special Notes
Task Management	student behaviors which enable student to engage in academic task -- not direct responses to academic tasks		
Passive Response	student is looking at teacher for instructions; at blackboard for direction; or at another student asking or answering a question -- Key: looking at teacher or peer	- student looks at teacher while she lectures - student pages through math book to final assignment - teacher asks student to pass out ditto sheets to class	- coded for listener when two students are talking about academics - rapid flipping of pages - two students are playing a game; target student observing - reading (ect.) takes precedence
Raising Hand/RH	student's hand raised; may be accompanied by looking for teacher and if student raises hand in a request to answer teacher question	- teacher asks question and student raises hand to respond. - student needs help with math so raises hand to alert teacher	- RH plus yelling equals DI (disruption)

Student Response continued

Student Response/ Code	Definition	Examples	Special Notes
Look for Materials/ LM	student observed looking for or putting away materials; includes use of materials away from desk (e.g. answer sheets, reference books)	- student goes to teacher's desk for correction sheet - student returns dictionary to shelf - student looks for paper and pencil	- may include use of reference materials away from desk; look up word in dictionary sharpening pencil stapling
Moves to New Academic Station/M	student moves to new area as station for next activity- activity is in transition	- student moves to learning center during free time - students lining up for recess	- includes lining up and moving when in compliance with teacher request
Play Appropriate/PA	engaged in play behaviors approved by teacher may involve toys from home; may be strictly social	- students play musical chairs during party - students play Monopoly during free time	- code G if play becomes an academic game - code when student puts head on desk when told to or when has free time drawing, coloring drinking water, washing hands
Inappropriate behavior			
Disruption/DI	behaviors which are aggressive or produce loud noises: includes loud talk	- trips another student - shakes fist at other student - yells - poke another student	- DI takes precedence over inappropriate locale

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Student Response continued

Student Response/ Code	Definition	Examples	Special Notes
Play Inappropriate/ PI	play not approved by teacher	- play involving squirt guns, toys hidden in desk - shoots rubber bands; paper airplanes	- includes scribbling or drawing at wrong times - code when student puts head on desk when is not supposed to
Inappropriate Task/ IT	engaged in task without teacher approval; not related to task assigned	- student colors to avoid math assignment - reads story during Social Studies	- avoidance of assigned task is key
Talk Non-Academic/ TNA	talks aloud to peer about non-academic materials not related to assignment	- students talk about after school plans - "What time is lunch?"	- can be directed to teacher or student - includes passing notes
Inappropriate Locale/ IL	child out of seat and away from instruction site looses contact with seat	- student goes to bathroom without permission - student becomes angry and leaves school - student stands on desk	
Look Around/LA	student looking away from academic task	- child looks out window - looks at floor then ceiling	- code AT if student looking at classmate and answering question
Self Stimulation/ SST	active behaviors of child like rapid rocking or shaking; maintained for 2 to 3 seconds	- student rocks back & forth - rapidly moves his pencil back and forth	- single major feature of child's behavior - academic responses take precedence over SST

APPENDIX B

Optical Scanner Coding Sheet

ID | PAGE | START 1 | STOP 1 | START 2 | STOP 2 | START 3 | STOP 3 | OBS #

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CISSAR Coding Sheet

R M S H L Sc Ss Ac Ft Bm Tn Ct | Rr Wb Ws Pp Ll Om | Tsd Fp | Eg Sg I

IF AD AS S B D | NR T OT A D | W G RA RS TA | ANQ ASK | AT RH LM M PA | DI PI IT TNA IL LA SST

Stop Code
A B C D E
F G H I J
K L M N O
P Q

START 1

STOP 1

START 2

STOP 2

START 3

STOP 3

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