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ABSTRACT

Twenty-eight second and third grade classrooms in Austin, Texas were observed for approximately thirty hours each, using an elaboration of the Brophy-Good Dyadic Interaction Observation System. These process data were then analyzed for differences according to grade, student sex, and student socioeconomic status (SES). Grade and sex differences were below chance levels in frequency and were generally as would be expected in direction. However, SES differences were widespread, indicating that teachers working at the same grade level may be faced with very different opportunities and demands. High SES classrooms featured eager and competitive students and businesslike teachers who focused on the curriculum. In contrast, low SES classrooms featured students who were fearful, anxious, and generally alienated from the student role. Their teachers attempted to combat student fears with patience and determination, and showed a greater willingness to deviate from the curriculum and to attend to matters of personal concern or interest; they generally exhibited a more personalized approach. These process differences in teacher behavior appeared to be appropriate responses to the particular demands placed upon the teachers. (Author/MV)

The Research and Development Center for Teacher Education

UTR&D

The University of Texas at Austin

THE TEXAS TEACHER EFFECTIVENESS STUDY: STUDENT SEX, GRADE, AND SOCIOECONOMIC STATUS DIFFERENCES IN CLASSROOM PROCESS MEASURES

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The Research and Development Center for Teacher Education

The University of Texas at Austin

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Abstract

Twenty-eight second and third grade classrooms were observed about thirty hours each with an elaboration of the Brophy-Good dyadic interaction observation system. These process data then were analyzed for differences according to grade, student sex, and student socio-economic status (SES). Grade and sex differences were below chance levels in frequency and mostly expected in direction. However, SES differences were widespread, indicating that teachers working at the same grade level may be faced with very different opportunities and demands. High SES classrooms featured eager and competitive students and businesslike teachers who focused on the curriculum. In contrast, low SES classrooms featured students who were fearful, anxious, and generally alienated from the student role, and teachers who attempted to combat student fears with patience, determination, greater willingness to deviate from the curriculum and take up matters of personal concern or interest, and a generally more personalized approach. In general, these process differences in teacher behavior appeared to be appropriate teacher responses to the particular demands placed upon them.

The Texas Teacher Effectiveness Study: Student Sex, Grade, and Socioeconomic Status Differences in Classroom Process Measures

This is one of a series of ancillary technical reports from the Texas Teacher Effectiveness Project. The larger project, from which the data were drawn, was a two-year replicated teacher effectiveness study conducted at the second and third grades. The teachers had been selected from a larger pool of experienced second and third grade teachers in the Austin Independent School District. The teachers were included in the effectiveness research because analyses of the mean residual gain scores of students in their classes across three consecutive years prior to the study revealed that these teachers were exceptionally consistent, relative to the larger sample of teachers, in their ability to produce student learning gains.

Teachers were selected for observational study purely on the basis of consistency. That is, the observed teachers represented the full range of effectiveness and were distributed roughly normally about the mean; we did not select a group of high effective teachers to compare with a group of low effective teachers.

Consistent teachers were selected for observation because their relative consistency in producing student learning suggested that they might be particularly consistent in their classroom behavior, also. This, in turn, suggested that these teachers would be especially likely to produce systematic and meaningful process-product relationships when measures of their

classroom behavior were analyzed in relation to measures of student learning, compared to a random sample of teachers (Brophy, 1973).

The teachers were representative of teachers at these grade levels in the school system generally, except that they were somewhat older and more experienced. Also, analyses of their responses to a 495-item questionnaire concerning teacher beliefs, attitudes, and reported practices, revealed close similarity to the responses of a randomly selected sample of teachers who were working at the same grade levels in the same school system but were not included in the study.

However, the teachers in the Texas Teacher Effectiveness Project were somewhat more traditional in their beliefs and attitudes about schooling than those in the comparison group. This traditionalism typified the sample as a whole, although within the sample it was negatively related to student learning gains in low SES schools (Sherman, Brophy, Evertson, & Crawford, in press).

Also, traditionalism was not related to age or years of teaching experience (when traditionalism and teacher age were analyzed within each of the two groups, these variables were utterly unrelated). Apparently, something about this sample of teachers makes them both more traditional in their beliefs and attitudes and more consistent in their effects upon students (although, as noted earlier, they ranged from very low to very high in level of effectiveness, although all were highly consistent in degree of effectiveness). Thus, these teachers were different from other second and third grade teachers in the same school system in at least two ways: they were more traditional in their beliefs and attitudes, and they were

more consistent in their relative effects upon student learning. The reasons for these differences remain unknown.

The present report focuses on student grade, sex, and socioeconomic status (SES) differences in process data taken from observations in the classrooms of these teachers. It seems unlikely that their special characteristics would influence external validity with regard to SES, because the majority of teachers were working within the same SES levels for many years. However, it is possible that findings related to grade and especially to sex were minimized in this group, compared to teachers who were less consistent and possibly more influenced by student differences.

It could be argued that highly traditional attitudes might increase sex differences if the teachers were particularly traditional in their sex role expectations. However, analyses of these teachers' questionnaire responses revealed that their traditionalism was focused squarely on beliefs and attitudes about schools and teaching. They were more traditional in the sense that they felt that school should be primarily an educational institution rather than a socializational one, that teacher directed instruction usually was preferable to independent student learning, and, in general, that their job was to teach the students the fundamentals of the three R's. This suggests that, if anything, the special characteristics of these teachers would be such as to reduce the frequency of sex differences in the teacher-student interactions observed in their classes.

They might also reduce grade differences somewhat, since these teachers seemed particulary reluctant to use some of the new curriculum packages meant for individualized instruction and to use activities designed for the creation and use of learning centers. In general, however, within the set

of process data included in the observation instrument to be discussed, there is every reason to believe that the obtained differences have high external validity.

Highly consistent teachers were observed for two years, 31 for the first year and 28 the second, divided roughly evenly between the second and third grades. Included in the second year were 19 teachers who had been in the study the first year, plus nine new ones selected from the original pool of 165 (to replace the 12 who did not continue in the study the second year because they had retired, gone on leave, changed grade levels, or refused further participation).

The teachers were observed only four times in the first year, due to financial limitations. This was not much of a data base, particularly for low inference variables that do not occur very often. Since this was the case for many of the variables in the system, the first year data, although reliable from the standpoint of intercoder agreement, did not constitute a reliable sample of the teachers' general behavior, except for a relatively small number of variables.

Consequently, the present report deals only with the second year data. During that year, the 28 participating teachers were observed for 14 half-days (approximately 30 hours) each, spaced across the school year and divided roughly evenly between morning and afternoon observations. The primary focus was on relationships between classroom process behaviors and measures of student outcomes (standardized achievement test scores adjusted for student achievement levels at the beginnings of the years). Readers interested in these data should consult Brophy and Evertson (Note 1, Note 2).

Data Collection Instrument

Low inference classroom observational data were collected with an adaptation of the original Brophy-Good Dyadic Interaction Observation System (Brophy & Good, 1970). This system concentrates on dyadic interactions between teachers and individual students, dividing them broadly into public response opportunities occurring in whole class lessons or discussions and public response opportunities occurring in small groups such as reading groups; private dyadic contacts involving classroom work or procedural matters; and behavioral contacts which occur because a child is singled out for praise or (usually) warning or criticism for misconduct. All interactions are coded so that it is clear whether the interaction was initiated by the teacher or by the child, and teacher praise or criticism of the child is coded whenever it occurs. In addition, the system allows for several other coding distinctions.

Within public response opportunities, in addition to coding whole class versus small group contexts, the observers noted the sex of the child, the difficulty level of the question, the method by which the response opportunity was obtained, the quality of the student's response, and the nature of the teacher's reaction to this response. Question difficulty was coded as process (the question is a "why" or "how" question that requires the child to explain something at length); product (the question is a "who," "what," "where," "when," or "how many" question that requires the child to produce a fact from memory); choice (yes-no questions, either-or questions, or other response opportunities that allow the child to choose among alternatives); opinion (the question does not have a single correct answer and

simply solicits the student's opinion on something); or self (the question has nothing to do with the curriculum but simply asks the student about personal preferences or experiences).

Methods of obtaining response opportunities included preselect (the teacher names the student who is to answer the question before even asking the question); non-volunteer (the teacher asks the question and waits for the students to raise their hands, but then calls on a student who does not have his or her hand up); volunteer (the teacher calls on a student with his or her hand up); or call-out (before the teacher can call on anyone, a student calls out the answer).

The quality of student response was coded as correct, incorrect, part correct, don't know (the student says "I don't know" or indicates this by shrugging), or no response (the student makes no overt response at all).

Teacher reactions to student responses were coded whenever they involved anything other than simple affirmation of correct responses or negation of incorrect responses. Categories included praise, criticism, no feedback (the teacher does not even indicate whether or not the response was correct, but simply moves on to something and someone else), process feedback (the teacher explains the situation at length), gives answer (the teacher simply gives the answer without explaining at length), call-out (some other student calls out the answer), asks other (the teacher calls on another child for the answer), repeat (the teacher repeats the question or at least indicates to the child that she is waiting for a response to the original question), rephrase or clue (the teacher goes beyond merely repeating the original question by helping the child through rephrasing

the question to make it easier or providing a clue to help him or her respond), or new question (the teacher asks a question that calls for a different answer than the first question did). Several of these teacher feedback categories could be coded in reaction to a single student response. For example, a teacher could give the answer, give process feedback in addition to providing just the answer, and criticize the student for failing to know the answer.

Private dyadic contacts were categorized according to whether they were initiated by the teacher or by the student, and, within this, according to whether they dealt with work versus procedure. Work contacts specifically involved seatwork or other student work on classroom assignments. The interactions occurred because the teacher went around checking progress and stopping to provide feedback or encouragement to students, or because the students came to the teacher to show work in order to get approval or help. Procedural interactions included all other dyadic interactions except behavioral ones. These had to do with such matters as running errands for the teacher, passing out paper or supplies, requesting permission to go to the washroom or use some special equipment, and so on. Teacher praise or criticism was coded whenever it occurred during such interactions. In addition, work interactions were coded as either brief or long, and, when the observer could hear the interaction and make a decision, teacher feedback provided in these work interactions was coded as process feedback (detailed explanations) or product feedback (simply giving a correct answer).

When teachers initiated procedural interactions, which usually involved requesting students to perform some errand or favor, the teacher also was

coded for whether or not she thanked the student for doing so. In student initiated procedural interactions, which usually involved student requests for permission to do something, the teachers were coded for whether or not they granted the student's request, and if they did, whether they granted it immediately or delayed it.

Finally, behavioral interactions were coded whenever the teacher singled out an individual student for good or (more commonly) bad classroom behavior. Behavioral praise was coded if the teacher called general attention to the good behavior of a student who had done something praiseworthy (he or she finished cleaning up and quickly got in line; the student kept a neat desk; etc.). Behavioral warnings were coded when a child who was becoming disruptive was warned that the objectionable behavior had to be changed. Teacher criticism was coded in similar situations if the teacher went beyond simply warning the students by criticizing them in a negativisitic and personal manner or punishing them for their misbehavior.

The system also allowed for the coding of some of the variables stressed by Kounin (1970) in situations involving student misbehavior. Three types of teacher errors in handling such situations were coded if and when they were observed. These included target errors (the teacher identifies the wrong student or only some of the students responsible for the problem), timing errors (the teacher waits too long before intervening, so that what started out as a relatively minor problem becomes a major disruption), or overreactions (the teacher overreacts to the situation emotionally and behaviorally, giving it much more negative and/or extended attention than it warrants). If none of these errors were made, "no error" was coded.

Readers interested in the coding manual presenting the details of these coding distinctions along with information about coder training, establishing reliability, and other aspects of the implementation of the coding system should consult Brophy and Evertson (1973). All of this information is included in the appendix to that report.

Data Tabulation and Analyses

Data for each classroom involve a number of frequency measures and a larger number of proportion scores. Both of these were derived from simple sums of the codes within each category. Frequency data for a few variables were obtained by dividing the sum in each category for a given classroom by the amount of time that classroom was observed.

Percentage measures were obtained by expressing a category or combination of related categories as a numerator and dividing it by a denominator composed of that same category or set of categories plus other ones that formed part of a larger set. For example, teachers differed in their raw frequencies of praise of correct answers by students. However, percentage scores allowing direct comparisons of teachers were computed by dividing the number of correct student answers that each teacher praised by the total number of correct student answers coded in her classroom. This yielded a variable called "percentage of correct answers followed by teacher praise." Similar procedures were used to create such variables as "percentage of student responses which were not given any feedback by the teacher," "percentage of work contacts which were initiated by the student," and "percentage of student misbehaviors which elicited teacher warnings (versus criticisms)."

These procedures yielded a total of 171 low inference measures of classroom process behavior. Not all of these measures yielded usable data, however, because some never occurred at all, and others occurred so infrequently that meaningful analyses could not be performed. Thus, although there were 13 teachers working in low SES schools and 15 teachers in high SES schools, and there were 15 teachers working in second grade and 13 teachers working in third grade, data were not always available for all teachers.

The data were obtained through two-way (sex by SES) analyses of variance to assess sex and SES differences and their interactions, and by one-way analyses by grade, to assess differences between second and third grade (student sex was omitted from the latter analyses because the former analyses had revealed it to be of minimal significance, as will be reported below). In these analyses, no data were recorded whenever the number of teachers in either cell for SES or grade fell below five. As a result, data were available on 85 variables for whole class interactions in the mornings, for 75 variables for whole class interactions in the afternoons, and for 94 variables for reading group interactions.

This represents a serious shrinkage of data. It could have been avoided if individual students rather than intact classes had been used as the units of analysis. However, given the large number of students involved (over 700) and the small amounts of data available for individual students, this would have been inappropriate. The present procedures were much more conservative, and they confined attention to those variables which occurred with sufficient frequency to allow meaningful analyses. Furthermore, under

the circumstances, statistical significance translates pretty directly into practical significance, in that differences had to be large and widespread enough to be of some importance for an effect to reach statistical significance.

This was true even though the relatively high probability level of .10 was used (to compensate for the low N). Given the probability value of .10 and the numbers of variables for which data were available, the numbers of significant findings expected by chance alone were 8.5 for whole class interactions in the mornings, 7.5 for whole class interactions in the afternoons, and 9.4 for interactions in the reading groups. This should be kept in mind, because only the findings for SES exceeded these chance expectations.

Results

The results of the two-way, sex by SES analyses of variance are presented in Table 1, and the results of the one-way analyses of variance by grade (second grade versus third grade) are presented in Table 2.

Insert Table 1 about here

Sex and SES

The results of the sex by SES analyses are presented in Table 1. In general, SES was an important factor, but sex was not. Significant main effects for SES were obtained for 21 of the 85 variables for whole class interactions in the morning, 13 of the 75 variables for the whole class

interactions in the afternoon, and 25 of the 94 variables for reading group interactions. In sharp contrast to these figures, significant main effects for sex appeared only five times, four times, and five times, respectively, for the same contexts. Sex by SES interactions appeared only twice for the whole class interactions in the mornings, twice in the reading group interactions, and not at all in the afternoon interactions. Thus, main effects for SES occurred at frequencies clearly above chance expectancy, while those for sex and for interaction were actually below chance expectancy.

In presenting the data, the variable numbers are given in parentheses after each result discussed, so that readers can locate the exact data in the tables more easily. These are the numbers which appear in the leftmost columns of each table.

Student Sex

None of the significant sex differences occurred on variables having to do with public response opportunities occurring in reading groups or whole class discussions. This means that teachers were equalizing response opportunities to boys and girls, that the children were responding about equally in terms of percentages of correct answers, and that teachers were giving generally similar kinds of feedback to these student responses. Two of the significant sex differences appeared for variables dealing with teacher feedback to relevant student initiated questions during morning interactions. The teachers responded with brief feedback more often when such questions were asked by boys (64), but they responded with long feedback more often when such questions were asked by girls (65). These questions

were not asked frequently, however, and these sex differences for the morning data were not replicated in either the afternoon data or the reading group data.

The next significant sex differences deal with academically-related student initiated comments (as opposed to questions). Boys called out more such comments without prior permission than girls in the mornings in general class activities (81). The means for the other two data sets were in the same direction, but were not statistically significant. These fit with numerous other data to the effect that boys are more active in the classroom in calling out responses without permission (Baum, Brophy, Evertson, Crawford, & Anderson, Note 3).

Sex differences also appeared for the percentages of student initiated comments accepted (86) and for the percentage integrated into the discussion topics of the moment (87). Both of these significant sex differences appeared only in the reading group data, and they showed that teachers were more likely to merely accept a relevant student comment from boys, but to integrate a relevant student comment from girls into the discussion. Assuming that these differences are real (not just chance findings), they might reflect either a greater teacher receptiveness toward the comments made by girls, or a tendency for girls to make more relevant or higher level comments which are easier for teachers to integrate into the discussion rather than to merely acknowledge.

Sex differences appeared in all three contexts for the percentage of private contacts which were initiated by the students (110). In each case, girls initiated a greater percentage of private contacts with the teachers

than boys, except that boys initiated more contacts involving personal concerns in reading group situations (117). This same sex difference in spontaneous student initiated approaches to teachers was observed in a different study spanning grades two through five (Baum, et al., Note 3). Boys apparently are relatively uninterested in teachers and tend to confine their interactions with teachers to those necessitated by student role demands.

In the afternoons, the teachers made slightly more management requests of boys than girls (128). Thus, when the teacher needed someone to run an errand or perform some task required for classroom management, they were more likely to ask boys than girls, at least in this context. The data from the other two contexts show a non-significant difference in the same direction for the mornings, but no difference for the reading groups.

The teachers also had proportionally more non-verbal control contacts with boys, although the difference was significant only in the reading group context (138). The reasons for this sex difference are unknown. Boys do misbehave more often, but this does not explain why teachers respond to them non-verbally more often. Perhaps frequent but minor misbehavior causes boys to regularly check to see if they are being watched, thus making it easier for teachers to use non-verbal methods with them.

The final variable showing sex differences was total teacher initiated dyadic contacts over total time (171). Boys had more such contacts in all three contexts, and the sex difference was significant for whole class interactions in the mornings and the afternoons. The difference for reading groups was in the same direction but was not significant. These

data parallel the student initiation data suggesting that teachers make up for the fact that boys come to them less frequently to initiate contacts by going to the boys to initiate contacts themselves instead. This same relationship was found by Baum, et al. (Note 3)

School SES

Data from the teachers in the 13 low SES classrooms compared to the teachers in the 15 high SES classrooms showed more than twice the number of significant differences to be expected by chance in all three contexts. In general, SES differences in classroom composition were extremely important in this study; the process-product data make much more sense when analyzed separately for low versus high SES classes than they do when analyzed for the group of teachers as a whole (Brophy & Evertson, Note 2).

SES scores for each school were derived by summing school SES rankings made by six school administrators. These rankings were highly intercorrelated (all r's above .90). They were summed to yield a distribution from low to high SES, and the teachers in the sample were divided at the median to form SES groups. As it happened, the 28 teachers could not be divided into two exactly equal groups because inclusion of the median score resulted in a 13-15 split. Rather than arbitrarily assign one of the teachers in the higher SES group to the lower SES group, we used N's of 13 for the lower SES group and 15 for the higher SES group.

The SES differences reveal that the natures of the student body and teacher-student interaction can be very different in schools of contrasting SES level, even at the same grade level. Our classroom observers noted that

the high SES classrooms were populated mostly by bright and highly motivated children who generally spoke up, were eager to respond, and seemed to enjoy learning. If anything, the teachers in these classrooms had problems controlling overeagerness and competitiveness. Handwaving and other attempts to get the teacher to call on students were frequent in these classes.

In contrast, the observers stated that the lower SES classrooms typically were marked by alienation from learning. In these early grades, this alienation rarely took the form of overt hostility or aggressiveness. Instead, the students were passive and inhibited. Teachers often had to work to get them to respond in any fashion, let alone correctly. Handwaving and other signs of eagerness to respond were rare. Also, the children in the low SES classrooms usually did not yet have the combination of independent work skills, functional reading, and direction following ability needed to enable them to work independently for very long. Thus, they were more dependent upon the teacher for structuring of learning experiences and for monitoring and correcting seatwork.

These observations have been inserted here to help "set the scene" for some of the SES differences observed in the data. To facilitate comparisons with the data presented in the report by Baum, et al. (Note 3), the data for public response opportunities will be presented first, followed by the data for private work and procedure interactions, followed by the data for behavior interactions.

Teachers were more likely to preselect students for response opportunities in reading group in the high SES classes (I). Differences were in the same direction for the whole class interactions, but they were not significant. This finding may represent one way that these teachers dealt

with the problem of competitiveness in seeking response opportunities in these high SES classrooms. The other significant SES finding relating to selection of student respondents, and an especially interesting one, was that low SES students were more likely to call out answers in two of the three contexts, and both of these differences were significant (4). At first, this seems to contradict the general picture of low SES classrooms drawn above. However, other data indicate that teachers in low SES classrooms were more tolerant of student call outs, and that teachers in high SES classrooms were especially firm in insisting that everyone respect everyone else's response opportunities (appropriately, in each case). Thus, we believe that these differences reflect differences in what the teachers allowed rather than differences in student predisposition to call out responses without permission.

The measures of the difficulty level of teacher questions showed only one significant sex difference: more choice questions were asked in reading groups in high SES classrooms (6). This was contrary to expectations, because we had thought that there would be more process questions (which usually are more difficult) and fewer choice questions (which usually are simpler) in the high SES classrooms. We offer no interpretation for this finding, because there were context differences in the opposite direction: more choice questions were asked in the low SES classrooms in each of the other two contexts (whole class interactions), although neither difference reached statistical significance.

Data on the quality of children's answers indicated that high SES students were likely to respond correctly about 82% of the time, while the low SES students responded correctly 72% of the time (7). Conversely,

the percentage of wrong answers was higher for the low SES students (9). Also, the percentage of instances in which the students made no response whatsoever was higher for the low SES students, significantly so for two of the three contexts (11). Thus, high SES students were more likely to make some kind of response when called on, and they also were more likely to be correct.

Teacher reactions to correct answers showed no significant differences. Data on teacher reactions to part-correct answers revealed that low SES teachers tended to call on someone else when the child did not respond or responded incorrectly more frequently than high SES teachers, but only in the reading group context (22). The difference was in the same direction for one of the other contexts, but was reversed for the third. The low SES teachers also were more likely to rephrase or give a clue to try to improve a partially correct response. However, this appeared only for the afternoon, whole class interaction context. The means for the other two contexts were identical (26). These data are of questionable meaning, because part-correct responses were relatively rare. Again, though, they indicate that the low SES teachers had greater difficulty in obtaining correct responses from their students.

The data on teacher responses to wrong answers showed that the low SES teachers allowed more call outs in reading groups than the high SES teachers did (34), and that the low SES teachers rephrased or gave clues more often in trying to enable students to respond correctly (37), at least in the whole class interactions in the afternoons. High SES teachers apparently either gave the answers or called on other students in these situations, although the differences were not significant. These data

again indicate the difficulties that teachers in the low SES schools had in obtaining student responses.

Teacher reactions to "I don't know" responses and to student failures to respond were analyzed both separately and together. The separate analyses revealed nothing for the "I don't know" responses, because these happened too infrequently to analyze. Thus, most of the findings for the combination of "I don't know" and no response situations come from no response situations.

First, looking only at the data on teacher reactions when the children failed to respond at all, it is clear that the high SES teachers generally either gave the student the answer themselves or called on another student (157, 158). In contrast, teachers in the low SES schools were more likely to stay with the original student and attempt to get an improved response by repeating the question, rephrasing the question, or asking a new question (160, 162). These process differences in teacher behavior appeared to be appropriate, because process-product analyses revealed that staying with the original respondent and attempting to get an answer was associated with success in obtaining student learning gains in low SES schools, while calling on someone else or giving the answer was associated with obtaining student learning gains in high SES schools (Brophy & Evertson, Note 1, Note 2).

These same general differences are reflected in the data for teacher reactions to "I don't know" situations and no response situations combined (41, 42, 44, 46). Again, teachers in the high SES schools were more likely to give the answer or call on someone else, while teachers in the low SES schools were more likely to stick with the original student and try to obtain a response.

The data for teacher reactions combined across all response opportunities (regardless of quality of student answers) reflect a somewhat different pattern. Teachers in low SES schools were more likely to stay with the original respondent and attempt to improve the response after an initial failure (52), and they also tolerated more student call outs (56), as reported previously. However, the low SES teachers also were more likely to call on another student after an initial failure to answer correctly during general class interactions in the morning (55). This contrasts with the findings reported above in situations where students had failed to make any kind of response at all. The apparent reason is that this finding primarily reflects teacher behavior following wrong answers by students, as opposed to teacher behavior following no response at all.

The measure of student response opportunities over total teaching time (57) favored the high SES classrooms in all three contexts, significantly so for whole class interactions in the morning. Thus, the high SES classrooms involved more verbal interchanges in the public response opportunity context than did the low SES classrooms.

The data on student initiated questions occurring in public response opportunity situations indicate that more such questions were called out in the low SES classrooms (59). Again, we believe this to be a difference in teacher tolerance rather than student preference. All of the other measures relating to student initiated questions showed either no significant differences or not enough data to allow analyses. There were few student initiated questions at these early grade levels, even in high SES classrooms.

The data for student initiated comments (as opposed to questions) again showed that the low SES teachers tolerated more call outs than the high SES teachers did (81). High SES teachers accepted more relevant student initiated

comments than low SES teachers did (86), but low SES teachers went beyond simple acceptance and integrated more of these comments into the discussion, at least in reading group interactions (87). Informal observer reports suggest that this difference probably appeared because the high SES teachers received many more student initiated comments, so that simple acceptance of such comments probably was appropriate in most instances. In contrast, student initiated comments in low SES classrooms were infrequent, so that the relevant ones could be integrated into the discussion topic more frequently. As with student initiated questions, student initiated comments were infrequent, so that the remaining variables in this set showed either no significant differences, or, typically, not enough data to analyze.

The data on self and opinion questions show that both of these non-academic questions were more frequent in low SES classrooms (101, 104). These findings fit with our observers' impressions that the high SES classrooms concentrated more on teaching the curriculum, while the low SES classrooms deviated from the curriculum more frequently to take up more general discussions or matters of personal concern. However, the high SES teachers were more likely to praise the answers their students gave to opinion questions, at least in the one context for which data were available (106).

The preceding data all dealt with measures taken in public response opportunity situations. The next major set of data deal with teacher and student initiated work and procedure contacts. These were essentially private contacts of relevance only to the specific student involved, although often they were overheard by other students.

The data for student initiated work contacts show that low SES teachers praised students more during such contacts in one of the three contexts (111), that the percentage of private work contacts which were student initiated was higher in the high SES classrooms (113), and that the high SES students more often were given brief feedback when they initiated work contacts (115). Thus, high SES students came to the teachers to get help or to show their work more frequently, and teacher responses usually were briefer. This teacher behavior probably was appropriate, given that the high SES students generally were more successful and thus probably needed less explanation or correction, on the average. The praise difference also makes sense, because process-product data indicated that praise in this situation was especially facilitative of student learning in the low SES classrooms, but not so much in the high SES classrooms (Brophy & Evertson, Note 1, Note 2).

The data for student initiated contacts involving personal concerns of students indicate that there were more such contacts in the low SES schools (117). This is another aspect of the more general finding that the low SES classrooms were more personalized and less focused on the curriculum than the high SES classrooms. Another aspect of this same general SES difference is the greater frequency of procedural contacts in low SES classrooms (122).

Teacher initiated work contacts involving praise were more frequent in the high SES classrooms (124), and in general, teacher praise was more frequent in teacher initiated work contacts than in student initiated work contacts. This was appropriate, because process-product data indicated

that praise was more effective in teacher initiated contacts than in student initiated contacts (Brophy & Evertson, Note 1, Note 2).

The percentage of teacher initiated procedural contacts which involved management requests was slightly higher in the low SES classrooms (128). This probably reflects a greater need for these teachers to give their students specific instructions about what to do and when and how to do it, as compared with teachers working in high SES classrooms. In addition to asking their students to do things more frequently, low SES teachers thanked them for doing so more frequently, at least in the whole class contexts in the morning (130). However, these data were reversed in the reading group contexts. Thus, the data concerning thanking students for doing management tasks are mixed.

The combined teacher evaluation data across all academic situations revealed that high SES teachers praised their students more frequently for good work or good responses than low SES teachers did (131). Ironically, such praise was negatively correlated with student learning gains in the high SES classrooms (Brophy & Evertson, Note 1, Note 2), however. There were no significant SES differences in behavioral praise or behavioral warnings.

The data on discipline and control errors revealed no SES differences in frequency of errors or in target or timing errors. However, in the one context for which data were available, overreactions were much more frequent in the low SES classrooms than in the high SES classrooms (137). These appeared to be functional, however, because the process-product data revealed overreactions to be positively associated with student learning gains

(Brophy & Evertson, Note 1, Note 2). Apparently, teacher interventions which struck classroom observers as emotional overreactions were not really overreactions in the context of the situation. At any rate, these teacher behaviors coded as overreactions were positively associated with student learning rates.

The data on sharing of personal experiences in private dyadic contexts revealed that this occurred more frequently in low SES classrooms, both in teacher initiated contacts (145) and in child initiated contacts (144). This is yet another aspect of the general tendency of low SES classrooms to be more personalized and less strictly structured by curriculum considerations, relative to high SES classrooms.

The final variable showing a social class difference is the measure of total response opportunities in the morning over the total time available. This showed a significant difference in favor of the high SES classrooms (170), and it is related to the previously reported finding concerning response opportunities over total teaching time (57). These high SES classrooms involved more verbal interactions in which teachers asked questions and students answered or participated in discussions, compared to the lower SES classrooms. The latter involved relatively more individualized practice and seatwork, and proportionately less verbal interaction, particularly verbal interaction involving the whole class.

In general, these SES differences reflect appropriate teacher behavior, at least with respect to student achievement. Almost every SES difference observed was correlated positively with student learning gains on standardized achievement tests. That is, when teachers in one of the two SES groups did

more of something than teachers in the other group, the behavior involved usually was correlated positively with student learning gains for that SES group.

Furthermore, most of the SES differences observed appeared to reflect teacher controlled variables. That is, even though there was ample evidence that the students in the two SES groups were very different and presented different demands and problems to the teachers, the present data, along with the process-product data, suggest that teachers were responding appropriately to these student differences in ways that helped facilitate student learning. This is discussed at much greater length in the reports of process-product relationships (Brophy & Evertson, Note 1, Note 2).

Grade Differences

Grade differences were obtained through one-way analyses of variance comparing the 15 teachers in grade two with the 13 teachers in grade three. The data are presented in Table 2.

Insert Table 2 about here

Observed grade differences were somewhat below chance expectations. The analyses yielded significant differences (only 11 of 107 times for the whole class interactions in the morning, four of 103 times for whole class interactions in the afternoon, and eight of 105 times for reading group interactions.) This was not surprising. Few differences between grades two and three were expected, partly on the basis of the general similarities

in these two grades, and partly on the basis of previous data showing these two grades to be very similar to each other (Baum et al., Note 3).

There were no grade differences in methods of selecting students to respond to questions. Data on the difficulty level of questions revealed that process questions were more frequent in third grade for morning, whole class interactions and for reading groups (5). Part-correct answers also were more frequent at third grade (8). Both of these findings might have been expected on the basis of the greater verbal abilities, on the average, of the third graders.

There were no differences in teacher reactions to correct answers, but several appeared in teacher reactions to wrong answers. The third grade teachers criticized students for wrong answers more frequently (29), and they more often gave the answer to the student if the question had not been answered correctly (32). Meanwhile, the second grade teachers were much more tolerant of student call outs (34). Taken together, these data suggest that the third grade teachers were somewhat more focused on the curriculum and less tolerant of either poor student performance or unsanctioned student behavior. In this sense, it might be said that they were "stricter" than the second grade teachers.

Teacher reactions to "I don't know" and no response situations in combination did not reach significance, but data for these two situations separately did. Specifically, second grade teachers were more likely to call on someone else if the student had said "I don't know" (149), while the third grade teachers were more likely to stay with the student by either repeating the question, or rephrasing, or asking a new question (160, 162)

if the student had failed to make any kind of response at all. These differences fit with those reported above, in that they suggest that the third grade teachers were more concerned about getting responses than the second grade teachers.

The data for teacher reactions combined across all response opportunities showed that the third grade teachers were slightly more likely to give the answer after a failure to answer correctly (54). This is simply an elaboration of the previously reported finding that the third grade teachers were more likely to give the answer when the student had given a wrong answer to the original question.

There were no differences in the frequency of public response opportunities by grade (57, 170). This was mildly surprising, in that we had expected that response opportunities would become more frequent in third grade, as the children became more verbal.

The data for student initiated questions did not yield any significant findings. However, third grade teachers were more likely to praise relevant student initiated comments than second grade teachers were (82). This again suggests a focus on curriculum content by the third grade teachers.

The data on self questions revealed these to be much more frequent at second grade (103). The data on opinion questions showed them to be more frequent at the third grade in all three contexts, however, and the grade difference was significant for reading groups (104). These data again suggest a greater focus on the curriculum on the part of the third grade teachers, at least for self questions. It is possible to interpret the opinion question data in the same way, given the nature of

opinion questions and of the context differences involved.

Opinion questions sometimes dealt with curriculum related matters and sometimes did not. Casual observation suggested that opinion questions during reading groups usually dealt with the story (often they were used as ways to generate interest in the story or to help students see how it applied to their own lives), while opinion questions occurring in the general class context were less likely to be related to the curriculum. Thus, even the seemingly contradictory findings for opinion questions can be seen as conforming to the general idea that third grade teachers are more focused on the curriculum than second grade teachers, when the context difference (whole class versus reading group) is taken into account.

In sum, the data for response opportunities did not show the expected increase from second to third grade, but they did reveal on several different measures a tendency for third grade teachers to become more businesslike and focused on the curriculum, relative to the second grade teachers.

The data on private dyadic contacts showed that a greater percentage of such contacts were initiated by the st dents in second grade (110). These data fit with the trend noted by Baum, et al. (Note 3) to the effect that, across the second through fifth grade range, children, especially boys, decrease in their tendency to approach teachers spontaneously.

The third grade teachers praised during student initiated work contacts more frequently than second grade teachers did (111). This may have been counter-productive; the process-product data indicated that praise in this particular context was negatively associated with student learning gains (Brophy & Evertson, Note 1, Note 2).

The second grade teachers were more likely to merely observe students at work, without stopping to say anything to them (125). They also were more likely to control behavior problems through non-verbal methods such as moving closer to the misbehaving student (138). Both of these findings make sense, given the relatively impersonal interactions of teachers with very young children and given the relative difficulty that very young children have in expressing themselves in verbal interactions, although neither result was anticipated in advance.

The percentage of child initiated contacts which involved sharing personal experiences was higher at grade three (144). Again, this probably reflects in part greater verbal abilities which enable students to carry on conversations with the teachers. Also, it probably reflects the tendency of certain students (but probably a minority, and mostly girls) to seek out the teacher for social contacts. Girls do seem to value this, and to show it through initiating such contacts, although boys typically do not.

The final variable showing a grade difference concerns the total number of teacher initiated contacts divided by the total time observed. This proportion was higher for the third grade teachers (171). With regard to non-academic contacts, these data may reflect the increasing verbal abilities of the children, which make sustained interactions with the teacher more possible at higher grade levels. With regard to academic contacts, the grade difference may reflect the tendency of children, especially boys, to reduce the frequency with which they initiate contacts with teachers spontaneously (110). Thus, the increase in teacher initiated contacts at the third grade

level may be a more or less systematic attempt by the teachers to make up for the contacts which no longer occur because students initiate them, as they did in earlier grades. A similar pattern was noted by Baum, et al. (Note 3).

Discussion

Analyses for sex, SES, and grade differences in process interaction measures revealed many SES differences but few sex or grade differences. The few grade differences were not surprising, given that only second and third grade students were involved. The few sex differences might be surprising to some, although they should not be. Studies of teacher attitudes usually reveal numerous sex differences, but studies of process behavior, especially if data are collected with low inference instruments, typically reveal minimal sex differences. Also, those that do appear tend to be differences among the students rather than differences in teacher behavior that reflect teacher bias (Brophy & Good, 1974).

In short, student sex is not as important a variable as some have suggested, at least not in the early grades. There are some sex differences, but close examination usually reveals these to be of relatively minor importance. In addition, analyses of teacher behavior in relationship to sex differences usually reveal that teachers compensate for the student sex differences that do occur. Thus, although boys generally volunteer less often than girls (as a group), teachers tend to equalize public response opportunities by calling on non-volunteer boys more often and by allowing more call outs from boys. Similarly, although boys generally approach teacners

less often for help or feedback concerning work, teachers compensate by approaching the boys more often, thus tending to equalize the frequency of individualized work contacts with students. We do not know the degree to which this compensatory behavior by teachers is conscious, but we have observed it in several investigations.

In general, to the extent that sex differences do exist, girls tend to be more conforming and achievement oriented and to be more oriented toward and interested in the teacher as an individual, as compared to boys. Conversely, boys typically misbehave much more often and consequently have many more behavior-oriented contacts with teachers, including criticism and punishment for misbehavior. However, investigations which have included male teachers have shown that these same patterns exist in classrooms taught by males, and the general weight of the evidence is that sex differences are due to student differences in misbehavior, and not to teacher bias in favor of females (Brophy & Good, 1974).

Although we were not surprised with the small number of sex differences that appeared in this study, it should be noted that additional ones might have occurred had we been able to collect data on individual students, instead of only noting the sex of the student and analyzing males versus females as intact groups. Martin (1972), using data on individual students, reported that the boys tended to be polarized at the extremes of distributions of most academic and conduct variables, with girls usually bunched in the middles of the distributions. He noted that this tendency was so widespread and extreme that it made more sense to analyze high achieving and generally conforming boys separately from low achieving and generally non-conforming boys, rather than attempting to deal with "boys" as an aggregate group.

In our own investigations which have involved collection of individual student data, we have found consistent support for Martin's contentions. Assuming that similar subgroup differences existed in the present study, they would have been masked by the fact that data had to be collected only by student sex, without information on individuals. Consequently, it is possible (and quite likely, we think) that subgroups, particularly among the boys, cancelled one another within the data for sex groups as aggregates. Thus, while it is true that means and other central tendency data for aggregated sex groups showed few differences, it also is true that analyses of individual student data which take into account student sex usually reveal many significant differences.

The large number of significant SES differences did not surprise us, given what is known about the power of SES as a predictor variable and given the previously reported fact that the process-product data from this study are understood more clearly when analyzed separately by SES than when analyzed for the sample as a whole (Brophy & Evertson, 1973). In general, the SES differences observed in these analyses support the interpretations made in connection with the process-product data (Brophy & Evertson, 1973), and they also support the general contention that teachers usually respond appropriately to the differential opportunities and problems that different students present to them.

We view SES as a proxy variable standing for a complex of differences in ability, achievement, and general orientation toward schools, teachers, and the student role. These and other analyses of SES are not so much important in their own right as they are in providing guidance about some

of the important student differences which must be taken into account in order to understand classroom process data fully. It is becoming increasingly clear that students affect teacher behavior, although most classroom research has assumed a model that implicitly treats teacher behavior as cause and student behavior as effect in interpreting correlations.

This can lead to misleading and overgeneralized results. For example, it is much easier to use an indirect teaching style and/or to ask high level questions and get student responses reflecting complex thought processes in high SES classrooms than in low SES classrooms, other things being equal. Thus, studies which did not either control or take into account student differences in SES, achievement levels, or related variables are suspect at best.

In general, de facto segregation in housing patterns tends to create classrooms which are relatively homogeneous by SES. This homogeneity due to segregation is perhaps even stronger than homogeneity of race or ethnicity. In any case, SES differences are so strong and pervasive that they cannot be ignored. As a general rule, high SES schools are likely to be populated primarily by eager, achievement oriented, and somewhat competitive students, while low SES schools are likely to contain a high proportion of students who are alienated from school and from learning.

Grade level is also relevant here. At the higher grades, many low SES schools are reminiscent of "the blackboard jungle," featuring overt student defiance and hostility in addition to alienation from learning. However, in the early grades, students in low SES schools usually are <u>not</u> overtly defiant or hostile. Instead, they tend to be anxious, fearful, self-conscious,

lacking in confidence about their own abilities, afraid of being called upon to respond publicly, and, in general, likely to deal with alienation through withdrawal and inhibition rather than overt defiance.

The SES differences observed in this study indicate that teachers in these two respective types of schools generally were adapting to student differences in ways likely to maximize student learning (Brophy & Evertson, 1973). In particular, teachers working in the high SES schools maintained a businesslike demeanor and a primary focus upon the curriculum, and they took advantage of the opportunities provided by the fact that their students were generally brighter and more verbal than the students in the low SES schools. Conversely, teachers in the low SES schools were more personalized in their interactions with their students, thus helping to combat student alienation and fear. They also spent more time teaching the fundamentals of the three R's, because most of their students had not learned these fundamentals yet. They also moved at a slower pace, trying to socialize their students to give answers to questions, rather than to remain silent, by sticking with students who failed to respond rather than simply giving answers and moving on to someone else.

At these grade levels, such behavior would have amounted to pointlessly pumping the students in the high SES schools, since these students almost always give the response (and give it quickly) if they know it. However, in the low SES schools, such behavior was functional, because many students capable of responding correctly would not do so the first time because of fear. For these students, teacher persistence combined with patience and encouragement not only was likely to succeed in helping them to get the correct

answer in a given situation, but also was important in helping to break down fear and socialize them toward a more positive student role.

As noted, the low frequency of significant grade differences was not surprising, given that only two grades were involved and that these grades were adjacent (second and third). Furthermore, the differences observed are mundane, indicating simply that children become more verbal and more socialized to the student role as they get older, at least within these grade levels. Other data (Baum, et al., Note 3) indicate that socialization to the student role is increasingly successful across the first several grades of school, but that students begin to become rebellious starting around fifth grade. It is probable that this reversal in trends continues at later grades; ongoing research at the junior high school level will help answer this question.

Data for sex and grade combined, both in this study and in others, indicate rather clearly that children in general, and boys in particular, do not value teacher praise very much, despite the frequent stress laid upon it in teacher education programs. This should not be taken to mean that teachers should praise less often or that praise is of no importance, although it may indicate that most teachers do not praise very effectively (i.e., in ways that motivate their students positively).

Part of the reason for this is that children become less adult-oriented and more peer-oriented throughout middle childhood. This is particularly true of boys, most of whom seem to be virtually indifferent to their teachers. In contrast, most girls are interested in teachers and increasingly begin to initiate personal contact with them and take an interest in them as individuals

as well as persons playing the teacher role. However, in most cases even this interest seems to be relatively limited, compared to interest in peers. In any case, process measures of classroom interaction at the second and third grade levels revealed relatively few grade differences, and the differences that did appear were rather trite and obvious.

These comments do not apply to grade differences in general, however, because other data indicate that grade level is extremely important in limiting the degree to which findings can be generalized (Brophy & Evertson, 1973). In particular, the nature of student cognitive development and of the teaching-learning situation typical of the first few grades of school differ in several important respects from those observed at higher grades. Most children in the early grades still are mastering the fundamentals of the three R's, whereas in later grades they are using these tool skills to learn content in other areas.

Thus, the early grades feature study of the three R's as ends rather than use of them as means, and instruction is more individualized and much less verbal and conceptual than at higher grade levels. This means that different variables are important at these different levels, and also that variables important at both levels do not always have the same kinds of relationships to student learning.

Reference Notes

1. Brophy, J. & Evertson, C. Process-product correlations in the Texas teacher effectiveness study: Final report (Res. Rep. 74-4). Austin, Texas: Research and Development Center for Teacher Education, 1974.

2. Brophy, J. & Evertson, C. The Texas teacher effectiveness project: Presentation of non-linear relationships and summary discussion. (Res. Rep. 74-6). Austin, Texas: Research and Development Center for Teacher Education, 1974.

3. Baum, M., Brophy, J., Evertson, C., Crawford, J., & Anderson, L. Sex and grade differences in the interactions and classroom behaviors of children in grades two through five. (Res. Rep. 75-18). Austin, Texas: Research and Development Center for Teacher Education, 1975.

References

Brophy, J. Stability of teacher effectiveness. American Educational Research Journal, 1973, 10, 245-252.

Brophy, J. & Evertson, C. Low-inference observational coding measures and teacher effectiveness. Catalog of Selected Documents in Psychology, 1973, 3, 97.

Brophy, J. & Good, T. The Brophy-Good dyadic interaction system. In A. Simon and E. Boyer (Eds.). Mirrors for behavior: An anthology of observation instruments continued, 1970 supplement, Volume A. Philadelphia: Research for Better Schools, Inc., 1970.

Brophy, J. & Good, T. Teacher-student relationships: Causes and consequences. New York: Holt, Rinehart and Winston, 1974.

Kounin, J. Discipline and group management in classrooms. New York: Holt, Rinehart and Winston, 1970.

Martin, R. Student sex and behavior as determinants of the type and frequency of teacher-student contacts. Journal of School Psychology, 1972, 10, 339-347.

Sherman, G., Brophy, J., Crawford, J. & Evertson, C. Traditional attitudes and teacher consistency in producing student learning gains in the early elementary grades. Journal of School Psychology, in press.

Footnotes

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Table 1. Group Means and Probability Data from Sex by Socioeconomic Status (SES) Analyses of Variance in Classroom Process Measures

Process Variables	Whole Class Interactions, Mornings							Whole Class Interactions, Afternoons							Reading Groups						
	Male Mean	Female Mean	High SES Mean	Low SES Mean	Probability Sex	SES	SexxSES	Male Mean	Female Mean	High SES Mean	Low SES Mean	Probability Sex	SES	SexxSES	Male Mean	Female Mean	High SES Mean	Low SES Mean	Probability Sex	SES	SexxSES
A. Selecting Respondents to Questions																					
1. % Preselects respondent before asking questions	04	04	05	03	-	-	-	04	04	04	03	-	-	-	07	07	10	04	-	**	-
2. Calls on non-volunteer	41	40	42	39	-	-	-	46	43	40	49	-	-	-	47	43	45	44	-	-	-
3. Calls on volunteer	40	45	44	41	-	-	-	38	43	43	39	-	-	-	32	37	35	33	-	-	-
4. Student calls out answers	14	11	08	17	-	**	-	12	09	13	09	-	-	-	15	14	10	18	-	**	-
B. Difficulty Level of Questions																					
5. Process Questions/Process+Product questions	05	06	05	07	-	-	-	05	05	06	04	-	-	-	04	05	04	05	-	-	-
6. Choice Questions/Process+Product+Choice	23	19	18	23	-	-	-	21	22	17	26	-	-	-	33	34	40	27	-	*	-

Table 1 Continued:

Process Variables	Whole Class Interactions, Mornings							Whole Class Interactions, Afternoons							Reading Groups						
	Male Mean	Female Mean	High SES Mean	Low SES Mean	Probability Sex	SES	SexxSES	Male Mean	Female Mean	High SES Mean	Low SES Mean	Probability Sex	SES	SexxSES	Male Mean	Female Mean	High SES Mean	Low SES Mean	Probability Sex	SES	SexxSES
C. Quality of Children's Answers																					
7. % Correct	77	78	82	72	-	**	-	76	78	79	75	-	-	-	78	80	81	76	-	**	-
8. % Part-correct	04	05	04	05	-	-	-	04	05	05	04	-	-	-	04	03	03	04	-	-	-
9. % Wrong	13	11	08	15	-	**	-	13	11	11	12	-	-	-	12	12	10	13	-	*	-
10. % "Don't know"															01	01	01	01	-	-	-
11. % No Response	07	06	06	07	-	-	-	06	06	04	08	-	**	-	06	05	04	07	-	**	-
D. Teacher Reactions to Correct Answers																					
12. Praise	12	13	14	11	-	-	-	12	10	12	10	-	-	-	12	11	13	10	-	-	-
13. Criticizing for calling out																					
14. Failure to give feedback															01	02	01	02	-	-	-
15. Process feedback															01	00	01	01	-	-	-
16. New question	15	12	15	13	-	-	-	11	11	11	12	-	-	-	10	09	09	10	-	-	-

Table 1 Continued:

Process Variables	Whole Class Interactions, Mornings: Male Mean	Female Mean	High SES Mean	Low SES Mean	Probability: Sex	SES	SexxSES	Whole Class Interactions, Afternoons: Male Mean	Female Mean	High SES Mean	Low SES Mean	Probability: Sex	SES	SexxSES	Reading Groups: Male Mean	Female Mean	High SES Mean	Low SES Mean	Probability: Sex	SES	SexxSES
E. Teacher Reactions to Part-Correct Answers																					
17. Praise																					
18. Criticism																					
19. Failure to give feedback																					
20. Process feedback																					
21. Gives the answer								15	14	15	14	-	-	-	20	11	20	11	-	-	-
22. Calls on someone else	30	37	28	39	-	-	-	32	30	33	30	-	-	-	20	26	15	30	-	**	-
23. Another student calls out the answer																					
24. Repeats, rephrases, or asks new question	43	47	48	38	-	-	-	36	42	39	39	-	-	-	52	52	56	47	-	-	-
25. Repeats question	16	18	19	14	-	-	-								18	14	18	14	-	-	-
26. Rephrases or gives clue	20	24	22	22	-	-	-	29	28	20	37	-	*	-	28	32	30	30	-	-	-
27. Asks new question															06	06	08	04	-	-	-
F. Teacher Reactions to Wrong Answers																					
28. Praise																					
29. Criticism																					

Table 1. Continued:

Process Variables	Whole Class Interactions, Mornings: Male Mean	Female Mean	High SES Mean	Low SES Mean	Probability: Sex	SES	SexxSES	Whole Class Interactions, Afternoons: Male Mean	Female Mean	High SES Mean	Low SES Mean	Probability: Sex	SES	SexxSES	Reading Groups: Male Mean	Female Mean	High SES Mean	Low SES Mean	Probability: Sex	SES	SexxSES
30. Failure to give feedback																					
31. Process feedback	05	08	06	07	-	-	-								04	03	05	02	-	-	-
32. Gives the answer	10	11	11	10	-	-	-	12	16	17	11	-	-	-	19	20	20	19	-	-	-
33. Calls on someone else	40	36	39	37	-	-	-	36	37	36	36	-	-	-	26	33	29	30	-	-	-
34. Another student calls out the answer															05	04	03	06	-	*	-
35. Repeats, rephrases, or asks new question	38	36	39	35	-	-	-	41	36	33	44	-	-	-	42	39	37	44	-	-	-
36. Repeats question	15	12	15	13	-	-	-							-	15	17	15	17	-	-	-
37. Rephrases or gives clue	18	22	21	20	-	-	-	24	28	18	33	-	**	-	24	19	19	25	-	-	*
38. Asks new question																					
G. Teachers Reactions to "I Don't Know" or No Response																					
39. Criticism																					
40. Failure to give feedback																					

Table 1 Continued:

Process Variables	Whole Class Interactions, Mornings: Male Mean	Female Mean	High SES Mean	Low SES Mean	Probability: Sex	SES	SexxSES	Whole Class Interactions, Afternoons: Male Mean	Female Mean	High SES Mean	Low SES Mean	Probability: Sex	SES	SexxSES	Reading Groups: Male Mean	Female Mean	High SES Mean	Low SES Mean	Probability: Sex	SES	SexxSES
41. Gives the answer															09	05	10	05	-	*	-
42. Calls on someone else	47	58	45	59	-	*	*	48	47	58	37	-	*	-	51	52	61	41	-	**	-
43. Another student calls out the answer															11	11	10	12	-	-	-
44. Repeats, rephrases, or asks new question	35	23	32	25	-	-	-	38	40	34	44	-	-	-	24	29	16	36	-	**	-
45. Repeats question	14	10	09	14	-	-	-								12	11	10	14	-	-	-
46. Rephrases or gives clue	12	10	14	08	-	-	-								11	16	06	20	-	**	-
47. Asks new question																					
H. Teacher Reactions Combined across All Response Opportunities																					
48. Praise	09	10	11	08	-	-	-	09	08	10	07	-	-	-	09	08	11	07	-	-	-
49. Failure to give feedback	01	01	01	01	-	-	-								01	02	01	02	-	-	-
50. Process feedback	01	02	02	02	-	-	-	02	01	01	01	-	-	-	01	01	01	01	-	-	-
51. New question	13	10	13	10	-	-	-	10	10	10	10	-	-	-	08	08	08	08	-	-	-

Table 1 Continued:

Process Variables	Whole Class Interactions, Mornings							Whole Class Interactions, Afternoons							Reading Groups						
	Male Mean	Female Mean	High SES Mean	Low SES Mean	Probability Sex	SES	SexxSES	Male Mean	Female Mean	High SES Mean	Low SES Mean	Probability Sex	SES	SexxSES	Male Mean	Female Mean	High SES Mean	Low SES Mean	Probability Sex	SES	SexxSES
52. Repeat, rephrase, or new question after failure to answer **	40	34	40	34	-	-	-	40	40	35	45	-	-	-	38	35	33	41	-	*	-
53. Repeats question after failure to answer correctly	03	03	03	04	-	-	-	04	03	03	04	-	-	-	04	03	03	04	-	-	-
54. Gives the answer after failure to answer correctly	02	03	02	03	-	-	-	03	03	03	03	-	-	-	03	03	03	03	-	-	-
55. Calls on another student after failure to answer correctly	09	09	06	11	-	**	-	10	08	08	10	-	-	-	08	08	08	08	-	-	-
56. Another student calls out answer after failure to answer correctly	01	01	01	02	-	*	-								01	01	01	02	-	**	-
I. Student Response Opportunities																					
57. Response opportunities/ total teaching time	09	07	10	07	-	**	-	12	08	11	09	-	-	-	28	24	28	24	-	-	-

Table 1 Continued:

Process Variables	Whole Class Interactions, Mornings							Whole Class Interactions, Afternoons							Reading Groups						
	Male Mean	Female Mean	High SES Mean	Low SES Mean	Probability Sex	SES	SexxSES	Male Mean	Female Mean	High SES Mean	Low SES Mean	Probability Sex	SES	SexxSES	Male Mean	Female Mean	High SES Mean	Low SES Mean	Probability Sex	SES	SexxSES
J. Student Initiated Questions (SIQ's)																					
58. % SIQ's irrelevant																					
59. % SIQ's called out	76	69	66	78	-	-	-	75	65	57	83	-	**	-	75	70	55	89	-	**	-
60. Praise of question after relevant SIQ																					
61. Criticism of question after relevant SIQ																					
62. % of relevant SIQ's delayed																					
63. % relevant SIQ's not accepted																					
64. % relevant SIQ's given brief feedback	80	59	66	7.	**	-	-	59	68	60	67	-	-	-	69	80	81	68	-	-	-
65. % relevant SIQ's given long feedback	14	29	20	23	*	-	-								18	17	13	22	-	-	-
66. % relevant SIQ's redirected to class																					
67. Behavioral praise of relevant SIQ																					

Process Variables	Whole Class Interactions, Mornings							Whole Class Interactions, Afternoons							Reading Groups						
	Male Mean	Female Mean	High SES Mean	Low SES Mean	Probability Sex	SES	SexxSES	Male Mean	Female Mean	High SES Mean	Low SES Mean	Probability Sex	SES	SexxSES	Male Mean	Female Mean	High SES Mean	Low SES Mean	Probability Sex	SES	SexxSES
68. Behavioral criticism of relevant SIQ																					
69. Behavioral warning after relevant SIQ																					
70. Criticism of Question after irrelevant SIQ																					
71. % Irrelevant SIQ given no feedback																					
72. % Irrelevant SIQ delayed																					
73. % Irrelevant SIQ given brief feedback																					
74. % Irrelevant SIQ given long feedback																					
75. % Irrelevant SIQ not accepted																					
76. % Irrelevant SIQ redirected to class																					
77. Behavioral criticism after irrelevant SIQ																					
78. Behavioral warning after irrelevant SIQ																					

Process Variables	Whole Class Interactions, Mornings: Male Mean	Female Mean	High SES Mean	Low SES Mean	Probability: Sex	SES	SexxSES	Whole Class Interactions, Afternoons: Male Mean	Female Mean	High SES Mean	Low SES Mean	Probability: Sex	SES	SexxSES	Reading Groups: Male Mean	Female Mean	High SES Mean	Low SES Mean	Probability: Sex	SES	SexxSES
K. Student-Initiated Public Interactions																					
79. Student initiated comments and questions/ total response opportunities	13	11	11	12	-	-	-	16	14	17	13	-	-	-	09	09	08	11	-	-	-
L. Student-Initiated Comments (SIC's)																					
80. % SIC's relevant															85	90	90	86	-	-	-
81. % SIC's called out	80	63	66	78	**	-	-	76	61	62	76	-	-	-	73	68	57	83	-	**	-
82. Praise of comment after relevant SIC																					
83. % relevant SIC's given no feedback																					
84. % relevant SIC's delayed																					
85. % relevant SIC's not accepted															09	06	08	07	-	-	-
86. % relevant SIC's accepted	75	75	84	66	-	**	-	64	72	69	67	-	-	-	78	70	82	66	*	**	-
87. % relevant SIC's integrated into discussion topic															09	15	08	16	*	**	*
88. % relevant SIC's which cause a shift in topic																					

Process Variables	Whole Class Interactions, Mornings							Whole Class Interactions, Afternoons							Reading Groups						
	Male Mean	Female Mean	High SES Mean	Low SES Mean	Probability Sex	SES	SexxSES	Male Mean	Female Mean	High SES Mean	Low SES Mean	Probability Sex	SES	SexxSES	Male Mean	Female Mean	High SES Mean	Low SES Mean	Probability Sex	SES	SexxSES
89. Behavioral praise after relevant SIC's																					
90. Behavioral criticism after relevant SIC's																					
91. Behavioral warning after relevant SIC's																					
92. Praise of comment after irrelevant SIC's																					
93. % irrelevant SIC's given no feedback																					
94. % irrelevant SIC's delayed																					
95. % irrelevant SIC's not accepted																					
96. % irrelevant SIC's accepted																					
97. % irrelevant SIC's integrated into discussion topic																					
98. % irrelevant SIC's which cause a shift in topic																					
99. Behavioral criticism after irrelevant SIC's																					

Process Variables	Whole Class Interactions, Mornings							Whole Class Interactions, Afternoons							Reading Groups						
	Male Mean	Female Mean	High SES Mean	Low SES Mean	Probability Sex	SES	SexxSES	Male Mean	Female Mean	High SES Mean	Low SES Mean	Probability Sex	SES	SexxSES	Male Mean	Female Mean	High SES Mean	Low SES Mean	Probability Sex	SES	SexxSES
100. Behavioral warning after irrelevant SIC's																					
II. Self and Opinion Questions																					
101. Self Questions/ process + product + choice questions 05	04	03	07	-	*	-	12	11	11	11	-	-	-	03	02	02	03	-	-	-	
102. % Self questions which were subject-matter related							81	64	63	82	-	-	-	86	83	84	85	-	-	-	
103. % Self questions related to personal preferences							27	32	31	29	-	-	-	36	44	31	49	-	-	-	
104. Opinion questions/ process + product + choice questions 05	06	05	08	-	**	-	12	10	12	10	-	-	-	05	05	03	07	-	**	-	
105. % Opinion questions given no feedback																					
106. % Opinion questions followed by praise							09	06	11	04	-	*	-								
107. % Opinion questions followed by teacher disagreement																					
108. % student opinions accepted 76	84	78	82	-	-	-	89	88	89	88	-	-	-	88	84	92	81	-	-	-	

Process Variables	Whole Class Interactions, Mornings							Whole Class Interactions, Afternoons							Reading Groups						
	Male Mean	Female Mean	High SES Mean	Low SES Mean	Probability Sex	SES	SexxSES	Male Mean	Female Mean	High SES Mean	Low SES Mean	Probability Sex	SES	SexxSES	Male Mean	Female Mean	High SES Mean	Low SES Mean	Probability Sex	SES	SexxSES
109. % student opinions integrated into discussion topic																					
N. Private Dyadic Contacts																					
110. % private contacts student initiated	32	40	36	37	**	-	-	33	41	37	38	**	-	-	30	37	34	33	*	-	-
111. Student initiated work contacts involving praise	03	03	03	03	-	-	-	04	05	03	06	-	**	-	02	03	03	02	-	-	-
112. Student initiated work contacts involving criticism	02	01	02	02	-	-	-	02	01	02	01	-	-	-	03	03	03	02	-	-	-
113. % of private work contacts student initiated	64	67	71	60	-	**	-	64	66	70	61	-	**	-	72	75	75	71	-	-	-
114. % student initiated contacts delayed	06	06	06	06	-	-	-	06	07	07	06	-	-	-	05	05	05	05	-	-	-
115. % student initiated contacts given brief feedback	41	45	49	38	-	**	-	46	45	51	41	-	**	-	55	56	60	51	-	*	-
116. % student initiated contacts given long feedback	18	17	17	18	-	-	-	13	16	14	15	-	-	-	15	14	12	17	-	-	-
117. % student initiated contacts involving personal concerns	29	27	22	34	-	**	-	31	29	26	34	-	*	-	24	17	20	21	*	-	-

Process Variables	Whole Class Interactions, Mornings							Whole Class Interactions, Afternoons							Reading Groups						
	Male Mean	Female Mean	High SES Mean	Low SES Mean	Probability Sex	SES	SexxSES	Male Mean	Female Mean	High SES Mean	Low SES Mean	Probability Sex	SES	SexxSES	Male Mean	Female Mean	High SES Mean	Low SES Mean	Probability Sex	SES	SexxSES
118. % student initiated requests granted																					
119. % student initiated requests delayed	09	08	09	08	-	-	-	07	10	10	07	-	-	-	07	08	07	09	-	-	-
120. % student initiated requests not granted																					
121. Private work contacts/ private work contacts + public response opportunities	46	51	46	51	-	-	-	55	58	56	56	-	-	-	26	29	31	24	-	-	-
122. Procedural contacts/ procedural contacts + response opportunities	53	52	46	59	-	**	-	61	60	58	63	-	-	-	27	26	28	26	-	-	-
123. Teacher initiated work contacts/ teacher initiated work + procedure contacts	43	46	48	41	-	-	-	42	46	44	43	-	-	-	04	06	05	05	-	-	-
124. Teacher initiated work contacts involving praise	07	12	13	07	-	**	-	09	10	10	10	-	-	-	07	04	09	02	-	**	-
125. Teacher initiated work contacts involving mere observation	09	10	11	07	-	-	-	05	06	07	05	-	-	-	64	69	63	71	-	-	-

Process Variables	Whole Class Interactions, Mornings							Whole Class Interactions, Afternoons							Reading Groups						
	Male Mean	Female Mean	High SES Mean	Low SES Mean	Probability Sex	SES	SexxSES	Male Mean	Female Mean	High SES Mean	Low SES Mean	Probability Sex	SES	SexxSES	Male Mean	Female Mean	High SES Mean	Low SES Mean	Probability Sex	SES	SexxSES
126. Teacher initiated work contacts involving brief feedback	56	54	56	54	-	-	-	64	62	67	59	-	-	-	29	26	28	27	-	-	-
127. Teacher initiated work contacts involving long feedback	33	35	31	37	-	-	-	27	32	26	32	-	-	-	93	93	93	93	-	-	-
128. % teacher initiated procedural contacts which were management requests	89	86	86	90	-	*	-	92	88	89	91	**	-	-	21	21	21	21	-	-	-
129. % teacher thanks student for doing a favor request															02	02	03	01	-	-	-
130. % teacher thanks student following a management request	06	06	02	10	-	*	-	03	03	03	03	-	-	-	82	80	87	75	-	*	-
0. Combined Teacher Evaluation Statements																					
131. Academic praise/ academic praise + academic criticism	81	84	87	78	-	*	-	75	79	80	74	-	-	-	07	05	09	03	-	-	-
132. Behavioral praise/ total behavioral contacts	06	09	10	05	-	-	-	09	09	13	06	-	-	-	73	69	71	71	-	-	-
133. Behavioral warnings/ behavioral warnings + behavioral criticism	70	72	72	70	-	-	-	73	62	68	66	*	-	-	08	08	06	10	-	-	-

Process Variables	Whole Class Interactions, Mornings							Whole Class Interactions, Afternoons							Reading Groups						
	Male Mean	Female Mean	High SES Mean	Low SES Mean	Probability Sex	SES	SexxSES	Male Mean	Female Mean	High SES Mean	Low SES Mean	Probability Sex	SES	SexxSES	Male Mean	Female Mean	High SES Mean	Low SES Mean	Probability Sex	SFS	SexxSES
P. Discipline and Control Errors																					
134. % discipline contacts involving one or more error	06	07	07	07	-	-	-	07	10	10	06	-	-	-							
135. Target errors/ total errors	23	39	36	27	-	-	-														
136. Timing errors/ total errors																					
137. Overreactions/ total errors								67	73	55	85	-	**	-							
138. Nonverbal control contacts/ total control contacts	13	09	11	11	-	-	-	12	10	11	11	-	-	-	19	10	19	11	*	-	-
Q. Combined Teacher Feedback Data																					
139. Repeat/ repeat + rephrase + new question	38	35	31	42	-	-	-	35	26	32	29	-	-	-	42	39	41	39	-	-	-
140. Rephrase/ repeat + rephrase + new question	48	55	52	52	-	-	-	50	63	51	63	-	-	-	50	57	52	56	-	-	-
141. Brief feedback/ brief + long feedback	64	64	66	65	-	-	-	71	68	72	67	-	-	-	73	75	74	74	-	-	-

Process Variables	Whole Class Interactions, Mornings: Male Mean	Female Mean	High SES Mean	Low SES Mean	Probability: Sex	SES	SexxSES	Whole Class Interactions, Afternoons: Male Mean	Female Mean	High SES Mean	Low SES Mean	Probability: Sex	SES	SexxSES	Reading Groups: Male Mean	Female Mean	High SES Mean	Low SES Mean	Probability: Sex	SES	SexxSES
R. Math Contacts																					
142. Total public math contacts/ total public math contacts + total private math contacts	48	44	48	43	-	-	-														
143. Total teacher initiated private math contacts/ total public math contacts + total private math contacts	29	29	31	28	-	-	-														
S. Personal Experience Sharing																					
144. % of CCC which are personal experience sharing	09	09	06	12	-	**	-	08	06	07	10	-	-	-	08	06	06	08	-	-	-
145. % of TAC which are personal experience sharing	04	05	03	05	-	-	-	04	03	02	05	-	*	-	03	05	05	03	-	-	-
I. Teacher Reaction to DK																					
146. Criticism																					
147. Failure to give feedback																					
148. Gives the answer																					
149. Calls on someone else																					

Process Variables	Whole Class Interactions, Mornings							Whole Class Interactions, Afternoons							Reading Groups						
	Male Mean	Female Mean	High SES Mean	Low SES Mean	Probability Sex	SES	SexxSES	Male Mean	Female Mean	High SES Mean	Low SES Mean	Probability Sex	SES	SexxSES	Male Mean	Female Mean	High SES Mean	Low SES Mean	Probability Sex	SES	SexxSES
150. Another child calls out the answer																					
151. Repeats, rephrases or asks new question																					
152. Repeats question																					
153. Rephrases or gives clue																					
154. Asks new question																					
II. Teacher Reaction to No Response																					
155. Criticism																					
156. Failure to give feedback																					
157. Gives the answer	06	10	13	03	-	*	*								06	09	09	06	-	-	-
158. Calls on someone else	47	56	46	57	-	-	-	48	44	59	34	*	**	-	47	47	58	37	-	**	-
159. Another student calls out															15	13	15	13	-	-	-
160. Repeats, rephrases or asks new question	32	24	33	23	-	-	-	37	42	34	45	-	-	-	26	31	18	39	-	**	-

Process Variables	Whole Class Interactions, Mornings: Male Mean	Female Mean	High SES Mean	Low SES Mean	Probability: Sex	SES	SexxSES	Whole Class Interactions, Afternoons: Male Mean	Female Mean	High SES Mean	Low SES Mean	Probability: Sex	SES	SexxSES	Reading Groups: Male Mean	Female Mean	High SES Mean	Low SES Mean	Probability: Sex	SES	SexxSES
161. Repeats	12	11	09	13	-	-	-								14	12	11	15	-	-	-
162. Rephrases or gives clue	13	10	15	08	-	-	-	13	15	16	12	-	-	-	12	17	07	22	-	**	-
163. Asks new question																					
V. Math Contacts																					
164. Total teacher-afforded math contacts/ total math time	14	11	13	12	-	-	-														
165. Total math response opportunities/ total math time	24	20	25	20	-	-	-														
W. Misc.																					
166. % relevant SIQ given no feedback																					
167. % opinion questions criticized																					
168. % opinion questions given no feedback																					
169. % behavioral praise after irrelevant SIC																					
X. Total Time Spent																					
170. Total R.O. (A.M.)/ total time	09	07	10	07	-	**	-	12	08	11	09	-	-	-	27	25	28	24	-	-	-

Process Variables	Whole Class Interactions, Mornings							Whole Class Interactions, Afternoons							Reading Groups						
	Male Mean	Female Mean	High SES Mean	Low SES Mean	Probability Sex	SES	SexxSES	Male Mean	Female Mean	High SES Mean	Low SES Mean	Probability Sex	SES	SexxSES	Male Mean	Female Mean	High SES Mean	Low SES Mean	Probability Sex	SES	SexxSES
171. Total TAC (A.M.)/ total time	11	09	10	09	*	-	-	22	13	20	15	*	-	-	13	10	13	09	-	-	-

No data appear when cell N's fell below 5 for a particular analysis. Means have been rounded to two decimal places, but decimals before the numbers in each mean have been omitted from the table.

* $p < .10$

** $p < .05$

Table 2

Group Means and Probability Data for Measures

Showing Significant ($p < .10$) Grade Differences in

One-way Analyses of Variance Comparing Grades Two and Three[1]

Process Variables	Context[2]	Means for Grades Two	Means for Grade Three	Probability
A. Selecting Respondents to Questions				
1. % preselects respondent before asking questions	AM	04	05	-
	PM	05	02	-
	RG	07	07	-
2. Calls on non-volunteer	AM	44	38	-
	PM	45	45	-
	RG	43	49	-
3. Calls on volunteer	AM	40	45	-
	PM	37	44	-
	RG	37	29	-
4. Student calls out answers	AM	13	12	-
	PM	13	10	-
	RG	14	15	-
B. Difficulty Level of Questions				
5. Process questions/process + product questions	AM	03	08	**
	PM	05	06	-
	RG	03	07	**
6. Choice questions/process + product + choice	AM	25	15	-
	PM	16	27	-
	RG	32	35	-
C. Quality of Children's Answers				
7. % correct	AM	77	77	-
	PM	78	76	-
	RG	79	77	-
8. % part-correct	AM	03	05	-
	PM	03	06	*
	RG	03	04	-

Table 2 continued:

Process Variables	Context[2]	Means for Grades Two	Means for Grade Three	Probability
9. % wrong	AM	13	11	-
	PM	12	11	-
	RG	12	12	-
10. % "don't know"	AM	<01	01	-
	PM	01	01	-
	RG	01	01	-
11. % no response	AM	07	06	-
	PM	06	06	-
	RG	05	06	-
D. Teacher Reactions to Correct Answers				
12. Praise	AM	14	10	-
	PM	12	10	-
	RG	13	09	-
13. Criticizing + Answer	AM	-	-	-
	PM	<01	<01	-
	RG	-	-	-
14. Failure to give feedback	AM	01	01	-
	PM	01	02	-
	RG	<01	02	-
15. Process feedback	AM	01	01	-
	PM	01	01	-
	RG	01	01	-
16. New question	AM	15	14	-
	PM	13	11	-
	RG	09	10	-
E. Teacher Reactions to Part-Correct Answers				
17. Praise	AM	-	-	-
	PM	-	-	-
	RG	-	-	-
18. Criticism	AM	-	-	-
	PM	-	-	-
	RG	-	-	-
19. Failure to give feedback	AM	-	-	-
	PM	-	-	-
	RG	-	-	-

Table 2 continued:

Process Variables	Context[2]	Means for Grades Two	Means for Grade Three	Probability
20. Process feedback	AM	–	–	–
	PM	02	03	–
	RG	–	–	–
21. Gives the answer	AM	17	14	–
	PM	13	11	–
	RG	15	20	–
22. Calls on someone else	AM	24	35	–
	PM	28	38	–
	RG	27	20	–
23. Another student calls out the answer	AM	–	–	–
	PM	–	–	–
	RG	51	50	–
24. Repeats, rephrases, or asks new question	AM	48	44	–
	PM	34	48	–
	RG	–	–	–
25. Repeats question	AM	19	10	–
	PM	06	09	–
	RG	17	16	–
26. Rephrases or gives clue	AM	18	32	–
	PM	34	23	–
	RG	29	27	–
27. Asks new question	AM	–	–	–
	PM	11	16	–
	RG	04	07	–
F. Teacher Reactions to Wrong Answers				
28. Praise	AM	–	–	–
	PM	–	–	–
	RG	–	–	–
29. Criticism	AM	–	–	–
	PM	03	02	–
	RG	01	09	*
30. Failure to give feedback	AM	02	02	–
	PM	–	–	–
	RG	–	–	–
31. Process feedback	AM	07	07	–
	PM	03	04	–
	RG	04	02	–

Table 2 continued:

Process Variables	Context[2]	Means for Grades Two	Means for Grade Three	Probability
32. Gives the answer	AM	08	16	**
	PM	10	17	-
	RG	16	25	-
33. Calls on someone else	AM	35	38	-
	PM	40	30	-
	RG	33	26	-
34. Another student calls out the answer	AM	05	04	-
	PM	-	-	-
	RG	07	01	**
35. Repeats, rephrases, or asks new question	AM	42	30	-
	PM	44	35	-
	RG	35	47	-
36. Repeats question	AM	12	13	-
	PM	12	11	-
	RG	13	18	-
37. Rephrases or gives clue	AM	24	15	-
	PM	29	20	-
	RG	21	24	-
38. Asks new question	AM	06	02	-
	PM	03	04	-
	RG	01	05	-
G. Teacher Reactions to "I Don't Know" or No Response				
39. Criticism	AM	-	-	-
	PM	03	02	-
	RG	-	-	-
40. Failure to give feedback	AM	-	-	-
	PM	-	-	-
	RG	-	-	-
41. Gives the answer	AM	10	07	-
	PM	06	02	-
	RG	09	10	-
42. Calls on someone else	AM	48	53	-
	PM	46	44	-
	RG	51	49	-
43. Another student calls out the answer	AM	06	07	-
	PM	08	03	-
	RG	12	08	-

Table 2 Continued:

Process Variables	Context[2]	Means for Grades Two	Means for Grade Three	Probability
44. Repeats, rephrases, or asks new question	AM	31	29	-
	PM	35	49	-
	RG	23	29	-
45. Repeats question	AM	14	10	-
	PM	21	18	-
	RG	11	14	-
46. Rephrases or gives clue	AM	11	14	-
	PM	12	23	-
	RG	10	15	-
47. Asks new question	AM	07	05	-
	PM	-	-	-
	RG	-	-	-
H. Teacher Reactions Combined across All Response Opportunities				
48. Praise	AM	11	08	-
	PM	10	08	-
	RG	11	07	-
49. Failure to give feedback	AM	01	01	-
	PM	01	01	-
	RG	01	02	-
50. Process feedback	AM	02	01	-
	PM	01	02	-
	RG	01	01	-
51. New question	AM	13	11	-
	PM	11	09	-
	RG	07	09	-
52. Repeat, rephrase, or ask new question after failure to answer	AM	42	33	-
	PM	42	42	-
	RG	35	41	-
53. Repeats question after failure to answer correctly	AM	03	03	-
	PM	04	03	-
	RG	03	04	-
54. Gives the answer after failure to answer correctly	AM	02	03	-
	PM	02	03	-
	RG	03	04	-
55. Calls on another student after failure to answer correctly	AM	08	09	-
	PM	09	09	-
	RG	08	08	-

Table 2 Continued:

Process Variables	Context[2]	Means for Grades Two	Means for Grade Three	Probability
56. Another student calls out answer after failure to answer correctly	AM	01	01	–
	PM	01	01	–
	RG	02	01	–
I. Student Response Opportunities				
57. Response opportunities/ total teaching time	AM	15	18	–
	PM	22	19	–
	RG	54	46	–
J. Student Initiated Questions (SIQ's)				
58. % SIQ's irrelevant	AM	–	–	–
	PM	–	–	–
	RG	–	–	–
59. % SIQ's called out	AM	79	70	–
	PM	71	64	–
	RG	78	59	–
60. Praise of question after relevant SIQ	AM	–	–	–
	PM	–	–	–
	RG	–	–	–
61. Criticism of question after relevant SIQ	AM	–	–	–
	PM	–	–	–
	RG	–	–	–
62. % relevant SIQ's delayed	AM	–	–	–
	PM	–	–	–
	RG	–	–	–
63. % relevant SIQ's not accepted	AM	–	–	–
	PM	07	07	–
	RG	–	–	–
64. % relevant SIQ's given brief feedback	AM	78	69	–
	PM	70	60	–
	RG	74	70	–
65. % relevant SIQ's given long feedback	AM	16	20	–
	PM	–	–	–
	RG	19	15	–
66. % relevant SIQ's re-directed to class	AM	–	–	–
	PM	–	–	–
	RG	–	–	–

Table 2 Continued:

Process Variables	Context[2]	Means for Grades Two	Means for Grade Three	Probability
67. Behavioral praise of relevant SIQ	AM	-	-	-
	PM	-	-	-
	RG	-	-	-
68. Behavioral criticism of relevant SIQ	AM	-	-	-
	PM	-	-	-
	RG	-	-	-
69. Behavioral warning after relevant SIQ	AM	-	-	-
	PM	-	-	-
	RG	-	-	-
70. Criticism of question after irrelevant SIQ	AM	-	-	-
	PM	-	-	-
	RG	-	-	-
71. % irrelevant SIQ given no feedback	AM	-	-	-
	PM	-	-	-
	RG	-	-	-
72. % irrelevant SIQ delayed	AM	-	-	-
	PM	-	-	-
	RG	-	-	-
73. % irrelevant SIQ given brief feedback	AM	-	-	-
	PM	-	-	-
	RG	-	-	-
74. % irrelevant SIQ given long feedback	AM	-	-	-
	PM	-	-	-
	RG	-	-	-
75. % irrelevant SIQ not accepted	AM	-	-	-
	PM	-	-	-
	RG	-	-	-
76. % irrelevant SIQ redirected to class	AM	-	-	-
	PM	-	-	-
	RG	-	-	-
77. Behavioral criticism after irrelevant SIQ	AM	-	-	-
	PM	-	-	-
	RG	-	-	-
78. Behavioral warning after irrelevant SIQ	AM	-	-	-
	PM	-	-	-
	RG	-	-	-

Table 2 Continued:

Process Variables	Context[2]	Means for Grades Two	Means for Grade Three	Probability
K. Student Initiated Public Interactions				
79. Student initiated comments and questions/total response opportunities	AM	11	13	–
	PM	14	17	–
	RG	08	10	–
L. Student Initiated Comments (SIC's)				
80. % SIC's relevant	AM	95	90	–
	PM	–	–	–
	RG	86	93	–
81. % SIC's called out	AM	69	77	–
	PM	70	66	–
	RG	77	71	–
82. Praise of comment after relevant SIC	AM	–	–	–
	PM	–	–	–
	RG	02	09	**
83. % relevant SIC's given no feedback	AM	–	–	–
	PM	06	06	–
	RG	03	09	–
84. % relevant SIC's delayed	AM	–	–	–
	PM	–	–	–
	RG	–	–	–
85. % relevant SIC's not accepted	AM	13	07	–
	PM	18	11	–
	RG	09	05	–
86. % relevant SIC's accepted	AM	78	77	–
	PM	62	67	–
	RG	75	75	–
87. % relevant SIC's integrated into discussion topic	AM	06	11	–
	PM	12	16	–
	RG	09	13	–
88. % relevant SIC's which cause a shift in topic	AM	–	–	–
	PM	–	–	–
	RG	–	–	–
89. Behavioral praise after relevant SIC's	AM	–	–	–
	PM	–	–	–
	RG	–	–	–
90. Behavioral criticism after relevant SIC's	AM	–	–	–
	PM	–	–	–
	RG	–	–	–

Table 2.Continued:—

Process Variables	Context[2]	Means for Grades Two	Means for Grade Three	Probability
91. Behavioral warning after relevant SIC's	AM	–	–	–
	PM	–	–	–
	RG	–	–	–
92. Praise of comment after irrelevant SIC's	AM	–	–	–
	PM	–	–	–
	RG	–	–	–
93. % irrelevant SIC's given no feedback	AM	–	–	–
	PM	–	–	–
	RG	39	20	–
94. % irrelevant SIC's delayed	AM	–	–	–
	PM	–	–	–
	RG	–	–	–
95. % irrelevant SIC's not accepted	AM	–	–	–
	PM	–	–	–
	RG	–	–	–
96. % irrelevant SIC's accepted	AM	–	–	–
	PM	–	–	–
	RG	42	64	–
97. % irrelevant SIC's integrated into discussion topic	AM	–	–	–
	PM	–	–	–
	RG	–	–	–
98. % irrelevant SIC's which cause a shift in topic	AM	–	–	–
	PM	–	–	–
	RG	–	–	–
99. Behavioral criticism after irrelevant SIC's	AM	–	–	–
	PM	–	–	–
	RG	–	–	–
100. Behavioral warning after irrelevant SIC's	AM	–	–	–
	PM	–	–	–
	RG	–	–	–
M. Self and Opinion Questions				
101. Self questions/process + product + choice questions + self	AM	09	13	–
	PM	16	19	–
	RG	04	09	–
102. % self questions which were subject-matter related	AM	71	75	–
	PM	70	67	–
	RG	77	75	–

Table 2 Continued:

	Process Variables	Context[2]	Means for Grades Two	Means for Grade Three	Probability
103.	% self questions related to personal preferences	AM	45	14	**
		PM	48	19	**
		RG	44	33	-
104.	Opinion questions/process + product + choice questions + opinion	AM	03	07	-
		PM	12	13	-
		RG	03	07	**
105.	% opinion questions given no feedback	AM	-	-	-
		PM	-	-	-
		RG	-	-	-
106.	% opinion questions followed by praise	AM	-	-	-
		PM	11	07	-
		RG	05	04	-
107.	% opinion questions followed by teacher disagreement	AM	09	04	-
		PM	-	-	-
		RG	-	-	-
108.	% student opinions accepted	AM	78	89	-
		PM	83	92	-
		RG	90	85	-
109.	% student opinions integrated into discussion topic	AM	-	-	-
		PM	-	-	-
		RG	-	-	-
	Private Dyadic Contacts				
110.	% private contacts student initiated	AM	40	31	**
		PM	40	36	-
		RG	34	32	-
111.	Student initiated work contacts involving praise	AM	02	04	**
		PM	04	05	-
		RG	02	02	-
112.	Student initiated work contacts involving criticism	AM	02	01	-
		PM	02	01	-
		RG	03	02	-
113.	% of private work contacts student initiated	AM	67	65	-
		PM	62	65	-
		RG	80	60	-
114.	% student initiated contacts delayed	AM	06	06	-
		PM	06	06	-
		RG	05	04	-

Table 2 Continued:

Process Variables	Context[2]	Means for Grades Two	Means for Grade Three	Probability
115. % student initiated contacts given brief feedback	AM	44	43	-
	PM	42	48	-
	RG	61	48	-
116. % student initiated contacts given long feedback	AM	18	17	-
	PM	15	13	-
	RG	16	08	-
117. % student initiated contacts involving personal concerns	AM	25	30	-
	PM	27	31	-
	RG	15	27	-
118. % student initiated requests granted	AM	-	-	-
	PM	-	-	-
	RG	-	-	-
119. % student initiated requests delayed	AM	08	08	-
	PM	07	10	-
	RG	08	07	-
120. % student initiated requests not granted	AM	-	-	-
	PM	-	-	-
	RG	-	-	-
121. Private work contacts/ private work contacts + public response opportunities	AM	47	49	-
	PM	54	61	-
	RG	25	28	-
122. Procedural contacts/ procedural contacts + public response opportunities	AM	52	50	-
	PM	61	61	-
	RG	22	30	-
123. Teacher initiated work contacts/teacher initiated work + procedure contacts	AM	43	50	-
	PM	37	49	-
	RG	44	46	-
124. Teacher initiated work contacts involving praise	AM	10	09	-
	PM	08	12	-
	RG	04	05	-
125. Teacher initiated work contacts involving mere observation	AM	08	11	-
	PM	05	07	-
	RG	05	06	*
126. Teacher initiated work contacts involving brief feedback	AM	56	54	-
	PM	61	66	-
	RG	67	67	-

Table 2 Continued:

Process Variables	Context[2]	Means for Grades Two	Means for Grade Three	Probability
127. Teacher initiated work contacts involving long feedback.	AM	33	34	-
	PM	26	26	-
	RG	28	26	-
128. % teacher initiated procedural contacts which were management requests	AM	138	86	-
	PM	91	90	-
	RG	92	95	-
129. % teacher thanks student for doing a favor request	AM	18	13	-
	PM	09	17	-
	RG	14	33	-
130. % teacher thanks student following a management request	AM	08	04	-
	PM	02	03	-
	RG	02	02	-
O. Combined Teacher Evaluation Statements				
131. Academic praise/academic praise + academic criticism	AM	82	86	-
	PM	79	81	-
	RG	82	75	-
132. Behavioral praise/total behavior contacts	AM	07	08	-
	PM	07	12	-
	RG	06	02	-
133. Behavioral warnings/ behavioral warnings + behavioral criticism	AM	64	76	-
	PM	70	70	-
	RG	62	79	-
P. Discipline and Control Errors				
134. % discipline contacts involving one or more errors	AM	05	09	-
	PM	07	08	-
	RG	06	10	-
135. Target errors/total errors	AM	31	28	-
	PM	22	14	-
	RG	-	-	-
136. Timing errors/total errors	AM	13	24	-
	PM	20	11	-
	RG	-	-	-
137. Overreactions/total errors	AM	56	46	-
	PM	58	68	-
	RG	67	67	-

Table 2 Continued:

	Process Variables	Context[2]	Means for Grades Two	Means for Grade Three	Probability
38.	Non-verbal control contacts/total control contacts	AM	17	06	**
		PM	15	08	**
		RG	17	14	-
	Combined Teacher Feedback Data				
39.	Repeat/repeat + rephrase + new question	AM	33	35	-
		PM	41	30	-
		RG	36	38	-
40.	Rephrase/repeat + rephrase + new question	AM	46	56	-
		PM	51	55	-
		RG	59	54	-
41.	Brief feedback/brief + long feedback	AM	65	63	-
		PM	68	73	-
		RG	73	76	-
	Math Contacts				
42.	Total public math contacts/ total public math contacts + total private math contacts	AM	43	53	-
		PM	-	-	-
		RG	-	-	-
43.	Total teacher initiated private math contacts/ total public math contacts + total private math contacts	AM	28	27	-
		PM	-	-	-
		RG	-	-	-
	Personal Experience Sharing				
44.	% of CCC which are personal experience sharing	AM	06	12	*
		PM	06	11	*
		RG	05	11	-
45.	% of TAC which are personal experience sharing	AM	03	04	-
		PM	06	03	-
		RG	02	04	-
	Teacher Reaction to Don't Know				
46.	Criticism	AM	-	-	-
		PM	-	-	-
		RG	-	-	-

Table 2 Continued:

Process Variables	Context[2]	Means for Grades Two	Means for Grade Three	Probability
147. Failure to give feedback	AM	-	-	-
	PM	-	-	-
	RG	-	-	-
148. Gives the answer	AM	-	-	-
	PM	-	-	-
	RG	-	-	-
149. Calls on someone else	AM	93	44	**
	PM	52	52	-
	RG	68	62	-
150. Another child calls out the answer	AM	-	-	-
	PM	-	-	-
	RG	-	-	-
151. Repeats, rephrases or asks new question	AM	07	41	-
	PM	-	-	-
	RG	-	-	-
152. Repeats question	AM	-	-	-
	PM	-	-	-
	RG	-	-	-
153. Rephrases or gives clue	AM	-	-	-
	PM	-	-	-
	RG	-	-	-
154. Asks new question	AM	-	-	-
	PM	-	-	-
	RG	-	-	-
Teacher Reaction to No Response				
155. Criticism	AM	-	-	-
	PM	-	-	-
	RG	-	-	-
156. Failure to give feedback	AM	-	-	-
	PM	-	-	-
	RG	-	-	-
157. Gives the answer	AM	11	07	-
	PM	-	-	-
	RG	09	07	-
158. Calls on someone else	AM	46	53	-
	PM	46	48	-
	RG	51	43	-

Table 2 Continued:

Process Variables	Context[2]	Means for Grades Two	Means for Grade Three	Probability
159. Another student calls out	AM	06	08	-
	PM	08	04	-
	RG	12	11	-
160. Repeats, rephrases, or asks new question	AM	32	29	-
	PM	37	43	-
	RG	24	34	**
161. Repeats	AM	14	09	-
	PM	22	20	-
	RG	12	19	-
162. Rephrases or gives clue	AM	11	15	-
	PM	12	14	-
	RG	11	15	-
163. Asks new question	AM	06	04	-
	PM	-	-	-
	RG	-	-	
V. Math Contacts				
164. Total teacher afforded math contacts/total math time	AM	26	22	-
	PM	-	-	-
	RG	-	-	-
165. Total math response opportunities/total math time	AM	45	44	-
	PM	-	-	-
	RG	-	-	-
VI. Miscellaneous				
166. % relevant SIQ given no feedback	AM	-	-	-
	PM	-	-	-
	RG	-	-	-
167. % opinion questions criticized	AM	-	-	-
	PM	-	-	-
	RG	-	-	-
168. % opinion questions given no feedback	AM	-	-	-
	PM	-	-	-
	RG	-	-	-
169. % behavioral praise after irrelevant SIC	AM	-	-	-
	PM	-	-	-
	RG	-	-	-

Table 2 Continued:

Process Variables	Context[2]	Means for Grades Two	Means for Grade Three	Probability
X. Total Time Spent				
170. Total response opportunities (AM)/total time	AM	15	18	-
	PM	22	19	-
	RG	54	46	-
171. Total teacher afforded contacts/total time	AM	17	23	*
	PM	40	37	-
	RG	17	23	-

[1] Decimals before each mean have been omitted from the table.

[2] The three contexts are indicated as follows: AM = whole class interactions in the mornings; PM = whole class interactions in the afternoons; and RG = reading group interactions.

* $p < .10$

* $p < .05$