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AUTHOR Morine-Dershimer, Greta
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ABSTRACT

Some results of a study of teacher preactive and interactive decision-making are presented. The paper focuses on teacher judgments and observations about the interactive behavior of other teachers. The teacher-judges viewed videotaped sequences of several lessons similar in content to lessons they themselves had just finished teaching. Patterns of teacher observation and preferences are reported and comparisons made to pupil observations based on viewing the same videotaped lesson segments. The study indicates that there are statistically significant differences in the kinds of comments made by teachers of high and low pupil gain scores, that teachers as a whole seem to attend to relevant aspects of a given lesson and respond differently when observing different teaching procedures, that individual teachers respond differentially to the same lesson, and that pupils are attentive to different aspects of lessons than their teachers. (RC)

TEACHER JUDGMENTS AND PUPIL OBSERVATIONS:

BEAUTY IN THE EYE OF THE BEHOLDER

Greta Morine-Dershimer

Far West Laboratory
and
San Jose State University
Teacher Corps Project

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Teacher Judgments and Pupil Observations: Beauty in the Eye of the Beholder

Greta Morine-Dershimer

The data to be reported in this paper form one small part of a larger study on Teacher and Pupil Perceptions of Classroom Interaction,* which was in turn a part of the larger Beginning Teacher Evaluation Study funded by the California State Commission on Teacher Preparation and Licensing, and directed by David Berliner at the Far West Laboratory. The Beginning Teacher Evaluation was designed to generate new and promising variables for further study of teaching effectiveness. The study of Teacher and Pupil Perceptions of Classroom Interaction was built on the premise that the two major participants in classroom interaction - the teacher and the pupil - were an important source of information that had not been fully tapped. We elected, therefore, to gather data from those participants in order to identify new and promising variables related to teaching effectiveness. The final report identifies several such variables.

Subjects

The subjects of the study were forty classroom teachers located in four different sections of California. There were twenty second grade teachers and twenty fifth grade teachers, who were selected from a group of two hundred volunteer teachers to represent a geographic range, to provide a distribution in terms of pupil ability, to include a variety of teaching styles, and most importantly, to provide differences in pupil gain scores resulting from special two-week units of instruction in reading and mathematics. At each grade level our subjects included ten teachers with high average pupil gain scores and ten teachers with low average pupil gain scores on these instructional units.

Within the classroom of each of the forty teacher subjects, a group of twelve pupils was identified. These pupils formed a randomly selected

*Greta Morine and Elizabeth Vallance, Teacher and Pupil Perceptions of Classroom Interaction, Beginning Teacher Evaluation Study Technical Report #75-11-6, San Francisco, Far West Laboratory, 1975.

stratified sample of the total classroom, based on reading achievement s es. These twelve pupils formed a group to whom teachers taught two lessons f the teacher-pupil perceptions - one lesson in reading, and one in math.

A second pupil sample, which was a subset of the first, were pupils with whom small group interviews were held to gather information about what pupils observed teachers doing. Briefly, a random selection was made of pupils from participating classrooms within the Bay Area to set up six groups of four pupils each. At second grade there was a group of four low achievers in reading, a group of four middle achievers, and a group of four high achievers. This was repeated at fifth grade. Within each group of four there were pupils from different school systems and different classrooms.

Procedures

The two tasks within the study on which this paper will concentrate are the Teacher Judgment Task and a corollary activity of pupils that was part of the Pupil Concepts of Teaching Task. These tasks were designed to answer the following kinds of questions:

1. What types of things do teachers perceive when they observe other teachers engaged in classroom interaction? What judgments do they make about appropriateness of teaching moves in various types of situations? On what do they base these judgments? Can teachers be differentiated on this basis? If so, are these differences related to teacher differences in pupil gain scores?
2. What kinds of teaching behavior are salient to pupils? How do pupils interpret or conceptualize this behavior? Can pupils be differentiated on this basis? If so, are these differences related to pupil achievement and/or grade level?

Teachers were given sample curriculum materials on a mathematical system called a lattice (see Appendix), and asked to plan a lesson that would be appropriate for their pupils. This lesson was observed and audiotaped. When the lesson was completed, the teacher was interviewed, and the interview consisted of three basic tasks.

The Teacher Judgment Task provided an opportunity for teachers to view other teachers teaching the same kind of content that they themselves had just taught. A videotape was shown to the teachers, presenting segments of five different lattice lessons, taught to small groups of pupils from grades two, four and five.

Variation in Lessons Viewed. The lessons were varied in a number of different ways. In Lesson One a group of fifth graders "invented" their own problems, while the teacher wrote them on the board, organizing them according to type of operation. The teacher accepted all pupil ideas. In Lesson Two a group of second graders also invented their own problems, but they themselves drew arrows on a large chart in order to show their problems to the rest of the class. The teacher frequently redrew these arrows to make them larger or straighter. In Lesson Three the teacher used an inductive discovery method to lead a group of fourth grade students to realize that alternating arrows cancelled each other. A series of problems with alternating arrows were written on the board. When pupils made an error the problem was "saved" for them to answer later, and the teacher wrote the pupil's initial next to the problem as a reminder. In Lesson Four a second grade group used individual worksheets to draw arrows and find answers to problems posed verbally by the teacher. The teacher held a large paper arrow and demonstrated problems with this arrow and a number chart. No problems were written down. This teacher used a great deal of positive reinforcement. When a pupil gave an incorrect answer other pupils were invited to help in arriving at the correct answer. In Lesson Five a fifth grade group worked individually to place a geometric figure on a lattice according to a "code" (problem) that described the figure and its placement. When a pupil had difficulty the teacher gave additional directions so that the pupil could solve the problem alone.

Content focus of the lessons varied as well. Lessons One and Three (with fifth and fourth graders) dealt with the mathematical properties of the lattice (what operations were possible; how reciprocal operations functioned). Lessons Two and Four (with second graders) focused on the numerical value of the arrows (↑ = +10, ↓ = -10). Lesson Five (with fifth graders) presented the lattice as an arrangement in space, and related it to geometry.

Teacher Interviews. After each lesson sequence the interviewer stopped the videotape and asked the following questions:

a. What do you notice about this teacher's general approach to the lattice lesson?

b. Which specific teaching procedures in this lesson seem particularly appropriate to you?

c. Were there any specific teaching procedures in this lesson that seemed inappropriate to you? Why?

After all sequences had been observed and commented upon in this manner, the interviewer asked for comparisons of the lessons, with regard to whether some lessons seemed more interesting or more successful than the others; whether there were any differences in the way the various teachers reacted to pupil errors; and whether there were any differences in the way the various teachers personalized the lesson or seemed to deal with pupil feelings. Teacher responses to these questions were audiotaped for later coding.

Pupil Interviews. At a later point in time the small groups of four pupils each were shown two of these same five videotaped lessons. The pupils were told:

> A few weeks ago you had a lesson about a lattice. Do you remember the lattice? Here is what it looked like. Here are some problems on the lattice. Do you remember how to do them? .... Good. You remembered a lot. Well, we're going to look at some videotapes of teachers teaching a lesson on the lattice. First we'll look at a fourth grade group, then at a second grade group. We'll just see part of each lesson. After each lesson I'm going to ask you what you noticed that teacher doing.

Two videotaped segments were played and after each segment pupils were asked what they had seen, and their comments were written down on chart paper. As they watched the videotapes pupils were very attentive to the lessons, calling out answers to the problems being posed to the videotaped class, and checking the accuracy of their answers.

Analysis of Data. The responses of teachers and pupils to these tasks were coded through use of a basic category system that was developed to reflect the comments made (that is, it was not a preconceived category system) and to compare responses across several tasks in the teacher-pupil perception study. Table 1 shows the five major categories in this system, as well as the sub-categories, and notes the pattern of responses from one task to another. In addition to this basic category system a task-specific category system was developed to reflect particular aspects of the Teacher Judgment Task. The task-specific categories are presented in Chart 1.

Tests of Interviewer Influence. Each teacher was interviewed twice by one interviewer. All interviewers had been trained together, but since the interview schedule was rather openended and invited probing questions by the interviewer, a check was made to determine whether the frequency of teacher

response varied systematically according to interviewer. Each interviewer worked with a different group of teachers. For the Teacher Judgment Task, the total number of types of judgments that teachers made (categories mentioned) was compared by interviewer. Using a one-way analysis of variance, it was found that interviewers were not significantly different in the frequency of teacher responses they obtained for the various tasks.

Table 1

Basic Category System

A Comparison of Category Use in Relation to Various Tasks

	Teacher Judgment	Stimulated Recall	Pupil Concepts of Teaching
General Approach			
A. Goals	x	x	o
B. Instructional Strategy	x	x	x
C. Sequence of Procedures	x	x	o
D. Teacher vs. Pupil Structure	x	x	x
E. Teacher Activity	x	x	x
F. Pupil Activity	x	x	x
G. Management/Control	x	x	x
H. Seating Arrangement	x	x	o
I. Size, Composition of Group	x	x	x
J. Pupil Outcomes	o	o	o
K. Teacher Style	x	x	o
II. Materials			
A. Preparation of Materials	x	o	x
B. Type of Materials	x	x	x
C. Teacher Use of Materials	x	x	x
D. Pupil Use of Materials	x	x	x
III. Cognitive Aspects			
A. Teacher Introduction	x	x	x
B. Teacher Directions	o	x	x
C. Teacher Questioning	x	x	x
D. Teacher Selection of Pupils for Discussion	o	x	x
E. Teacher Wait for Response	x	x	x
F. Teacher Explanation	x	x	x
G. Teacher Response to Right/Wrong Answers	x	x	x
H. Teacher Summary and Review of Lesson	o	x	x
I. Vocabulary	x	x	x
J. Content Focus	x	x	x
K. Data (selection, organization, amount)	x	x	x
L. Pacing/Time	o	x	x
M. Pupil Ability	x	x	x
N. Pupil Background, Preparation, Needs	o	x	o
O. Pupil Ideas	o	x	o
P. Pupil Learning	o	x	x
IV. Affective Aspects			
A. Teacher Enthusiasm	x	o	x
B. Teacher Attitude Toward Pupils	x	x	x
C. Teacher Use of Positive Reinforcement	o	x	x
D. Teacher Language	o	x	o
E. Pupil Participation/Attention	x	x	x
F. Pupil Behavior	o	x	x
G. Pupil Feelings	o	x	o
H. Teacher Image	o	x	o
V. Physical Aspects			
A. Pupil Comfort	o	x	o
B. Teacher/Pupil Movement	x	x	x
C. Teacher/Pupil Proximity	x	o	o
D. Visual/Auditory	x	x	x
E. Classroom as a Whole	x	o	x
F. Non-verbal Communication	o	x	o

CHART I

Task-Specific Categories

Teacher Judgment Task

Judgmental/Factual

+ - judged appropriate

-- - judged inappropriate

0 - neutral or factual observation

"Interference"

Ø - inaccurate observation

M - unusual interpretation

? - uncertainty

Makes Comparisons

E - compares to own teaching situation

T - compares to other taped teachers

Universal/Situational

C - categorical rule proclaimed

S - appropriateness is situational

I - indicates doesn't have all necessary information to verify or make judgment

Curiosity

Q - wants to know more about a procedure

N - notes it's a new idea

U - unexpectedness - shows surpris at an event

Considers Alternatives

A - proposes alternative procedur

R - revises earlier judgment

Generalizations About Teachers - makes statements (without probing) that synthesize observations, noting similarities and differences among the group of teachers on videotape, or noting similarities and differences among teachers in general.

Witholding Judgment - a score obtained by summing the neutral or factual observations (0), the comments indicating that appropriateness is situational (S) the indications that information is lacking (I), and the instances of revising an earlier judgment (R).

Findings

Briefly most of the findings on the Teacher Judgment Task are contained in Table 2. There were several statistically significant differences between teachers of high and low average pupil gain scores. Fifth grade teachers with high pupil gain scores noted more frequently that they needed more information in order to make a judgment, and were less apt to make categorical as opposed to situational comments (a situational comment was one like, "well, that might work well with second grade children"). Second grade teachers with high pupil gain scores were more apt to note an idea or technique that was new and interesting. The original expectation was that this might be a rough measure of curiosity, but as the table indicates, there were very few instances of this type of response. Teachers at both grade levels with high pupil gain scores more frequently made comparisons between themselves and the teachers they viewed on videotape. The teachers were invited in the directions to make comparisons among the teachers on videotape, but they tended instead to draw comparisons to themselves.

Tables 3 and 4 show statistically significant differences arising from teachers' summary judgments. That is, at the end of viewing all five lessons, teachers were asked among other things which lessons were most appropriate with regard to teacher responses to pupil errors. Two lessons stood out here. In Lesson 2 a second grade teacher said "good" very frequently and very sweetly but corrected almost every pupil answer in one way or another, even to the point of redrawing their arrows for them to make them straighter or darker. In Lesson 3 a fourth grade teacher said "No" when a child was wrong, then initialled the problem to save it for that child, going on meanwhile to other similar problems that would assist the child in solving his problem. Teachers with high pupil gain scores were more apt to judge Lesson 2 negatively. Teachers with low pupil gain scores were more apt to judge Lesson 3 negatively. It was from this result that the subtitle for this paper was drawn -- "Beauty in the Eye of the Beholder" -- for to this investigator Lesson 3 was indeed beautiful, but to eleven classroom teachers it was seriously lacking in some essential ingredient.

TABLE 2

COMPARISON OF MEANS BY PUPIL GAIN SCORE

	Second Grade		Fifth Grade		Combined	
	High Pupil Gain Scores (N=5)	Low Pupil Gain Scores (N=10)	High Pupil Gain Scores (N=9)	Low Pupil Gain Scores (N=9)	High Pupil Gain Scores (N=14)	Low Pupil Gain Scores (N=19)
Noted Needed More Information Before Making Judgment	2.4	3.6	3.9	1.7**	3.4	2.7
Noted An Idea or Technique that was New and Interesting	.8	.1*	.2	.2	.4	.2
Made Categorical vs Situational Comments	6.0	5.0	4.8	7.5*	5.2	6.2
Compared Taped Teachers to Self	7.4	3.9	5.0	3.6	5.9	3.7**

* t-test of significance, $p < .05$, df=14 (2nd grade) and 17 (5th grade)

** T-test of significance, $p < .10$, df=17 (5th grade) and 32(combined)

TABLE 3

JUDGMENTS ON TEACHER RESPONSE TO PUPIL ERRORS:

Lesson 2 - Teacher Corrects Pupils Frequently (2nd grade)

	Judged Negatively	Didn't Judge Negatively
High Pupil Gain Scores	7	7
Low Pupil Gain Scores	2	17

Fisher's Test of Exact Probability, $p = .0191$

TABLE 4

JUDGMENTS ON TEACHER RESPONSE TO PUPIL ERRORS:

Lesson 3 - Teacher Saves Problem for Pupil to Correct Own Error (4th grade)

	Judged Negatively	Didn't Judge Negatively
High Pupil Gain Scores	4	10
Low Pupil Gain Scores	11	8

$X^2 = 3.05$, $p < .10$

Now, how do these teacher responses relate to pupil responses to two of the same videotaped lessons? First, it's important to note that the pupils were not asked to make judgments about appropriateness of teacher behavior. They were merely asked, "what did you see the teacher doing?" The important finding for purposes of this study was that pupils of all grade levels and ability groups tended to comment most frequently on Teacher Responses to Right/Wrong Answers and on Data Selection (that is, what kinds of problems teachers gave pupils to solve, and in what order the problems were presented). The pattern of pupil responses was clearly not random, according to a Chi-square test of significance, with $p < .01$. As regards the major categories, pupils focused on cognitive aspects of the lesson much more than any other aspect, and this was true for all ability groups, though the middle achievers tended to be the leaders here.

Interestingly enough, pupils concentrated on cognitive aspects of the lesson even more than teachers. Two-thirds of pupil comments, as compared with less than one-half of teacher comments, related to cognitive aspects they observed. Also of interest was the fact that there were no statistically significant differences between teachers of high and low pupil gain scores with regard to how frequently they referred to cognitive aspects of the lessons they observed.

Variation in Teacher Response by Lesson

The information presented here so far is all contained in the final report of the Study on Teacher and Pupil Perceptions of Classroom Interactions. But this paper provided an opportunity to do some further analysis of responses to the Teacher Judgment Task. The intriguing question that led to this further analysis was whether teachers responded very differently to the five individual lessons, for the teaching in these lessons was quite varied. The differences in negative responses to Lessons 2 and 3, which was mentioned earlier, suggested that other differences might well exist. For this paper, the areas were selected where statistically significant differences were found between responses of teachers with high and low pupil gain scores, and teacher responses in these instances have been separated according to lesson. No tests of significance have been made of this data, it is presented here merely as descriptive of variations in teacher response.

Table 5 shows teacher fluency, or number of coded comments about the videotaped lessons. Actually there were no statistically significant differences

between teachers of high and low pupil gain scores on the number of total comments made. But fluency did differ from lesson to lesson, so it has been included here. Note that the overall means resemble a bell curve as responses move across lessons, with frequency of comments increasing markedly for the third lesson. This pattern is repeated for fifth grade teachers, for second grade teachers, and for teachers with high pupil gain scores, but teachers with low pupil gain scores have frequencies that look more like a flat plain interrupted by a mountain peak. It is not clear whether this difference in number of comments elicited by a lesson is a function of the lesson itself, or of teachers warming to the task, then tiring out. Hopefully, another time the order in which teachers view the lessons can be varied in order to answer that question.

Table 6 shows the general focus that teacher comments took in terms of the basic category system. It is apparent that not all teachers had a focus in Lessons 1, 2, 4, and 5. That is, several teachers in those lessons made one or two comments in each category, but had no concentration of comments within a category area. Lesson 3 stands out because of the large number of teachers who had a cognitive focus to their responses, as well as the fact that one-third of the teachers commented frequently on General Approach. Cognitive focus was present to a lesser degree in Lessons 1, 2, and 5, but not in Lesson 4. Lessons 2 and 4 were the only ones in which teachers focused their comments on instructional materials. These were the two second grade lessons. Again the general pattern of responses is repeated fairly consistently for each subgroup, fifth grade, second grade, and teachers with high and low pupil gain scores. What this table strongly suggests is that teachers did respond differently to the different lessons -- they focused on different aspects, they viewed the lessons differently, and they were alert to relevant teacher behaviors in each lesson.

TABLE 5

FLUENCY BY LESSON

	1	2	3	4	5	Total
Overall Results (N=33)						
Total Comments	136	170	264	161	145	878
Means	4.12	5.15	8.00	4.88	4.39	26.67
Range	1-8	2-9	3-15	2-8	1-11	14-50
Fifth Grade (N=18)						
Totals	77	92	136	81	79	466
Means	4.28	5.11	7.55	4.50	4.39	25.89
Second Grade (N=15)						
Totals	59	78	128	80	66	412
Means	3.93	5.20	8.53	5.33	4.40	27.47
High Pupil Gain Score (N=14)						
Totals	58	76	124	76	60	395
Means	4.14	5.43	8.86	5.43	4.29	28.21
Low Pupil Gain Score (N=19)						
Totals	78	94	140	85	85	483
Means	4.11	4.95	7.37	4.47	4.47	25.42

TABLE 6

NUMBER OF TEACHERS SHOWING A GENERAL FOCUS BY LESSON

(Category Emphasis)

	1	2	3	4	5	Total
Overall Results (N=33)						
General Approach	4	4	11	0	2	21
Materials	0	3	0	4	0	7
Cognitive Aspects	12	11	28	4	11	66
Fifth Grade (N=18)						
General Approach	3	2	6	0	2	13
Materials	0	1	0	3	0	4
Cognitive Aspects	6	6	15	1	6	34
Second Grade (N=15)						
General Approach	1	2	5	0	0	8
Materials	0	2	0	1	0	3
Cognitive Aspects	6	5	13	3	5	32
High Pupil Gain Scores (N=14)						
General Approach	0	2	5	0	1	8
Materials	0	1	0	3	0	4
Cognitive Aspects	6	4	14	2	5	31
Low Pupil Gain Scores (N=19)						
General Approach	4	2	6	0	1	13
Materials	0	2	0	1	0	3
Cognitive Aspects	8	7	14	2	6	37

This becomes even more apparent from Table 7 which presents the clustering of teacher comments by subcategory. Only the subcategories which received special attention from teachers have been included here. A cluster (or an x on this chart) means that over half of the teachers in a subgroup, such as second grade teachers with high pupil gain scores, commented on this particular subcategory in relation to a specific lesson. The left hand columns here show shifting focus by lesson. Lesson 1 gathered comments about Instructional Strategy, and nothing else. Lesson 2 had single clusters for Instructional Strategy, Pupil Use of Materials, Teacher Response to Right/Wrong Answers, and Content Focus, with a double cluster for Type of Materials, which resulted from teachers commenting on the large chart the teacher had made. Again Lesson 3 stands out. (This was the inductive discovery lesson on alternating arrows, where the teacher saved the problem for the child who made an error). Here there are heavy clusters of comments on Instructional Strategy, Teacher Response to Right/Wrong Answers, Data Selection, and Pupil Learning. In Lesson 4, where pupils worked with individual lattices, the focus of comments was on Pupil Use of Materials.

When specific focus is examined by teacher group in the right hand columns, a few differences are apparent. Fifth grade teachers were more apt to focus on Pupil Use of Materials and Teacher Response to Right/Wrong Answers. Second grade teachers were more apt to focus on Pupil Learning. Teachers with high pupil gain scores were more apt to focus on Teacher Response to Right/Wrong Answers, on Data Selection, and on Pupil Learning. Teachers with low pupil gain scores were more apt to comment on Content Focus of the Lesson. This latter difference is an interesting one, and one that should be worth pursuing further.

Table 8 shows a breakdown of positive and negative judgments by lesson. Here the overall means show Lesson 4 receiving the most positive comments, while Lesson 3 receives the most negative comments. Across the five lessons teachers tended to make more positive than negative comments. This overall pattern is pretty much repeated by fifth grade teachers and by teachers with low pupil gain scores, but the other two groups break the mold to some degree. Second grade teachers are somewhat more negative about both Lessons 2 and 3 than are the fifth grade teachers. Teachers with high pupil gain scores are more negative about Lesson 2 and more positive about Lesson 3 than are teachers with low pupil gain scores. Again there is an indication that teachers as a

TABLE 7

SPECIFIC FOCUS

CLUSTERING OF CATEGORIES

Focus By Lesson						Focus By Group			
1	2	3	4	5	Specific Categories	Fifth Grade	Second Grade	High Gain	Low Gain
					General Approach				
XX		XX			Instructional	XX	XX	XX	XX
XX	X	XX			Strategy	XX	XXX	XX	XXX
					Materials				
				X	Preparation of		X	X	
	XX		X	X	Type of	X	XXX	XX	XX
			X			XX			
	X		XX	XX	Pupil Use of	XXX	X	XXX	XXX
					Cognitive Aspects				
				X	T. Directions		X	X	
		X			T. Explanation		X		X
		XXX				XXX	XX	XXX	XX
		XXX			T. Response to				
	X	XXXX			R/W	XXXX	XX	XXXX	XX
	X	X	X	X	Content Focus	XXX	X	X	XXX
		XXXXX			Data Selection	XX	XXX	XXXX	X
		X			Pacing/Time		X	X	
		XXXXX		X	Pupil Learning	X	XXXXX	XXXX	XX
					Affective Aspects				
		X			Pupil Participation		X	X	

TABLE 8

POSITIVE-NEGATIVE JUDGMENTS

MEAN SCORES BY LESSON

	1	2	3	4	5	Total
Overall Results (N=33)						
Positive	1.88	1.94	2.61	3.24	2.76	12.42
Negative	1.00	2.03	3.85	.76	.76	8.40
Neutral	1.27	1.18	1.58	.88	.79	5.70
Fifth Grade (N=18)						
Positive	1.94	2.00	2.61	3.33	2.61	12.50
Negative	1.22	1.72	3.33	.50	.61	7.39
Neutral	1.17	1.39	1.61	.67	1.00	5.83
Second Grade (N=15)						
Positive	1.80	1.87	2.60	3.13	2.93	12.33
Negative	.73	2.40	4.47	1.07	.93	9.60
Neutral	1.40	.93	1.53	1.13	.53	5.53
High Gains (N=14)						
Positive	1.71	1.71	3.21	3.21	2.79	12.64
Negative	1.21	2.64	3.86	1.00	.79	9.50
Neutral	1.29	1.07	1.79	1.21	.71	6.07
Low Gains (N=19)						
Positive	2.00	2.11	2.16	3.26	2.74	12.79
Negative	.84	1.58	3.84	.59	.74	7.58
Neutral	1.26	1.26	1.42	.63	.84	5.42

whole responded differently to the teaching procedures they observed in the various lessons, and that individual teachers responded differently from each other.

Table 9 shows the specific focus of teachers' positive and negative judgments. Note that in Lesson 3, which is the only lesson to draw clusters of negative comments, the categories of Teacher Response to Right/Wrong Answers and Data Selection collect clusters of both positive and negative responses. The reader may recall that these two categories were also the ones that pupils focused on in viewing this videotape -- but pupil comments were generally neutral. Again we have an indication that both pupils and teachers perceive relevant aspects of a given lesson, but may respond differently in judging the appropriateness of the teaching behavior they observe.

Table 10 indicates the number of teacher comments to the effect that appropriateness of behavior is situational, or that more information is needed to make a judgment of appropriateness. It is apparent from the small means when these are broken down by lesson, that these kinds of comments were not particularly frequent. Lesson 3 gathers the largest number of informational comments. One strong impression resulting from this lesson by lesson analysis might well be that inductive discovery techniques like those used in Lesson 3 are not well understood by the teachers who were interviewed. It's encouraging that some of them were aware that they needed more information about this strategy. One particularly interesting item in this table is that fifth grade teachers made more situational comments about Lessons 2 and 4, which were the second grade lessons, while second grade teachers made the most situational comments about Lessons 1 and 3, which were fifth and fourth grade lessons. That is, teachers were apparently willing to say, "well, that may work in that situation" when they were talking about a grade level other than their own, but not so willing to make such comments about teachers on their own grade level.

Table 11 shows teacher comparisons lesson by lesson. It seems clear that teachers as a whole were more apt to draw comparisons between themselves and a given videotaped teacher than they were to compare one videotaped teacher to another. Of course in Lesson 1, comparisons to self were the only kind to be made, since only one videotaped teacher had been seen. It is also clear that self-comparative statements dropped off slowly, lesson by lesson. Could this mean perhaps that as teachers saw more examples of varied ways of approaching the lessons, they felt less defensive about the procedure they themselves had

TABLE 9

SPECIFIC FOCUS OF JUDGMENTS

Positive Judgments

Focus by Lesson						Focus by Group			
1	2	3	4	5	Specific Categories	Fifth Grade	Second Grade	High Gain	Low Gain
					General Approach				
X					Instructional	X	XX	XX	X
XX					Strategy				
					Materials				
X					Type of		X	X	
			XXX	XX	Pupil Use of	XXXX	X	XX	XXX
					Cognitive Aspects				
		XX						X	
		XX			T. Response to R/W	XX	XX	XX	X
		XX			Data Selection	X	X	X	X
					Affective				
		X			Pupil Participation		X	X	

Negative Judgments

Focus by Lesson						Focus by Group			
1	2	3	4	5		Fifth Grade	Second Grade	High Gain	Low Gain
					Cognitive Aspects				
		X							
		XX			T. Response to R/W	XX	X	X	XX
		X			Data Selection	X		X	
		X			Pupil Learning		X		X

TABLE 10

SITUATIONAL-INFORMATION COMMENTS

MEAN SCORES BY LESSON

	1	2	3	4	5	Total
Overall Results (N=33)						
Situational	.52	.58	.61	.55	.33	2.58
Informational	.42	.61	.91	.52	.55	3.00
Fifth Grade (N=18)						
Situational	.11	.83	.39	.67	.28	2.28
Informational	.33	.61	.72	.39	.78	2.61
Second Grade (N=15)						
Situational	1.00	.27	.89	.40	.40	3.07
Informational	.53	.53	1.13	.67	.27	3.20
High Gains (N=14)						
Situational	.43	.86	.71	.93	.29	3.21
Informational	.50	.71	.93	.64	.57	3.07
Low Gains (N=19)						
Situational	.58	.37	.53	.26	.37	2.21
Informational	.37	.53	.89	.42	.53	2.74

TABLE 11

COMPARISONS TO SELF AND TAPED TEACHERS

MEAN SCORES BY LESSON

	1	2	3	4	5	Total
Overall Results (N=33)						
Self	1.30	1.15	1.09	.55	.55	4.64
Tapes	.00	.73	.76	.67	.39	2.58
Fifth Grade (N=18)						
Self	1.28	.78	1.28	.33	.61	4.28
Tapes	.00	.94	.78	.67	.50	2.89
Second Grade (N=15)						
Self	1.33	1.60	.87	.80	.47	5.07
Tapes	.00	.47	.73	.67	.27	2.20
High Gains (N=14)						
Self	1.50	1.43	1.79	.79	.79	6.29
Tapes	.00	.93	.71	.93	.38	2.93
Low Gains (N=19)						
Self	1.16	.95	.58	.37	.37	3.42
Tapes	.00	.58	.79	.47	.42	2.32

selected, and thus had less need to compare themselves to the videotape? This would be another interesting question to pursue further.

Summary

To summarize briefly, the study of Teacher Judgments which was embedded in the larger study of Teacher and Pupil Perceptions of Classroom Interaction indicates that there are statistically significant differences in the kinds of comments made by teachers of high and low pupil gain scores, that teachers as a whole seem to attend to relevant aspects of a given lesson and respond differently when observing different teaching procedures, that individual teachers respond differentially to the same lesson, and that pupils are attentive to different aspects of lessons than their teachers. What is "beautiful" to one teacher may not be beautiful to another. To this researcher those differences in perception are very interesting. Hopefully, with further study we can learn enough to make that information useful for teacher training, as well as interesting for educational research.

APPENDIX

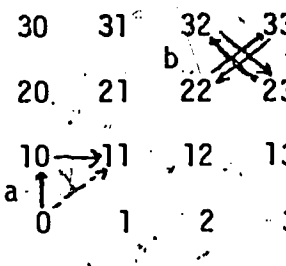
Instructions to Teachers: Using the Lattice (Mathematical Operations)

In this lesson you will be working with a simple mathematical system known as a lattice. The lattice consists of an arrangement of whole numbers in a way that can be used to perform (and demonstrate) many different kinds of mathematical operations. A lattice of the numbers 0-99, arranged in tens, is shown below.

90	91	92	93	94	95	96	97	98	99
80	81	82	83	84	85	86	87	88	89
70	71	72	73	74	75	76	77	78	79
60	61	62	63	64	65	66	67	68	69
50	51	52	53	54	55	56	57	58	59
40	41	42	43	44	45	46	47	48	49
30	31	32	33	34	35	36	37	38	39
20	21	22	23	24	25	26	27	28	29
10	11	12	13	14	15	16	17	18	19
0	1	2	3	4	5	6	7	8	9

The lattice may include more or fewer numbers than the one shown here, and can be arranged in fives or in other groups as well. Generally we have found the tens grouping to be the clearest and easiest to use, particularly for teachers and pupils not familiar with it. An array of 0-49 seems to be the smallest-sized lattice that still allows enough leeway for experimenting with very different kinds of problems.

The lattice is used to demonstrate the relationships between numbers and the operations performed on them by using arrows which trace a path of moves from one number to another. Thus, in the partial lattice below



the solid arrows in group a show the move from 0 to 10 and from there to 11. The dotted arrow shows the move directly from 0 to 11. An unlimited number of arrows can connect numbers in more and less complicated paths. The important characteristics of the arrows are that a sideways move (right or left one space) produces a change of plus or minus 1, and a vertical move (up or down) produces a change of plus or minus 10. Diagonal arrows (in any of four directions: see group b in the small lattice above) produce a change of plus or minus 11 (10 ↗ = 21; 21 ↙ = 10) or plus or minus 9 (10 ↘ = 1 ; 1 ↖ = 10). Opposite arrows "cancel" each other (10 ↑↓ = 10).

Lattice "problems" are a standard way of explaining how the lattice works, by allowing pupils to work through the operations. There are several kinds of lattice problems. The basic four are illustrated below.

1. One-arrow problems:
   14 → = (15)
   20 ↓ = (10)
   3 ↗ = (14)

2. Two-arrow problems:
   3 → → = (5)
   3 ↑ → = (14)
   16 → ← = (16)

3. Many-arrow problems:
   3 ↑ ↑ ↗ ↘ → → = (27)
   19 ← ← ↑ → → = (29)
   31 ↑ → ↓ ↑ → ↓ → = (34)

4. "Missing-arrow" problems:
   a) 15 = 26
   b) 46 = 15
   c) 6 = 8

Some possible answers (there are many) to #4:

a) 15 ↗ = 26; 15 ↑ → = 26; 15 ↑ ↑ ↘ = 26
b) 46 ↙ ↓ ↓ = 15; 46 ↓ ← ↓ ↓ = 15; 46 ↓ ↓ ↓ ← = 15
c) 6 → → = 8; 6 ↗ ↘ = 8; 6 ↑ → → ↓ = 8

These basic problem formats allow for a wide range of mathematical principles and operations to be demonstrated and discovered. Possible objectives of a first lesson on the lattice might include:

1. Pupils will learn to solve one-arrow (two-arrow) problems.
2. Pupils will discover all eight of the one-arrow operations.
3. Pupils will learn that 14 → ↑ = 14 ↗ (transitivity).
4. Pupils will learn that opposite arrows cancel each other: 41 → ← = 41.
5. Pupils will learn that there are many (an infinite number of) ways to get from one number to another.

More complex principles can also be used as the basis of lesson objectives, depending on the teacher's familiarity with the lattice and on children's success with simpler operations on it. These include:

6. Multiple cancelling
   a. the principle that a series of alternating arrows cancel each other when there are an even number of them (3 ↑ ↓ ↑ ↓ ↑ ↓ = 3) but do not cancel (and do move one step) when there is an odd number of arrows (3 ↑ ↓ ↑ ↓ ↑ ↓ ↑ = 13).
   b. the principle that the opposing arrows need not be sequenced in pairs in order to cancel each other. (for example, 32 ↑ → ← ↓ = 32).
7. The system of the lattice (being able to project to points above the top line of numbers and identify what those numbers would be).
8. Identification of numerical meaning of the arrows:
   → = +1; ← = -1; ↑ = +10; ↓ = -10; ↗ = +11; ↙ = -11; ↖ = +9; ↘ = -9.

You may want to practice making up problems with the lattice and familiarize yourself with the operations that the various arrow patterns describe before trying to teach a lesson. The lattice is not complicated and should be fairly easy to use. Your task in this lesson is to teach your pupils something about the lattice -- we are interested in how different teachers use this material in teaching, so what you teach and how you organize

the lesson are completely up to you. Feel free to experiment.

Do not feel that you must try to teach higher-order principles, or that you must teach as much as possible about the lattice. You may want to do so if you feel your pupils can handle it (and you may decide in the middle of the lesson to go further than you had planned), but different approaches to the lattice are appropriate for different grades and ability levels. Use your judgment -- of your pupils' background and of your understanding of the lattice -- in deciding what and how to teach.