DOCUMENT RESUME

ED 076 451 SO 005 495

AUTHOR Ehman, Lee H.

TITLE Stability of Social Studies Classroom Verbal Interaction Patterns Across Repeated Micro-Teaching Performances.

PUB DATE 25 Nov 72

NOTE 18p.; Paper presented at the Annual Meeting of the National Council for the Social Studies, Boston, November, 1972

EDRS PRICE MF-$0.65 HC-$3.29

DESCRIPTORS Classroom Communication; Inquiry Training; Interaction; Intergroup Relations; *Microteaching; *Preservice Education; Research Projects; *Social Studies; Speeches; Student Reaction; Teacher Education; Teacher Response; Teaching Models; Training Laboratories; *Verbal Communication

IDENTIFIERS *National Council for the Social Studies

ABSTRACT

In this research paper specific teaching tasks important in social studies instruction are described in terms of pre-service teachers' classroom verbal behavior which occurred in a teaching laboratory; and the stability of individual pre-service teachers' behavior while teaching two similar lessons involving a specific task are described and analyzed. Three elements chosen for study are: 1) teaching one or more social studies concepts; 2) eliciting student hypotheses in response to a problem situation; and 3) promoting student analysis of a values proposition or controversial issue. Through emphasis on these specific elements of social studies teaching an inquiry model of teaching is suggested. Figures and tables summarize the research findings and describe the verbal interaction occurring when these teaching tasks are attempted by pre-service teachers in a laboratory setting. (Author/SHM)

STABILITY OF SOCIAL STUDIES CLASSROOM VERBAL INTERACTION PATTERNS ACROSS REPEATED MICRO-TEACHING PERFORMANCES

Lee H. Ehman

Indiana University

Presented at the annual meeting of the National Council for the Social Studies, Boston, November 20-25, 1972.

This paper has two principal objectives. First, specific teaching tasks important in social studies instruction will be described in terms of pre-service teachers' classroom verbal behavior which occurred in a teaching laboratory. Second, the stability of individual pre-service teachers' behavior while teaching two similar lessons involving a specific task will be described and analyzed.

Teacher training programs are predicated on the assumption that teaching strategies, thought to be useful in promoting student learning, can be taught to pre- and in-service teachers. Unfortunately the "strategies" are seldom marked by specific behavior sequences which can be learned and applied. Rather, they often tend to be general and vague; the student is expected to "appreciate and apply" the intellectual foundation of the inquiry process, for example, with few guidelines as to what this means in terms of specific behavior. In order to teach in an inquiry mode, it is necessary to understand the intellectual processes of inquiry, of course. But this is not a sufficient basis for teaching others to practice inquiry. Other skills, involving the ability to interact verbally in certain patterns with learners for example, are also necessary.

One purpose of the present paper is to describe, through the description of classroom verbal behavior, some relevant dimensions of inquiry teaching elements. The three elements described here are: (1) teaching one or more social studies concepts; (2) eliciting student hypotheses in response to a problem situation; and (3) promoting student analysis of a values proposition or controversial issue.

The second objective -- the description and analysis of verbal behavior stability over similar successive lessons taught by the same individual -- is important from a research viewpoint. For example, researchers using direct classroom observation techniques usually base their sampling schemes on the assumption -- and it is only an assumption -- that teachers' and students' classroom behavior remains stable in across similar situations and through time. This assumption of verbal behavior stability is the second central concern in this paper.

Many teacher behavior studies have looked for behavior change as a result of some intervention such as supervision, or learning a specific set of skills. A few studies have examined across-time stability of teaching in naturalistic settings. Morgan and Woerdehoff, for example, concluded that social studies student teachers' behavior was stable from the first to the sixth week of student teaching.[1] Based on the Flanders ten-category verbal interaction system, they used analysis of variance to infer the stability. In contrast, Hill and Medley, also using the Flanders system, found behavior shift across a three and one-half month period in the second semester of first year teachers.[2] Bellack and others, from their intensive study of four consecutive days of social studies teaching, concluded that there is ". . . an astonishing degree of stability over time in the pattern of discourse both for teachers and for pupils."[3] They made similiar conclusions regarding teacher activity and for frequencies in each category of their coding system.

This paper, by emphasizing specific elements of social studies teaching, implies an overall model of teaching -- an inquiry model. The three elements chosen for study do not exhaust the possible facets of inquiry teaching, but they do seem to represent major parts of prominent inquiry teaching theories. Teaching

historical/social science concepts; eliciting student hypotheses in response to a social studies problem; and engaging students in analysis of values propositions and controversial issues -- these seem important enough a sample of inquiry elements to warrant description.

A major shortcoming of this descriptive effort should be underlined here. It does constitute description, and not prescription. Normative analysis would be more helpful to teacher educators, of course. By saying what teachers should do as they teach concepts, elicit hypotheses and analyze value issues, this paper would perform a great service. But no empirical basis for this kind of nomative orientation exists, given the fact that the study is based on a sample of classroom behavior which has not been validated against worthwhile outcomes, such as student learning of intellectual skills, knowledge, etc. It is a description how a large number of pre-service teachers and their students behave verbally while ostensibly engaging in these inquiry tasks. Some value judgments about behavior will be made through the selection and focus on certain behavior patterns, and at certain points in the analysis judgments distinguishing between patterns congruent and incongruent with an inquiry teaching model will be necessary. But the intent is primarily descriptive, rather than normative.

Procedure

Data used in this research were collected in a pre-service secondary social studies teacher training laboratory. Connected with several sections of an undergraduate secondary methods course, this laboratory enabled researchers to record large numbers of ten to fifteen minute lessons taught by the methods class pre-service teacher to groups of four to six ninth grade students who were hired for after-school work in the laboratory. Instructors in the methods classes assigned each student seven micro-teaching lessons as an integral part of the course. The first, taught only to peers, was aimed at warming up and familiarizing the methods student to the laboratory setting and mechanics of micro-teaching. These lessons were not used in the present study. The remaining six lessons were taught in pairs at about three-week intervals through the semester. In the first pair of lessons, the student invented a lesson in which one or more historical/social science concepts were taught. The content was selected by each student, but the teaching task was fixed. A plan was submitted, critiqued individually, and often revised; all of this took place before the teaching. Then the student taught the lesson to a group of ninth graders. He was critiqued by the instructor, who also played back for analysis selected parts of the video-taped lesson. Some students modified the lesson's structure or sequence according to the critique or his own ideas; others did not modify them. The content and task remained the same. Two days later, the same lesson was retaught under similar conditions to a new group of ninth grade students. Three weeks later, the next pair of lessons was taught, involving the task of eliciting student hypotheses in response to a problem chosen by the student. The third pair of lessons involved the analysis of a value proposition or controversial issue. Thus, there were three pairs of similar lessons taught under controlled conditions, in which all teachers had the same basic objectives assigned to them. In all, eighty-four students taught lessons which were recorded for analysis; in some cases, a full set of recorded lessons were not obtained because of mechanical or other difficulties. For the analysis which follows, all students for which data is available will be included, so that this number may vary somewhat

across analyses.

Each lesson, with the exceptions noted, was recorded on an audio tape cassette recorder, and then coded according to a modified version of the Flanders verbal interaction analysis system.[4] The basic ten categories were used, and teacher's question (category4,) student responses (category 8,) student-initiated statements (category9,) and silence/confusion (category 10,) were modified. Categories 4, 8, and 9, were subscripted according to the Aschner-Gallagher coding scheme.[5] Cognitive levels or modes implied by the verbal statements were coded into one of four categories: cognitive-memory; convergent; divergent; and evaluative. Figure 1 lists the twenty categories in the system.

FIGURE 1

MODIFIED FLANDERS VERBAL INTERACTION ANALYSIS SYSTEM

Category Symbol	Category Label
1	Accepts feelings
2	Praises/encourages
3	Accepts/uses student ideas
41	Asks cognitive-memory question
42	Asks convergent question
43	Asks divergent question
44	Asks evaluative question
5	Lectures
6	Gives Directions
7	Criticizes
81	Student response-cognitive-memory
82	" " convergent
83	" " divergent
84	" " evaluative
91	Student initiation-cognitive memory
92	" " convergent
93	" " divergent
94	" " evaluative
01	Productive silence or confusion
02	Unproductive silence or confusion

Lessons were coded by designating the category of the predominant verbal behavior for each three-second period. Three persons coded a random sample of tapes in a random sequence, so that all lessons of the same type were not coded in blocks; and all "teaches" were not coded before after all "reteaches", etc. Inter- and intra-coder reliabilities were estimated by having each coder work with criterion tapes at intervals throughout the project. Scott's coefficients for these reliability tests are presented in Table 1.

Table 1

SCOTT'S COEFFICIENTS FOR INTER- AND INTRA- CODER RELIABILITY

	Inter-coder*			Intra-coder**		
	1-2	1-3	2-3	1	2	3
Basic 10 categories	.79	.82	.82	.78	.79	.78
Categories 4, 5, 8, and 9 with subscripts (13 categories)	.75	.79	.80	.80	.79	.78
All categories (19 categories)	.63	.68	.72	.71	.71	.73

* Means of 6 tests
**Means of 2 tests

How should we assess stability of teaching behavior over time? In most studies which examine teaching behavior change, comparison of group means on some measure is the means of inferring change or stability. If the group mean for the first observation is different than the group mean for the second observation, change is inferred. If there is no difference, stability is inferred. The problem with this approach is that it is oriented toward finding treatment effects in experimental studies, rather than describing natural teaching behavior.

This problem leads to a correlational approach. Individual scores from two different observations are correlated in order to map stability or instability. As an example of this approach, the Bellack data referred to above have been analyzed by correlating the frequency counts in separate behavior categories across the four lessons for the fifteen teachers.[6] Bellack did not analyze the data in this way, but the results in Table 2 bear out his conclusions about stability fairly well, although there are some exceptions to the overall pattern.

Table 2

BETWEEN-LESSON STABILITY IN FIVE CATEGORIES USING BELLACK'S DATA.*

Teacher Talk/Pupil Talk Ratio

Session	
I-II	.84
II-III	.78
III-IV	.41

* Pearson product-moment correlations are the coefficients indicating degree of stability.

Table 2 continued

Soliciting

Session	Teacher	Student
I-II	.74	.40
II-III	.61	.72
III-IV	-.09	.36

Responding

Session	Teacher	Student
I-II	.66	.44
II-III	.32	.50
III-IV	.22	.41

Structuring

Session	Teacher	Student
I-II	.72	-.11
II-III	.72	.74
III-IV	.76	-.25

Reacting

Session	Teacher	Student
I-II	.37	.54
II-III	.54	.43
III-IV	.29	.52

Analysis

Examination of the data will be organized into two sections. The three types of lessons -- concept, hypothesizing, and values -- will first be described in terms of the single categories of the coding system, as well as several ratios generated by combining more than one category. The description and analysis will also include transitions between two categories, referred to in this paper as "two-stage chains." The second section will consider higher-order behavior chains of lengths three, four, and five categories. In each of the two analysis sections, the specific teaching task and the verbal behavior stability will be described.

One and Two-Stage Chains

Different verbal processes were expected for the three lessons because the specific teaching tasks in each lesson varied considerably. The concept teaching lesson was expected to be more direct and teacher-oriented than the other two lesson types. The task of teaching a concept to a group of students who do not initially understand its meaning is relatively teacher-centered throughout. In contrast, the hypothesis-eliciting and value analysis tasks were expected to be teacher-focussed while the problem or issue is being introduced and framed, but there the focus should shift to the students, who are expected to generate hypotheses or the analysis and grounding value positions. This difference was expected to result in differences in the proportion of time in teacher-talk. The direction of the differences in teacher-talk proportions do bear out this expectation, but the magnitude is slight. The average proportions are .69, .67, and .64 for the concept, hypothesis, and values lessons, respectively. All three proportions are close to the average of 68 per cent observed by Flanders.[7] Bellack, et al found an overall teacher-talk median of 72.6 per cent of lines in transcripts for sixty social studies lessons, and this also corresponds closely to the present findings.[8]

Differences in proportions within the several teacher-talk categories were also anticipated, but were not observed. Table 3 shows the startlingly similar proportions in the six teacher-talk categories in which behavior was observed. More lecturing and less use of student ideas was expected for the

Table 3

MEAN PROPORTIONS* IN BASIC TEACHER-TALK CATEGORIES IN THREE LESSON TYPES

	Basic Category	Lesson Type: Concept	Hypothesis	Values
1	Accepts feelings	(No behavior observed in this category)		
2	Praises/encourages	5.94	5.35	3.35
3	Accepts/uses student ideas	5.25	5.65	5.09
4	Asks questions	13.10	13.66	14.39
5	Lectures	35.45	33.49	33.84
6	Gives directions	1.00	1.09	0.57
7	Criticizes	0.12	0.15	0.03

* The proportions represent the time in the category divided by the total time in the lesson.

concept lesson than for the other two types, but the differences were trivial.

A difference in the balance between praise (category 2) and use of ideas (category 3) was also expected across the lesson types. In the concept-teaching lesson, where teacher cuing behavior was expected to be more prominent than in the other two lessons, simple praise was expected to be relatively greater than was of student ideas. Yet the balance between these categories is constant in all three lesson types.

No instances of accepting feelings were observed, and this may be due to the very short amount of interpersonal contact between teacher and students allowed by the micro-teaching laboratory setting. Of course, Flanders and others have reported a very low incidence of category 1 -- less than one per cent -- across the variety of subjects and situations. The proportion in category 7, Teacher Gives Criticism, was expected to be small because of the controlled laboratory situation, and this proved to be the case. Because the lessons were short and self-contained, rather few directions to students were called for, and this is supported by the very small proportions in category 6. In each lesson type, about half of the teacher talk, or one-third of the total lesson time, was devoted to teacher lecturing behavior, category 5. Explaining defining characteristics and giving examples of a concept seem to take about as much teacher talk as the problem-introduction and explaining process necessary in most hypothesis and values lessons. Either that, or persons occupying the teacher roles may feel impelled to talk a certain amount of time, perhaps because of the norms inherent in the situation.

Teacher questions were categorized into one of four possible categories: cognitive memory, convergent, divergent, and evaluative. Table 4 shows the proportions of total time in each category for each lesson type.

Table 4

PROPORTIONS OF TIME IN FOUR QUESTION CATEGORIES FOR THREE LESSONS

Question Subcategory	Lesson Types Concept	Hypothesis	Values
Cognitive-memory	6.03	4.37	3.57
Convergent	5.54	4.79	2.57
Divergent	0.95	3.92	1.72
Evaluative	0.57	0.57	6.52

The differences across lesson types form a reasonable pattern. Most cognitive-memory and convergent questioning appears in the concept lesson, with the proportions dropping in the hypothesis and values lessons, as we might expect. Divergent questions are most frequent in the hypothesis lesson, where the teaching task is to elicite several hypotheses to explain or answer the same phenomenon or question. Evaluative questions play a negligible part in the first two lesson types, but the higher proportion in the values lesson is indicative of the nature of that lesson task.

Student verbal behavior, as represented by means for each lesson type, follows the same general pattern as that of the teachers. Proportions of student talk in the response category are similar across the three lesson types: 18.51, 19.78, and 20.19 for the concepts, hypothesis, and values lessons, respectively. The student initiation category proportions are 8.71, 9.19, and 11.59, showing an anticipated rise in initiation as the lesson task becomes more open-ended.

Within the four subcategories of both student response and student initiation, the patterns resemble that of the teacher questions. Table 5 summarizes these proportions.

Table 5

PROPORTIONS OF TIME IN FOUR SUBCATEGORIES OF STUDENT RESPONSE AND INITIATION

Student Response	Lesson Type Concept	Hypothesis	Values
Cognitive-Memory	6.89	5.15	3.94
Convergent	8.94	8.14	4.34
Divergent	1.54	5.47	2.37
Evaluative	1.15	1.03	9.53
Student Initiation			
Cognitive Memory	3.88	4.11	3.18
Convergent	3.22	2.63	2.44
Divergent	0.92	1.97	1.72
Evaluative	0.69	0.48	4.24

The silence/confusion category is virtually unchanged across lesson types, with means of 11.92, 11.65, and 10.95.

Several interesting ratios can be derived from the basic interaction data. One, the proportion of teacher talk to all talk, has been presented above. Another ratio, having to do with teacher questions is the ratio of cognitive-memory and convergent to all questions. This is referred to as the closed question ratio. As expected, the ratio is a high .88 for the concept teaching lesson, and drops for the other two types, .67 for the hypothesis and .43 for the values lessons. The analogous student closed talk ratios are very similar in magnitude to the teacher closed question ratio: .84, .69, and .44, respectively.

Flanders computed a ratio of indirect to direct teacher behavior by dividing the sum of time spent in teacher categories 1-4 by all teacher talk. The higher the ratio, the more the teacher used "indirect influence", indicated by accepting and using student feelings and ideas, praise and questions, as compared with "direct influence," as represented by lecturing, directing, and criticizing. The values for this ratio are almost identical across lesson types: .40 for concept, .42 for hypothesis, and .40 for values. This result was not expected. It was predicted that the concept lesson would involve a more direct style than the other two types of lessons. Perhaps because all three lessons were taught in a discussion mode, the influence characteristic was actually controlled, in spite of the changes in task.

Two-stage behavior chains occur when the speaker shifts from one verbal category to another, or when teacher talk is followed by student talk, or vice versa. A teacher question followed by a student response is an example of the latter case, while teacher praise followed by teacher question is an example of the first type. The present data were searched for two-stage chains by selecting only those in a particular lesson type which comprised at least one per cent of the total lesson time. This move to limit the number under scrutiny seemed necessary because with the twenty-category system which was used in this research there are 380 possible two-stage chains.

The set of chains which begin with a teacher question is important to teaching in a discussion mode. In each of the lesson types there are several such chains containing one per cent or more of the total lesson time. The teacher question (cognitive memory)-student response (cognitive memory) chain was the most frequent such chain. Using the symbols from Figure 1, this is the 41-81 chain. Percentages in the three lesson types are 4.1 for concept, 3.0 for hypothesis, and 2.3 for values. Again, this pattern confirms that differences in teacher-student interaction vary as a function of teaching task. The 42-82 chain, which is teacher convergent question-student convergent response, has the same pattern: 3.3 per cent for concept, 2.8 for hypothesis, and 1.3 for values. The 43-83 chain, which is teacher divergent question-student divergent response, only appears in the hypothesis lesson with 1.8 per cent of time; in the other two types the chain accounts for only 0.5 and 0.7 per cent. Similarly, the 44-84 chain, teacher evaluative question-student evaluative response, accounts for 3.4 per cent of the values lessons, but only 0.3 per cent in each of the other two lesson types.

Interestingly, the teachers seemed to use lecture, as well as questions, as a soliciting tool. The 5-91 chain, teacher lectures-student initiates at cognitive memory level, appears in all three lesson types at just over the one per cent level. No other chain except one shows up as eliciting student initiations. This is the 02-9 chain, where 02 is unproductive silence/confusion. In the concept lessons, the 02-92 chain appeared at the 1.0 per cent level (0.9 per cent for each of the others), while in the values lesson the 02-94 accounted for 1.4 per cent of time (0.2 per cent for the others). Students may be moving to "rescue" a teacher or another student from the embarrassment of confused silence.

Another frequently appearing chain in all three lesson types is the 91-5 or student initiated talk-teacher lecture. It occurred 1.1 per cent of the time in each of the lesson types. In fact lecture seems to be the typical response to student-initiated ideas in any of the four cognitive levels. No frequent chain starting with a student-initiated idea ends with any teacher behavior except lecture. In contrast, several chains starting with student responses end with either teacher praise or use of student ideas, which are thought to be "rewarding" verbal behavior. These teachers, therefore, tend to reward student response, while they tend not to reward student-initiated ideas. A similar pattern occurs when the level of student response or initiation is examined. In all three lesson types, the teachers gave more praise and used student verbalizations more if they were at the cognitive-memory or convergent levels, as compared with the divergent and evaluative levels. These unexpected findings will be explored further in the multi-stage chain section.

Stability of One- and Two- Stage Chains. How stable are these verbal behavior patterns? To examine this question, proportions in categories, ratios, and two stage chain proportions discussed above were analyzed. Within lesson types, the proportions in the teach session were correlated with the re-teach session of each type. Product-moment correlations for the basic ten categories and the three subscripted categories, indicating stability or the lack of it, are shown in Table 6.

Table 3

STABILITY OF VERBAL INTERACTION CATEGORIES ACROSS TWO LESSONS IN EACH OF THREE LESSON TASK TYPES.*

Symbol	Category	Lesson Type: Concept	Hypothesis	Values
20	Praises/encourages	.41	.47	.42
30	Accepts/uses student ideas	.20	.08	.47
40	Asks questions-overall	.34	.52	.33
41	" " Cognitive-memory	-.01	.52	.47
42	" " Convergent	.12	.13	.01
43	" " Divergent	.35	.18	-.01
44	" " Evaluative	.32	.21	.23
50	Lectures	.59	.55	.60
60	Gives directions	.44	.15	.38
70	Criticizes	-.08	.25	-.04
80	Student responses-overall	.39	.23	.30
81	" " Cognitive memory	.09	.30	.29
82	" " Convergent	.20	.08	.18
83	" " Divergent	.12	.09	.07
84	" " Evaluative	.30	.25	.38
90	Student initiation-overall	.19	.23	.13
91	" " Cognitive memory	.25	.14	.17
92	" " Convergent	.08	.12	.07
93	" " Divergent	.11	.31	.11
94	" " Evaluative	.21	.06	.09
01	Productive silence/confusion	.55	.53	.49
02	Unproductive " "	.36	.33	.14

* Coefficients are Pearsons product-moment correlations.

Five main verbal behavior categories seem to be stable in all three lesson types. The highest stability coefficients are those for lecturing. Although fairly high at .55 or above, they are not quite as high as those computed from the Bellack data. Teacher praise also appears to be fairly stable. Teacher questions show a range of correlations of .34 to .52, which are also somewhat lower than those from the Bellack data. The most stable of the two student behavior categories is that of response. Among the four subcategories of student response, only evaluative responses appear consistently stable for all lesson types, although the correlations are rather modest in magnitude. Stability of student initiated verbal behavior is very low and not consistent across lesson types. Finally, productive silence is one of the most stable and consistent of all categories.

Overall, there is much less consistency than expected. Conditions for the teach and reteach sessions were well controlled, with the subject matter, teaching task, physical conditions, time of day, etc., the same. Even under the controlled conditions, many of the verbal categories appear to be unstable. It is interesting to note, however, that if we had inspected mean scores on the various measures, we would have been led to quite different conclusions. Table 7 shows main category means for all six lessons.

Table 7

MEANS OF BASIC VERBAL INTERACTION CATEGORIES FOR SIX LESSONS

		Lesson Type					
		Concept		Hypothesis		Values	
Symbol	Category	T	RT	T	RT	T	RT
20	Praises/encourages	6.17	5.81	5.21	5.74	3.90	3.18
30	Accepts/uses st. ideas	5.04	5.44	5.11	5.86	5.41	4.86
40	Asks Questions	13.00	13.74	13.18	14.92	14.41	14.57
50	Lectures	36.72	35.34	36.18	30.37	32.79	34.66
60	Gives Directions	1.00	0.89	1.03	1.29	0.74	0.46
70	Criticizes	0.13	0.11	0.13	0.12	0.01	0.03
80	St. Responses	18.05	18.72	18.24	20.81	21.25	19.16
90	St. Initiates	8.95	8.06	8.99	8.93	10.85	12.36
01	Silence/confusion	10.94	11.88	11.94	11.97	10.66	10.70

The means from teach to reteach of the same lesson are very similar, even though the teach-reteach stability correlations from the same data are rather modest, with the exception noted above.

Table 8 shows the stability of four interaction ratios discussed before.

Table 8

STABILITY OF INTERACTION RATIOS ACROSS TWO LESSONS IN EACH OF THREE LESSON TYPES

	Lesson Type		
Ratio	Concept	Hypothesis	Values
Closed Teacher Question	.26	.07	.26
Indirectness (I/I&D)	.57	.66	.57
Closed Student Talk	.30	.00	.24
Student Initiates (90/80&90)	.00	.05	.15

The indirectness ratio seems by far the most stable teacher characteristic, except lecturing. The closed teacher question ratio is not particularly stable, and neither are the two student talk ratios.

Stability of the two-stage chains discussed above is also low. Most stable of this set of variables is the group of chains which begin with teacher questions. Their stability coefficients range from .10 to .43, with a mean stability of .24. The 50-91 chain, teacher lecture-student initiation, has coefficients of .03, .20, and .28 for the three lesson types.

Multi-Stage Chains

Three-, four-, and five-stage chains present different analytical problems than the one- and two-stage chains. To reduce the dimensions of the multi-stage analysis, four steps were taken. First, all coding for all lessons was collapsed in such a way that only the main categories of the coding system were used. The

cognitive level subscripts for categories 4, 8, and 9 were therefore dropped. Second, the coding for individual lessons was "trimmed", so that only transitions from one category to a different one were retained. All "steady state" coding was dropped. For example, a string of codes, which was originally coded one category every three seconds, would look like this:

5-5-5-4-4-8-8-8-2-3-3-5

The teacher lecturer (first three 5's,) asks a question (the two 4's) a student responds (the three 8's), and the teacher than praises (the 2,) accepts, or uses the student's response (two 3's,) and reverts to the lecture mode (last 5). The trimmed version, reflecting only category transitions, looks like this:

5-4-8-2-3-5

The sequence of verbal behavior is retained, but the time dimension is dropped.

The third step to reduce the analytic problems was to cut out of the analysis all multi-stage chains which seldom occur. Although important chains might occur infrequently, and excellent teaching might be marked by such chains, for the present analysis this limitation had to be made. Finally, a sample of twenty teach and twenty reteach in each lesson type was analyzed, rather than the full set of lessons taught. This was necessary because of the very large number of chains possible, and because of the large number generated for each lesson.

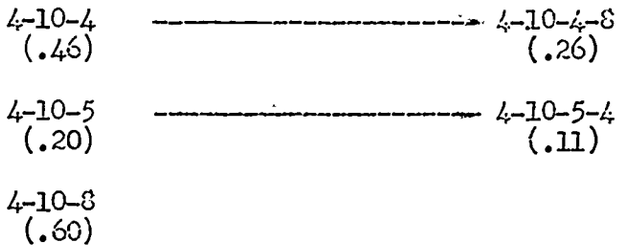
Teacher Question Chains. Because of space and time limitations only two sets of multi-stage chains will be analyzed. The first, including those beginning with teacher questions, are of particular interest because they suggest what "happens" to questions. Most, of course, are answered by students, but then what happens? Examination of three-, four-, and five-stage chains allows us to find out.

First, there is one three-stage chain, the 4-5-4 chain, which suggests a teacher adding information in the middle of question formation. This phenomenon may contribute to lack of clarity in teaching, with negative student learning outcomes.[9] This chain occurs infrequently, with means of .50, .45, and 1.27 for the concept, hypothesis, and values lessons, respectively. The only four-stage chain of any frequency which stems from this chain ends in a student response.

Another set of teacher question chains begins with the 4-10 chain. When questions meet with silence, what happens? Three "branches" from the 4-10 beginning, as shown in Figure 2. In the main the teachers either asked another question (4-10-4), dropped into lecture (4-10-5), or waited until a student responded (4-10-8). One of the "traumas" of early teaching attempts seem to be the silence

Figure 2

MEAN FREQUENCIES OF THE 4-10 CHAIN BRANCHES.*



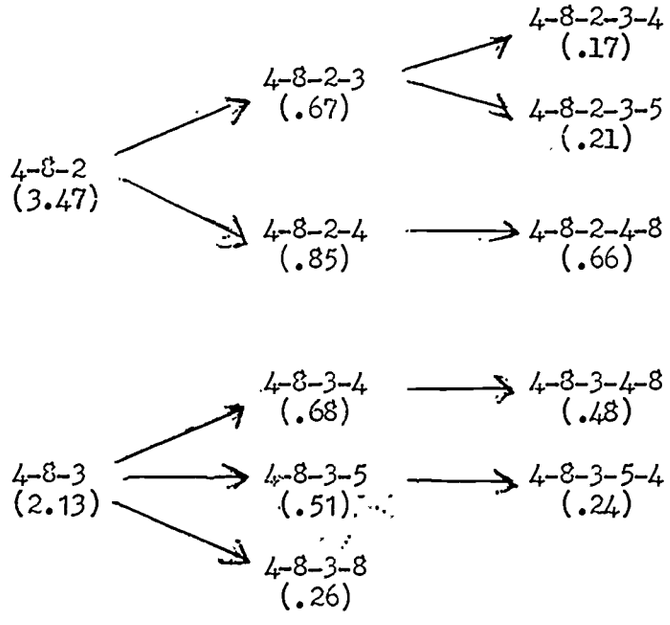
* Figures in parens are mean frequencies for all lessons.

which occurs after a question. Many teachers never recover from the initial shock, and "cover up" by quickly asking another question, or lecturing. Some do wait the students out, as represented by the 4-10-8 chain. The other two chains signal teacher impatience or concern about the clarity of the initial question.

All other frequent multi-stage chains beginning with teacher questions were of the set 4-8, or teacher question-student response. This set has numerous possible branches, of course. The first is the 4-8-2 branch, which ends with teacher praise. Figure 3 shows the branches associated with the 4-8-2 and 4-8-3 chains. The 4-8-2 set shows that teachers move about equally to use student

Figure 3

MEAN FREQUENCIES OF THE 4-8-2 and 4-8-3 CHAIN BRANCHES



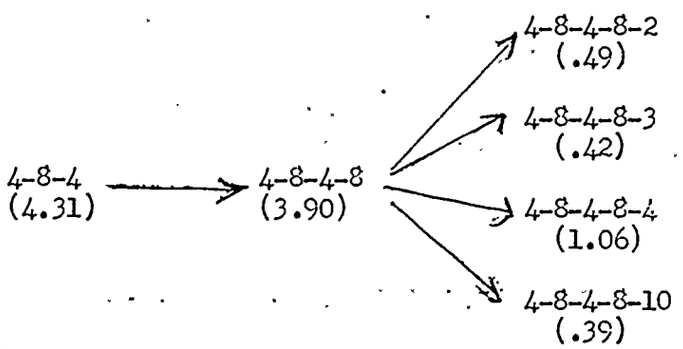
ideas (4-8-2-3) or another question (4-8-2-4) after the 4-8-2 chain is initiated. Further, two five-stage chains appear at the 4-8-2-3 root, about equally divided between endings of teacher question (4-8-2-3-4) and lecture (4-8-2-3-5). The other main branch most often leads to a recitation pattern: question-response-praise-question-response (4-8-2-4-8).

The three 4-8-3 branches, also shown in Figure 3, most often involve a second question-response chain at the end (4-8-3-4-8). The use of student ideas is also often followed by information giving and another question (4-8-3-5-4). Sometimes use of a student idea leads directly to another student response, as with the 4-8-3-8 chain, although the mean frequency is low. An example of this chain would be question-response-teacher puts the response into question form-second response.

A recitation-type chain, 4-8-4, occurs frequently in the data, with a mean of 4.31 per lesson. Figure 4 shows the branches for this chain. The basic

Figure 4

MEAN FREQUENCIES OF THE 4-8-4 CHAIN BRANCHES



three-stage chain has only one predominant branch to 4-8-4-8. Then teachers move in one of four final branches; to praise, acceptance or use of student ideas, a question, or silence. The question branch, 4-8-4-8-4, is a continuation of the recitation form, and is most frequent. The other three are about equal in frequency. Each five-stage chain in Figure 4, of course, contains a redundant 4-8 element at the beginning; each starts another set of 4-8 chains at the third stage.

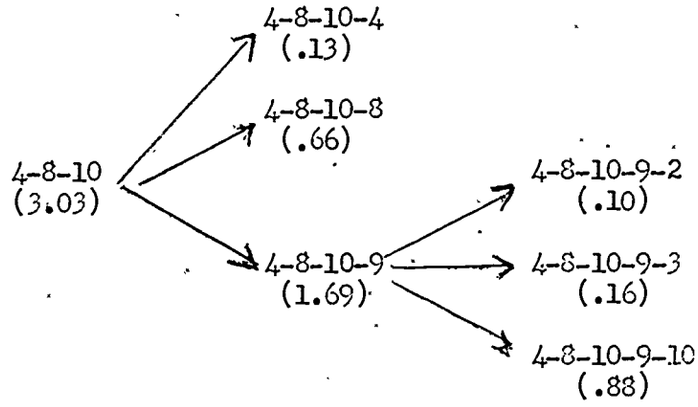
The 4-8-5 chain, in which the teacher lectures after receiving the response to his or her question, occurs on an average of 1.43 per lesson. Its only branch involves tacking on another question, 4-8-5-4 (mean of .75).

An indicator of a thought-provoking question is that after responding to a question, the student goes on to initiate a line of thinking of his or her own. This would suggest the 4-8-9 chain, which we looked for in vain. Alas, the means for the concept, hypothesis, and values lessons were only .05, .30, and .25, respectively. The production of this chain would seem important to teachers and methods instructors alike.

The 4-8-10 chain set completes the question-initiated chains. Figure 5 shows that silence after the 4-8 sequence may result in another question,

Figure 5

MEAN FREQUENCIES OF THE 4-8-10 CHAIN BRANCHES



(4-8-10-4), where the teacher may have been surprised by or unprepared for the response so that some extra "think time" was needed for question formulation. This happened seldom, however. More frequent is another student response, shown by the 4-8-10-8 chain. But a more important outcome was a student initiation (4-8-10-9). This is a variant of the 4-8-9 chain we failed to find above. Perhaps a classroom strategy for eliciting student ideas is to ask a question, and pause after the first response! This more fertile chain results in three more branches, ending in either praise, use of student ideas, or more silence, the last being the most likely by far.

The contrast in the place of silence in the chains between the 4-8-10 set and the 4-10 set is interesting. In the latter, teacher talk was a slightly more probable consequent behavior than student talk. But with the 4-8-10 set, the student talk consequent is much more likely than teacher talk. The chains containing one or more silence elements merit future attention by teaching methodologists.

Student Initiation Chains. The second set of chains to be considered here are those beginning with 9, student-initiated talk. There is less complexity here than in the teacher question chains. This is partly due to the low proportion in this category, and perhaps also because teachers fail to capitalize on student initiation to the fullest extent possible. Many teachers, beginners or otherwise, seem bewildered by student initiations. Yet in social studies education, which is perhaps the most discussion-oriented subject area in secondary schools, this should be a crucial area of concern.

The 9-3 chain marks use of student ideas following the initiation. A teacher question is then sometimes inserted, 9-3-4 (mean of .24), but more

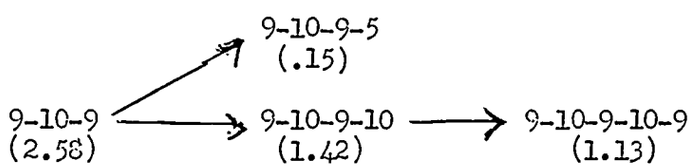
often the teacher lectures (mean of .69).

A frequent 9 chain is the 9-4-8 (mean of 1.21), indicating that the teacher sometimes builds a question on a previous student initiation. But even more often the teacher lectures after student initiations, 9-5-4 (.56), and 9-5-9 (.90). In the first case, the teacher gives ideas of his or her own, and then asks a question. In the second case, the teacher apparently is engaged in a dialogue with one or more students, because the student initiated again after the teacher. This chain is often continued to 9-5-9-5 (.35), indicating an extension of the dialogue. Further five-stage extensions were rare, however, indicating that most teachers discontinued dialogue after two ideas had been verbalized by both participants.

The most interesting set of 9 chanis is the 9-10 sequence. Again, this may signal difficulty on the teacher's part with reaction formulation, or it might mark a deliberate strategy of low teacher control. In the latter, the teacher waits for other initiations, either from the original or another student, rather than interjecting teacher talk. This set is diagrammed in Figure 6. As can be seen, the 9-10-9 is the only three-stage chain of sufficient

Figure 6

MEAN FREQUENCIES OF THE 9-10-9 CHAIN BRANCHES



frequency to be analyzed. It has two main branches, one extending to five stages. The 9-10-9-5 branch seldom occurs, leaving the repeating branch of 9-10-9-10-9 as a rather frequent five-stage chain. Whether it is a good or bad chain is not known, of course, but it does signify low teacher control and extended student initation. Whether the low teacher control is purposive, or whether it signals a meandering , out-of-control discussion, is difficult to determine.

Stability of the multi-stage chains was examined, using the same procedures outlined above. No chains were stable above a correlation of .20 across all three lesson types, and most showed essentially zero correlations. This lack of stability was probably due in part to the low frequencies involved.

Summary

Three types of social studies teaching tasks have been described in terms of the verbal interaction occurring when these tasks are attempted by pre-service teachers in a laboratory setting. The stability of this verbal interaction was much lower than expected. Three- , four- , and five-stage chains beginning with teacher questions and student initiations were analyzed. The use of silence to encourage student initiation was one area suggested for further research.

Notes

1. Jack Morgan and Frank J. Woerdehoff, "Stability of Student-Teacher Behaviors and their Relationship to Personality and Creativity Factors," Journal of Educational Research 62: 251-54, February, 1969.

2. Russel A. Hill and Donald M. Medley, "Change in Behaviors of First Year Intern Teachers," paper presented at the American Educational Research Association meeting at Chicago, February, 1968.

3. Arno A. Bellack et al, The Language of the Classroom, New York: Teachers College Press, 1966, p.55.

4. A complete description of the basic ten categories can be found in Ned A. Flanders, Analyzing Classroom Behavior. Reading, Mass: Addison-Wesley, 1971.

5. See the Aschner-Gallagher coding system described in Anita Simon and E. Gil Boyer, Mirrors for Behavior II, Volume A, Classroom Interaction Newsletter, Spring, 1970, pp. 3-4 to 3-6.

6. Bellack, op cit. Language of the Classroom, data from Tables 4, 8, 9, 10, 12, and 13 (pp. 44-67) were analyzed in this way. Pearson product-moment correlations are used throughout the present paper as indicators of stability.

7. Flanders, Analyzing Classroom Behavior, op cit, p. 101.

8. Bellack, Language of the Classroom, op cit, p. 45.

9. Barak Rosenshine, Teaching Behaviours and Student Achievement. London: International Association for the Evaluation of Educational Achievement, 1972. p. 107.