R E P O R T R E S U M E S

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AN EVALUATION APPROACH DESIGNED TO IDENTIFY THE LEVELS OF THINKING EXISTENT IN SELECT CLASSROOMS AS EXHIBITED BY TEACHER AND STUDENT VERBAL BEHAVIOR. FINAL REPORT.

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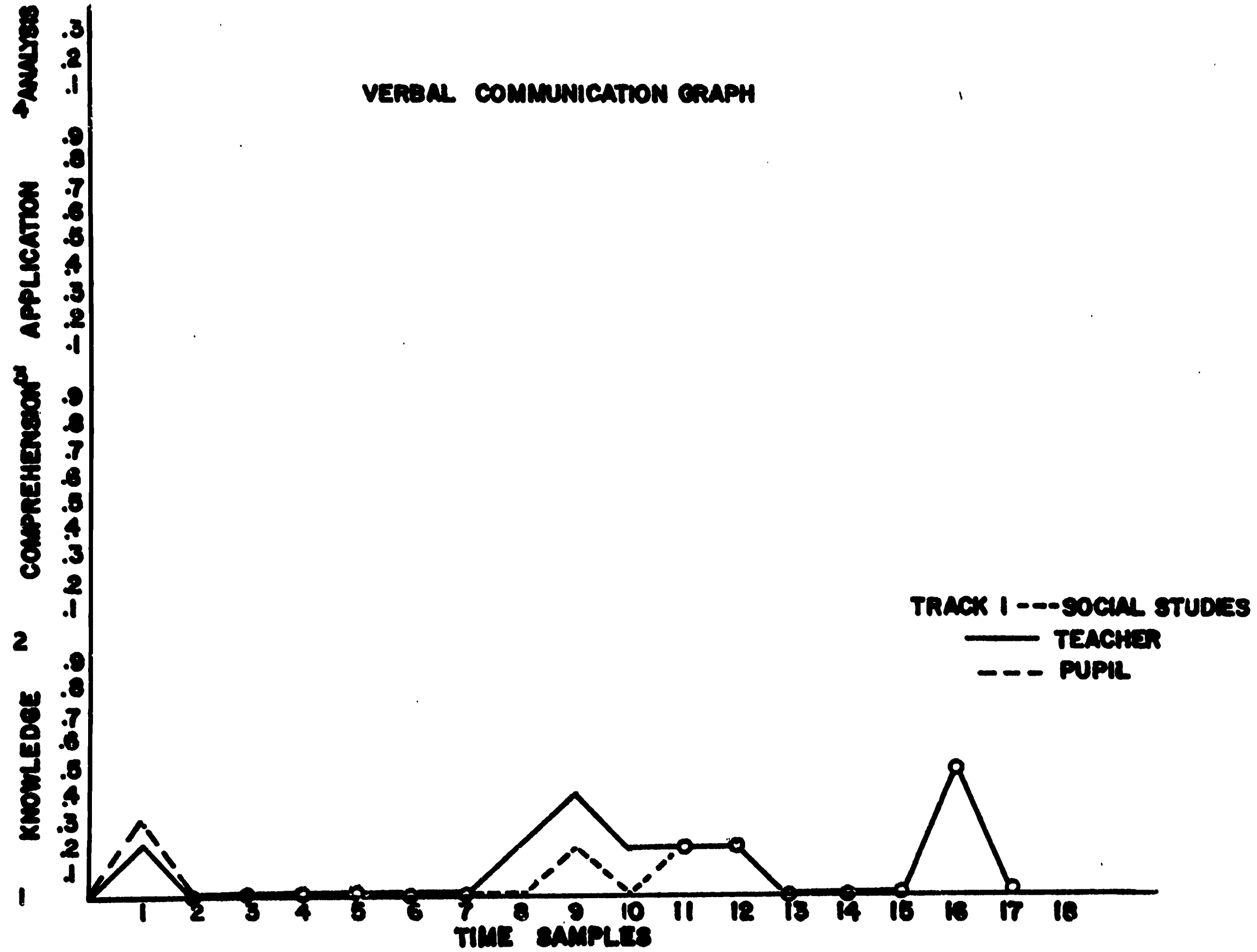
THE PURPOSE OF THIS STUDY WAS TO DETERMINE THE LEVELS OF THINKING THAT CHARACTERIZED TRACK I AND TRACK IV CLASSES IN ENGLISH, MATHEMATICS, AND SOCIAL STUDIES AT THE EIGHTH GRADE LEVEL. THE DATA WERE GATHERED AT CENTRAL JUNIOR HIGH SCHOOL, ALAMOGORDO, NEW MEXICO, BY OBSERVERS RECORDING THE VERBAL INTERCHANGES AND TEACHER-PUPIL TALK OR PUPIL-PUPIL TALK, WHICH TOOK PLACE AT THREE-MINUTE INTERVALS IN THE EIGHTH GRADE CLASSES DESIGNATED AS THE SAMPLE. FIVE OBSERVERS VISITED EACH CLASS ON DIFFERENT DAYS AND RECORDED A TOTAL OF TWENTY-EIGHT OBSERVATIONS. THE STATISTICAL COMPARISONS YIELDED NO SIGNIFICANT DIFFERENCES BETWEEN MEANS AT THE .05 LEVEL. CONCLUSIONS FROM THE STUDY INDICATE--(1) DIFFERENTIATION OF INSTRUCTION BETWEEN TRACK I AND IV IN ALL SUBJECT AREAS INVESTIGATED DOES NOT APPEAR TO BE IN TERMS OF LEVEL OF THINKING, (2) TEACHING IN THE SUBJECT AREAS INVESTIGATED APPEARS TO BE AIMED PRIMARILY AT THE COMMUNICATION OF KNOWLEDGE RATHER THAN AT ACTIVE EXPLORATION THROUGH VARIED LEVELS OF THINKING, (3) APPARENTLY TEACHER VERBALIZATION PLAYS A CRUCIAL ROLE IN DETERMINING THE LEVEL AT WHICH CLASSROOM INTERACTION OCCURS, AND (4) THINKING AT ONE LEVEL SHOULD BE DEVELOPED ADEQUATELY BEFORE HIGHER LEVELS ARE ATTEMPTED. (ES)

VERBAL COMMUNICATION GRAPH



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Spring 1966

An Evaluation Approach Designed to Identify The Levels of Thinking Existent in Select Classrooms As Exhibited by Teacher and Student Verbal Behavior

Introduction: The purpose of this portion of the study in Central Junior High School, Alamogordo, was to determine the levels of thinking that characterized Track I and Track IV classes in English, mathematics, and social studies at the eighth grade level. Specifically, the study was designed to investigate the following questions:

1. What levels of thinking occur most frequently in selected track one and track four eighth grade classes?

2. Are there significant differences between the most frequent levels of thinking in selected track one and track four classes?

3. Are there significant differences in the most frequent levels of thinking occurring among subject areas on one track level?

The data for the study was gathered by time sampling technique. Observers recorded the verbal interchanges, teacher-pupil talk or pupil-pupil talk, which took place at three-minute intervals in the eighth grade classes designated as the sample. Five observers visited each class on different days; thus, the data reported in this study is based upon a total of twenty-eight observations.[1]

Each verbal unit was assigned to one of six levels of thinking. The source of the definitions for each of the six levels of thinking was Bloom's, Taxonomy of Educational Objectives.[2] The six levels of thinking were defined as follows:

1. Knowledge: recalling facts, terminology, definitions, etc.

2. Comprehension: understanding of material as exhibited in one of three manners:
   a. translation: restating material in terms other than those used in the source of the material. Included in this category are actions such as restating a verbal problem in mathematical terms;
   b. interpretation: explaining a phenomena or summarizing a communication;
   c. extrapolation: using two or more facts to reach awareness of another fact.

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[1] One observer did not visit track IV algebra or track I math.

[2] Benjamin S. Bloom (ed.), Taxonomy of Educational Objectives, Handbook I, Cognitive Domain, (New York: David McKay Company, 1956).

3. Application: using two or more known generalizations in order to reach another generalization or to make a prediction. Also included in this category is the use of facts and/or generalizations to form a hypothesis.

4. Analysis: breaking down a concept into its constituent parts.

5. Synthesis: relating elements to create a novel whole. Included in this category are the production of a unique communication (poem, essay, etc.) and/or the production of a unique plan of operation (a strategy for solving a problem).

6. Evaluation: judging the value of materials and/or methods for the attainment of a given objective.

Each interchange was classified on the basis of a group decision. That is, each recorder's data was submitted to the committee of five before a classification for each verbal unit was made. Each level of thinking was assigned a single numerical value:

Knowledge = 1
Comprehension = 2
Application = 3
Analysis = 4
Synthesis = 5
Evaluation = 6

Examples of data gathered and the assigned values can be found in the appendix.

Statistical treatment of the data was the test for significance of the difference between means. Differences between the following means were tested for significance:

1. Track I and Track IV pupils in each subject.

2. Track I and Track IV teachers in each subject.

3. Teachers and pupils in Track I social studies.

4. Teachers and pupils in Track IV social studies.

5. Teachers and pupils in Track I mathematics.

6. Teachers and pupils in Track IV mathematics.

7. Teachers and pupils in Track I English.

8. Teachers and pupils in Track IV English.

Statistical Findings: None of the statistical comparisons yielded significant differences between means at the .05 level. (see Table I)

Verbal Communication Graphs: The data presented by the graphs is summarized as follows:

1. More verbal interchanges were plotted within the knowledge interval than in any other interval. This holds true for Track I and Track IV classes in all subject areas except Track IV English.

2. The second most frequently plotted interval was the comprehension category. In the case of Track IV English, instances of comprehension level responses were somewhat more frequent than knowledge level responses.

3. When points were plotted above the comprehension interval, they tended to occur during the middle part of the lesson (at approximately the eighth verbal interchange).

4. In general, there appears to be congruence between teacher and pupil level of thinking. Since the teacher, for the most part, initiated verbal interchanges, it appears that the students were communicating successfully with the teacher's objectives (as reflected in the level of thinking exhibited by the teacher).

5. When the level of thinking was abruptly elevated by several degrees, there was a tendency for divergence of level of thinking between pupil and teacher to occur. The party responding to the abrupt elevation tended to respond at a level of thinking lower than the level observed immediately prior to the sharp elevation.

Conclusions: The following generalizations result from an analysis of the data:

1. Differentiation of instruction between Track I and IV in all subject areas investigated does not appear to be in terms of level of thinking.

2. Teaching in the subject areas investigated appears to be aimed primarily at the communication of knowledge

rather than at active exploration through varied levels of thinking. Teachers tend to tell facts and attempt to convey ideas as ideas. Common questions teachers ask are of the what, how, where, when variety - questions which tend to elicit recall of information types of responses.

3. Since most verbal interchanges were initiated by the teacher and pupil responses tended to be congruent, the level of thinking reflected by pupil responses may be controlled, to some degree, by the teacher's verbal behavior. Apparently, teacher verbalization plays a crucial role in determing the level at which classroom interaction occurs.

4. Since divergence in levels of thinking occurred when the level was abruptly elevated, it appears that thinking sustained on one level may be necessary before further elevation can occur for both teacher and pupils. That is, thinking at one level should be developed adequately before higher levels are attempted.

Recommendations: In light of the data summarized above, it appears that teachers and administrators should examine the results of the study for the purpose of determining whether present levels of thinking exhibited by pupils and teachers in the subject areas investigated are meeting the educational objective of the school system which emphasizes reasoning, evaluating and re-evaluating. Therefore it is suggested:

1. that teachers be made aware of the results of this study;

2. that teachers who wish to participate in experiences designed to develop skill in the recognition and promotion of various levels of thinking be provided with adequate time, resource materials, and administrative and supervisory leadership;

3. that reconsideration be given to:

   a. investigation of levels of thinking which can be developed in the classroom through study of relevant professional texts and research;
   b. self evaluation by teachers in terms of the levels of thinking promoted during classroom instruction;
   c. adaptation of levels of thinking to the abilities of pupils;
   d. the concept of pacing a lesson;

e. identification of the major concepts relevant to a subject area to develop thinking sequences aimed at depth as well as breadth of pupil understanding;

f. exploration of teaching techniques in addition to lecture or prolonged question-answer sequences.

TABLE I
MEANS TESTED FOR SIGNIFICANCE OF DIFFERENCE
AND t VALUES FOR SELECTED LEVELS OF CONFIDENCE

Social Studies teacher Track I/Track IV	t = .24
Mathematics teacher Track I/Track IV	t = .32
English teacher Track I/Track IV	t = .53
Social Studies pupils Track I/Track IV	t = .35
Mathematics pupils Track I/Track IV	t = .05
English pupils Track I/Track IV	t = .14

Social Studies Track I teacher/pupils	t = .04
Social Studies Track IV teacher/pupils	t = .09
Mathematics Track I teacher/pupils	t = .04
Mathematics Track IV teacher/pupils	t = .12
English Track I teacher/pupils	t = .33
English Track IV teacher/pupils	t = .04

t VALUES FOR LEVELS OF CONFIDENCE (30 degrees of freedom)

Confidence level	.40	.30	.20	.10	.05
t value	.256	.530	.854	1.31	1.70

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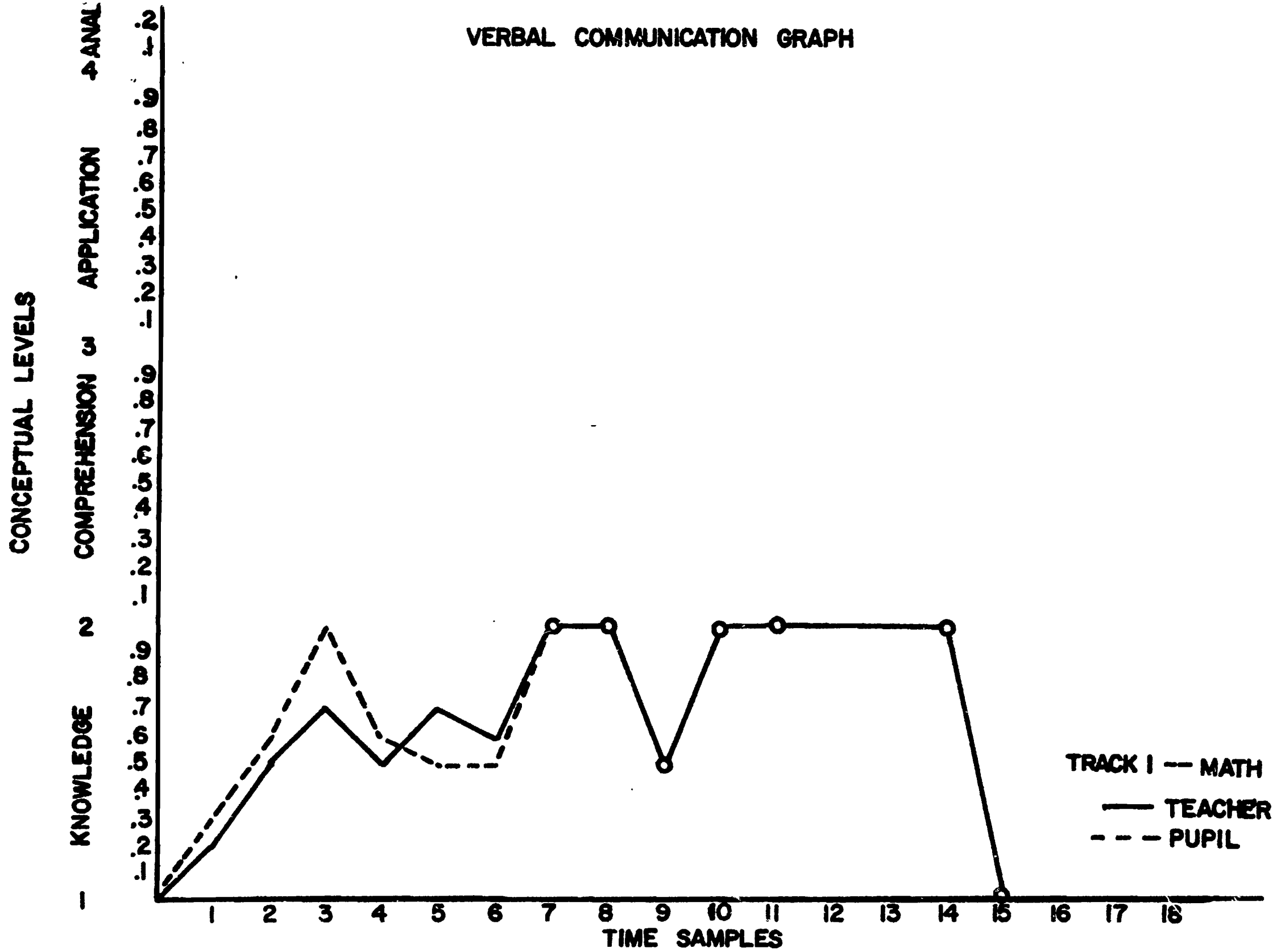

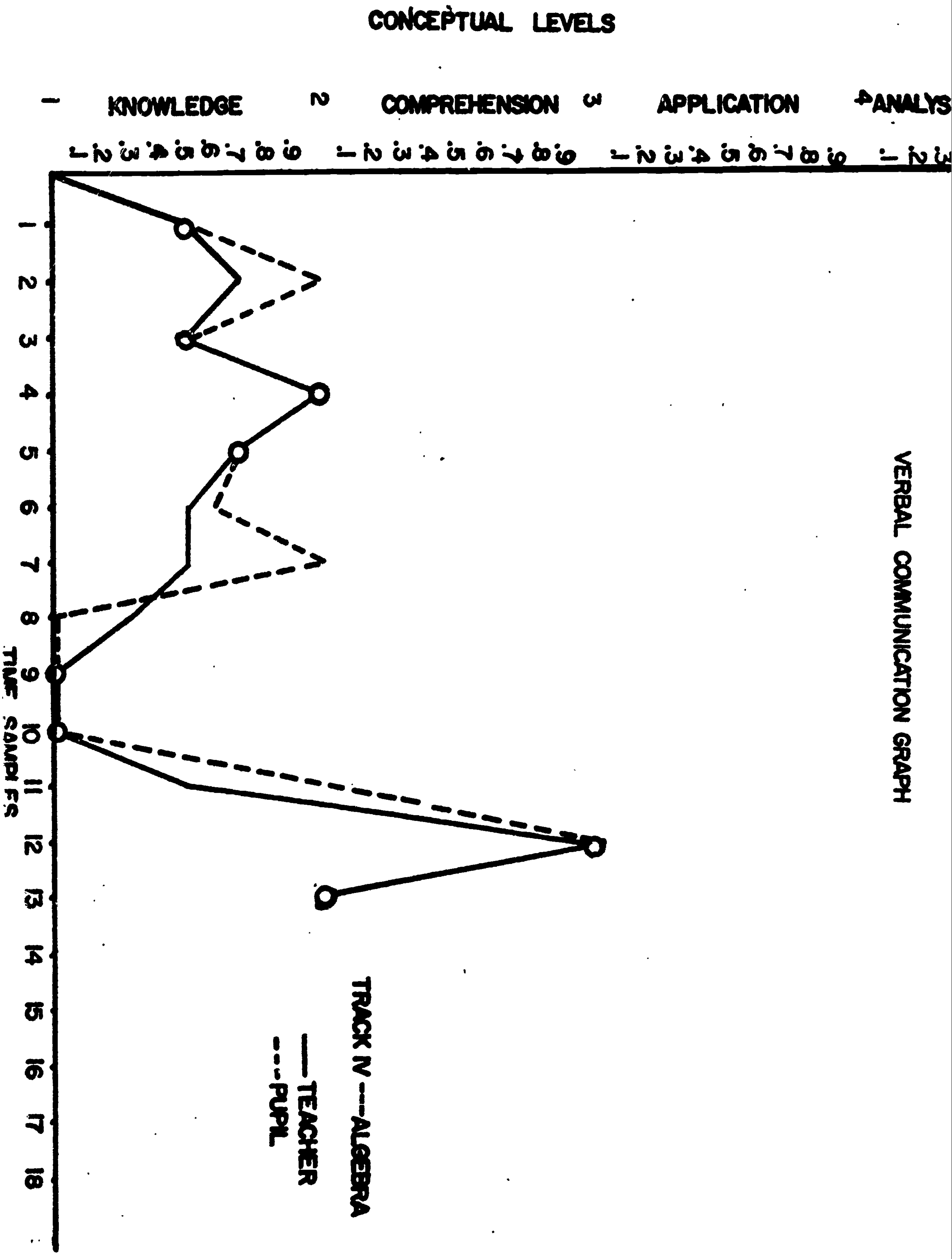

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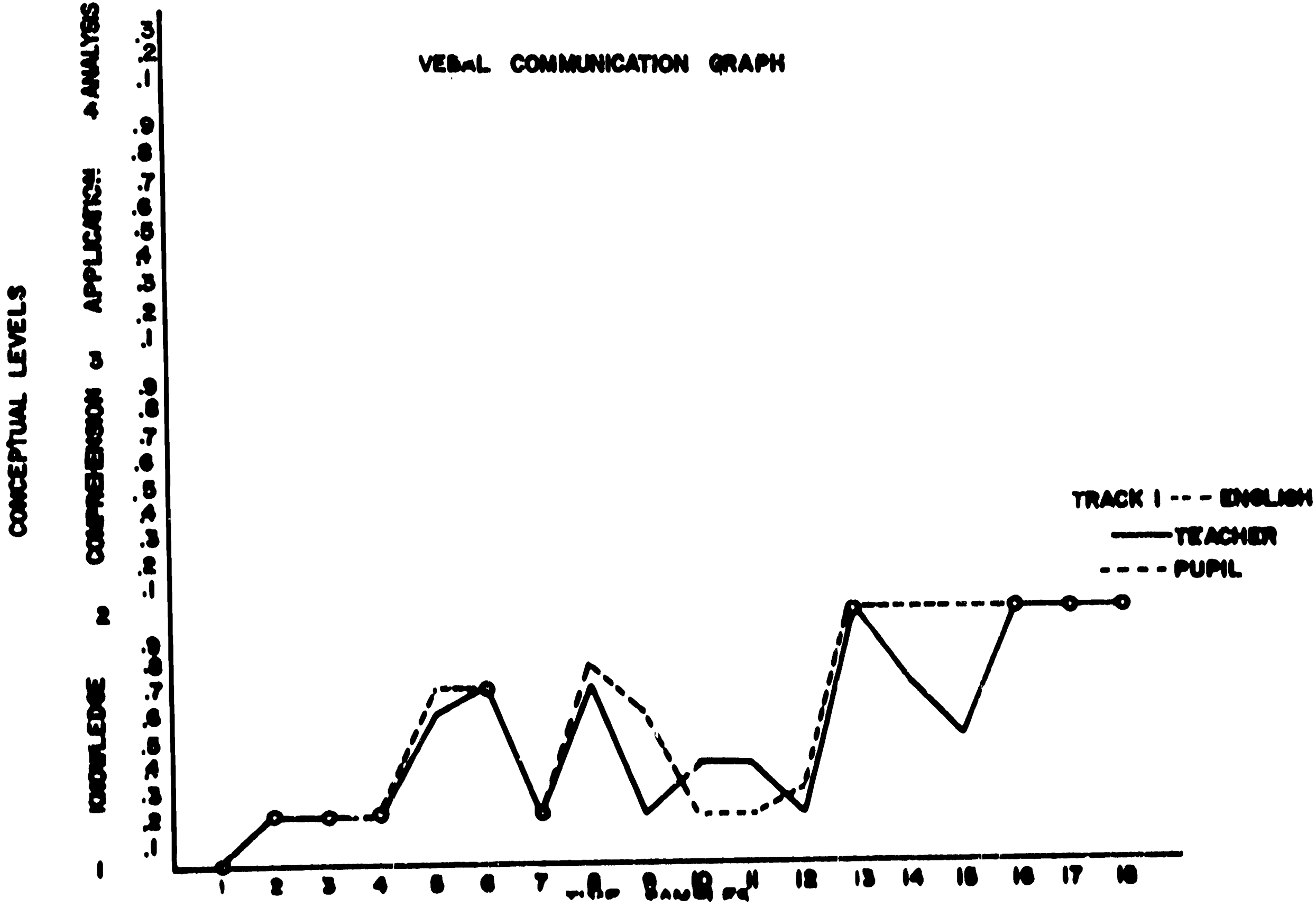

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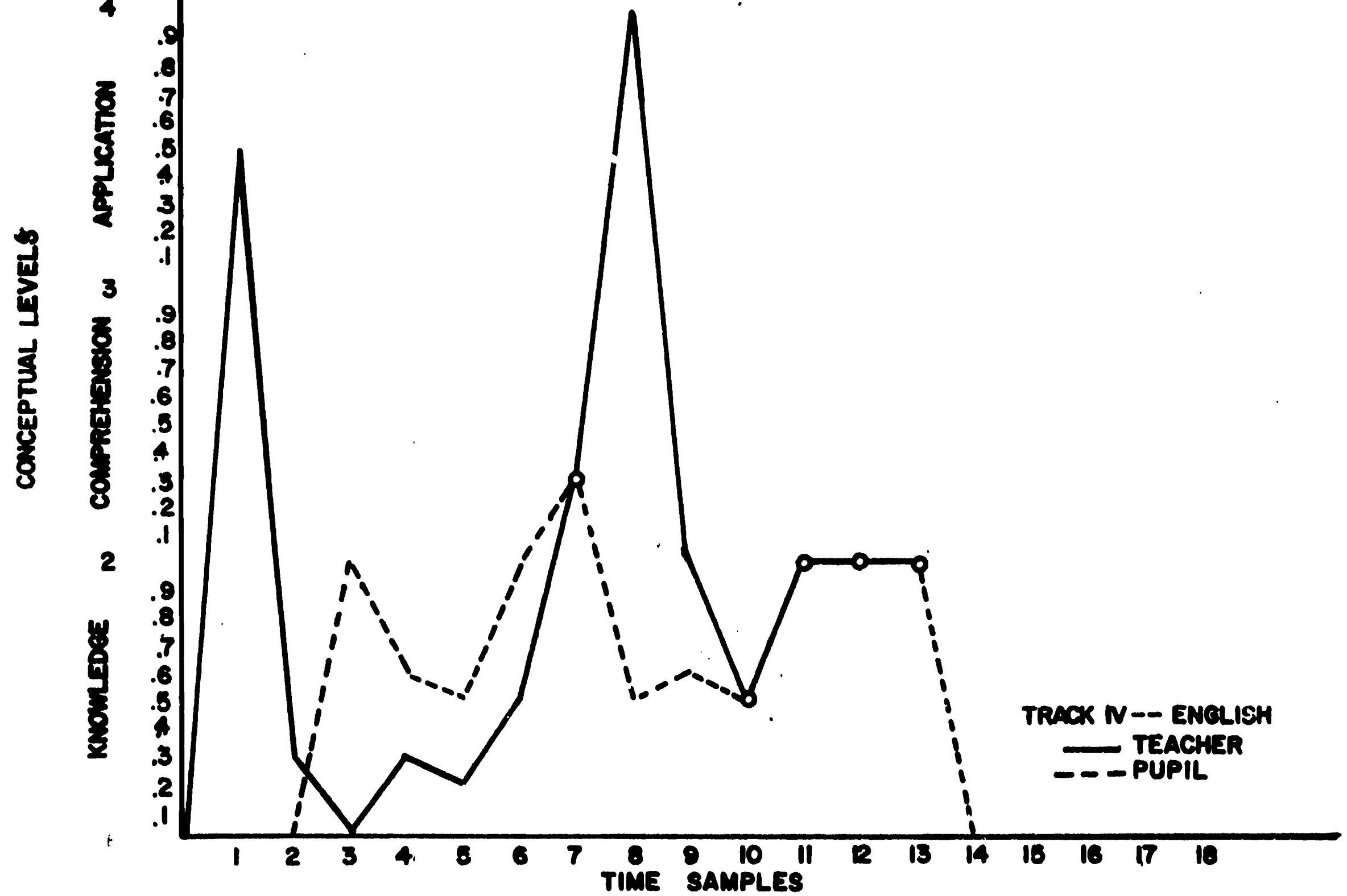

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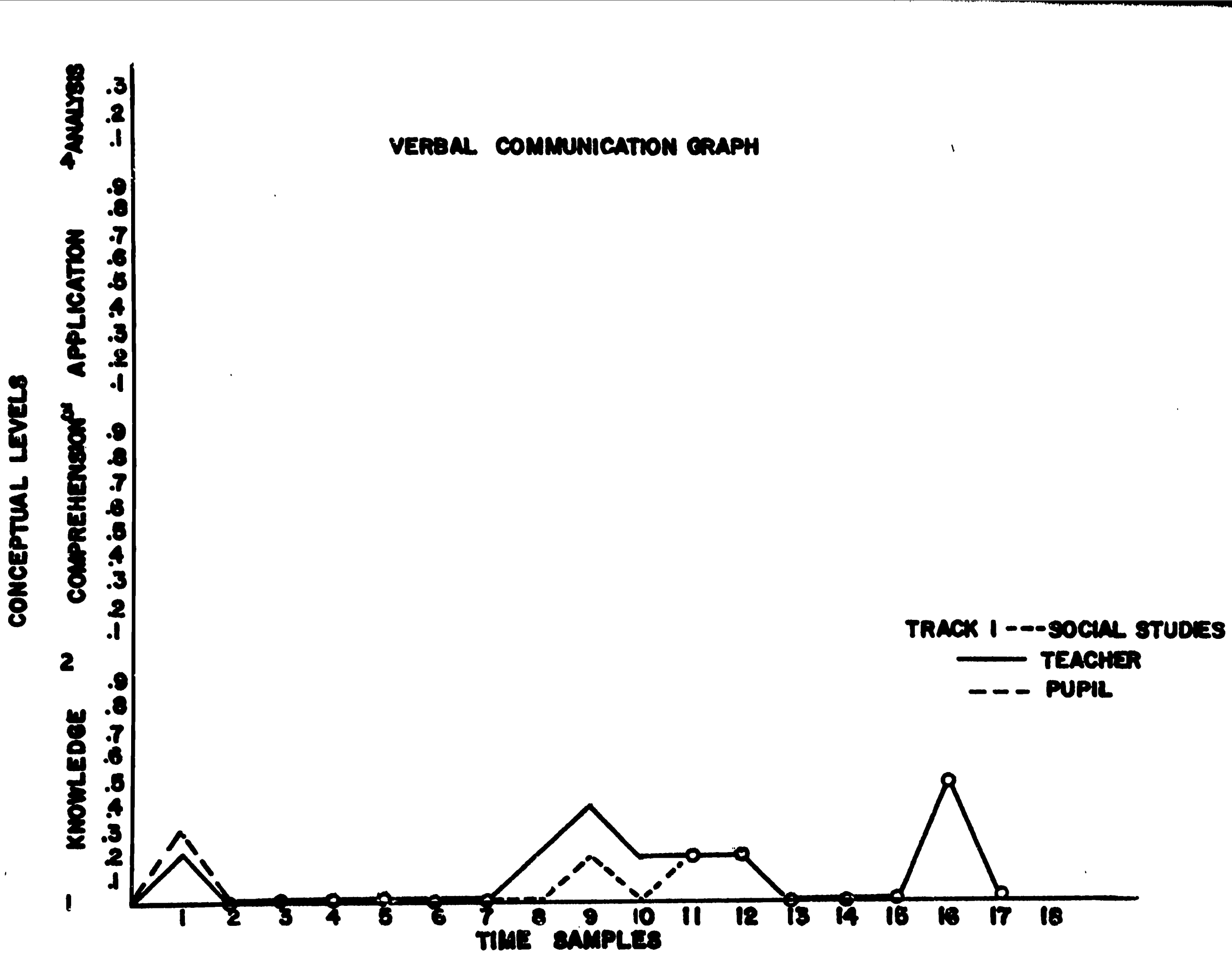

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