A STUDY OF THE RELATIONSHIP BETWEEN BELIEF SYSTEMS AND COGNITIVE FUNCTIONING IN CHILDREN OF GRADES FOUR, FIVE, AND SIX

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ABSTRACT

A STUDY OF THE RELATIONSHIP BETWEEN BELIEF SYSTEMS AND COGNITIVE FUNCTIONING IN CHILDREN OF GRADES FOUR, FIVE, AND SIX

by John Ford

The current literature in elementary social studies, as well as in general education, indicates a growing concern over the development of thinking skills in children. One frequently overlooked, but important element in the development of these skills is one's belief system--not only those held by pupils, but also those held by teachers. Belief system is defined as all ideas, sets, expectations, or hypotheses that one accepts as true of the world.

The purpose of this study was to explore the relationship between one area of belief systems of teachers and their pupils, and to analyze the ways in which this relationship is related to cognitive functioning in pupils.

It was hypothesized that the number of open- and closed-minded pupils will vary with the open- and closed-mindedness of the teacher. Further, pupils taught by open-minded teachers will show greater cognitive ability when compared with pupils taught by middle-scoring teachers and closed-minded teachers.

One hundred five fourth, fifth, and sixth grade teachers completed the Rokeach Dogmatism E Scale[1] during May, 1968. From this group nine teachers and their pupils were selected as the sample used in this study. Teachers with the three most extreme scores at either end of the scale were designated as high and low in dogmatism. The other three were drawn by random selection from the cluster of scores within one standard deviation of the mean.

Pupils in these nine classrooms were classified low, middle, and high in dogmatism as determined by their scores on Figert Dogmatism C Scale.[2] Cognitive Functioning was measured by pupil's scores on Sequential Tests of Educational Progress:Social Studies, Form 4B (STEP). Further, test items of STEP were divided into three classifications according to the thinking skill required of the child in responding correctly. The items tested ability to identify generalizations and values, to compare and contrast data, and to draw valid conclusions and generalizations.

The chi-square statistical technique was employed to test differences in the number of pupils who were classified low, middle, and high in dogmatism when taught by the three teacher types. The analysis of variance (mixed model) was used to analyze mean difference in pupils' cognitive functioning as it related to teacher dogmatism and pupil dogmatism. Significant mean differences obtained via over-all F-test were further analyzed using Scheffe's multiple-comparison technique.

The following hypothesis was supported.

> Disregarding pupil type, cognitive functioning among pupils taught by three teacher types will tend to show an inverse relationship (p .01).

Pupils in open-minded teachers' classrooms scored highest of all three groups in cognitive functioning, while those in closed-minded teachers' classrooms scored lowest. While this was significantly supported by the data, several other non-significant trends were evident which would bear further analysis in future studies. The mean scores of open-minded pupils were consistently highest whereas mean scores for closed-minded pupils, in more instances than not, were lowest. Even more interesting was the pattern of the interaction of pupil dogmatism and teacher dogmatism when examining cognitive functioning. The trend was clearly evident (but not statistically significant) that open-minded pupils in open-minded teachers' classrooms scored highest of all sub-groups on cognitive functioning, and closed-minded pupils in closed-minded teachers' classrooms (in more instances than not) scored lowest.

The second statistically-supported hypothesis of the study was

> Mean scores for all pupils on cognitive functioning will tend to vary from subscale to subscale (p .01).

Pupils scored highest on test items requiring ability to

identify generalizations and lowest on ability to draw conclusions.

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[1]Milton Rokeach, The Open and Closed Mind (New York: Basic Books, Inc., 1960), pp. 71-80.

[2]Russell L. Figert, "An Elementary School Form of the Dogmatism Scale:Development of an Instrument for Use in Studies of Belief-Disbelief Systems of Children in Grades 4-6" (unpublished Ph.D. dissertation, Ball State University, 1965), pp. 106-109.

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CHAPTER I

INTRODUCTION TO THE STUDY

The current literature in elementary social studies indicates an accelerated concern pertaining to the development of thinking abilities in children.[1] This growing concern appears to be because children are growing up in a free and increasingly complex society. Teaching for accumulation of descriptive facts per se is criticized as being highly obsolescent.[2] The current focus is upon development of thinking skills, such as identifying concepts, comparing alternate solutions, and evaluating data. Carpenter claims that thinking skills ". . .represent more generalized learnings and thus are likely to be applicable continually in all facets of an individual's life."[3]

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[1]Jean Fair and Fannie R. Shaftel (eds.), Effective Thinking in the Social Studies (Washington, D.C.: National Council for the Social Studies, 37th Yearbook, 1967); Jerome Bruner, The Process of Education (Cambridge, Massachusetts: Harvard University Press, 1960); and Hilda Taba, Thinking in Elementary School Children (San Francisco State College, United States Office of Education, Cooperative Research Project No. 1574, 1964).

[2]Arthur W. Foshay, "A Modest Proposal. . .For the Improvement of Education," Educational Leadership, 18:506-516, May, 1961.

[3]Helen M. Carpenter, "The Role of Skills in Elementary Social Studies," Social Education, 18:220, 1967.

Need for the Study

In preparation of goals for social studies education the National Council for the Social Studies states, "In a free society, behavior must rest upon reasoned convictions as well as emotional acceptance. Knowledge and the ability to think should provide the basis on which American children and youth build the beliefs and behavior of free citizens."[4] If knowledge and ability to perform various cognitive operations are legitimate social studies (educational) outcomes, then to improve training and selection of teachers, educators need to know the relationships among teacher personality, pupil personality, and pupil ability to perform certain cognitive operations. Results of past studies indicate that different teaching styles have different effects on children's learning. Greater general achievement and positive feelings are results of the class climate produced by Lewin's "democratic" teacher,[5] Anderson, Brewer, and Reed's "integrative" teacher,[6] Withall's "learner-supportive" teacher,[7] and Ryan's

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[4]The National Council for the Social Studies, "The Role of the Social Studies," Social Education, 26:316, October, 1962.

[5]K. Lewin, R. Lippitt, and R. White, "Patterns of Aggressive Behavior in Experimentally Greated Social Climates," Journal of Social Psychology, 10:271-299, 1939.

[6]H. H. Anderson, J. E. Brewer, and M. R. Reed, "Studies of Teachers' Classroom Personalities," Applied Psychological Monograph, No. 11, 1946.

[7]J. Withall, "The Development of a Technique for the Measurement of Social-Emotional Climate in Classrooms," Journal of Experimental Education, 17:347-361, 1949.

"warm-flexible" teacher[8] which are all similar styles called by different names. Because these studies only identified teaching style as an antecedent variable, they implied that all children in a given class are influenced equally by the teacher. These studies assumed a one-to-one relationship between some teacher characteristic (e.g. warmth) and pupil achievement with no account of the variance within classes taught by "warm" or "happy" teachers.

There is a dearth of research dealing with both teacher and pupil personality variables as antecedants to pupil achievement. Meanwhile, teacher training and teacher selection continue as before being based on an unsubstantiated assumption as a one-to-one relationship. In one of her articles Crabtree[9] claims that the type of research needed is verified evidence of which population of learners learn what type of task best by what method.

Purpose of the Study

Both teachers and pupils vary in their respective beliefs and characteristic ways of looking at the world. Further, teachers influence the thinking abilities of children in different ways. If the cognitive functioning (thinking skills) of children is related to their belief

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[8] D. G. Ryans, "Some Relationships between Pupil Behavior and Certain Teacher Characteristic," Journal of Educational Psychology, 52:82-97, 1961.

[9] Charlotte Crabtree, "Supporting Reflective Thinking in the Classroom," in Fair and Shaftel (eds.), loc. cit., p. 85.

systems and the belief system of the teacher by whom they are taught, then the focus of study should be on the configuration of belief systems held by the classroom members, both teacher and pupils. Belief system is defined as all ideas, sets, expectations, or hypotheses that one accepts as true of the world. It is the purpose of this study to explore the relationship between belief systems of teachers and pupils and to analyze the ways in which this relationship is related to cognitive functioning in pupils.

The findings of this study can contribute to a better understanding which can be used in training teachers. Further, the findings may help in eliminating the unsubstantiated assumption that a single method or ideal teacher is best for all pupils. Third, this exploratory and analytic study may facilitate the establishment of a framework for a more definitive base on which to select and place teachers. Finally, this study can serve as a stimulus for future research between personality variables of teachers and pupils.

Research Hypotheses

The two major hypotheses of this study are that the number of open- and closed-minded pupils will vary with the open- and closed-mindedness of the teacher, and pupils taught by open-minded teachers will show greater cognitive ability when compared with pupils taught by middle-scoring teachers and closed-minded teachers. (One is open- or closed-minded to the extent that he accepts or rejects

information uncritically. Cognitive functioning and ability refer to skill in identifying, comparing, and drawing conclusions from data).

Rationale

Rationale for this study is divided into four parts. In the first part the classroom is described as a sub-social system. Origin of belief system is explained in the second part. In the third part interaction of belief systems is discussed. The basic assumptions are listed in the final part.

A Sub-Social System

The classroom is conceptualized as a sub-social system, i.e., a group of actors organized to perform imperative goal-directed activities.[10] The actors fulfill various status-roles which are complementary and interdependent. The teacher teaches and pupils learn. Thus, one can predict classroom behavior by knowing the preestablished pattern (formal status-roles) of behavior. However, the status-roles are, in fact, held and acted out by individuals who have diverse belief systems. Diverse belief systems are related to variations in teacher and pupil behavior.

Teachers have different teaching styles that are consistent with their respective belief systems. One

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[10]Talcott Parsons, The Social System (Glencoe, Illinois: The Free Press, 1951); and N. B. Henry (ed.), The Dynamics of Instructional Groups, 59th Yearbook of National Society for the Study of Education, Part II (1960).

teacher, for example, holding a relatively closed belief system teaches in a very rigid and structured fashion whereas another teacher holding to a relatively open belief system provides very little structure and order. Yet a third teacher may hold beliefs between the open-closed polarized positions, thus exhibiting behavior between these positions. No casual relationship is intended here. The intention is that there is a positive correlation between one's belief system and one's overt behavior.[11]

Similarly, children are of different types in any given class taught by a teacher who has a particular belief system. Some of the children hold fixed beliefs while other children in the same class hold beliefs that can be changed on the basis of evidence. Further, children holding to rigid belief system accept authority without question while children holding to an open belief system are able to distinguish between authority and the information from that same source.

Development of Belief System

From birth one begins to absorb the external world according to his interpersonal relationships. As implied

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[11]H. M. McGee, "Measurement of Authoritarianism and Its Relation to Teachers' Classroom Behavior," Genetic Psychological Monograph, 52:89-146, 1955; Shia-Ling Liu, "Personal Characteristics in Secondary School Social Studies Student Teaching As Related to Certain Measures of Potential Teaching Behavior" (unpublished Ph.D. dissertation, North Texas State University, 1964).

in Mead's[12] writings, the child takes on a private replica from his significant others. In response to making sense of experiences, a conceptual system evolves. This system of beliefs about the world serves as a filter, a transformer which processes and codes impinging stimuli into psychological significance.[13]

However, as one assimilates knowledge of the world, he also acquires a characteristic mode of accomodating (reorganizing) information based on what he has learned to accept as a definitive source in which and by which he can check the validity of the information. The acquired conceptual system varies with the socializing conditions in which it evolves. Frenkel-Brunswik states, for example, that varying degrees of permissiveness or punitiveness in early child-parent relations result in individual differences in ability to tolerate ambiguity, and this emotional-social ambivalence influences the cognitive system (thinking skills).[14] Thus, one who has a relatively closed conceptual system is less able to perform certain cognitive

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[12]George H. Mead, Mind, Self, and Society (Chicago, Illinois: University of Chicago Press, 1934).

[13]B. Inhelder and J. Piaget, The Growth of Logical Thinking from Childhood to Adolescence (New York: Basic Books, Inc., 1958); and Harold Schroder and O. J. Harvey, "Conceptual Organization and Group Structure," Motivation and Special Interaction (New York: Ronald Press, 1963) pp. 134-166.

[14]Else Frenkel-Brunswik, "Intolerance of Ambiguity As an Emotional and Perceptual Personality Variable," Journal of Personality, 18:108-143, 1949.

operations when compared to one who has a relatively open conceptual system. Yet, a third conceptual system functions within the polar positions. Each is the result of different training conditions or different teachers holding different belief systems.

Interaction of Belief Systems

One teacher exerts complete control in which he determines procedures, maintains a uniform standard, adheres to absolute authority, and rewards conformity. Authority is viewed as infallible, knowledge is definite, and achievement (mastery of rules) per se is valued. This teacher is said to be closed-minded.[15] Closed-mindedness leads to great dependence, undifferentiated concepts, need for highly structured situations, and search for specific, absolute correct answers. Self-worth is synonomous with conformity to absolute external rules.[16]

Taking on such a conceptual system in the setting described, the child will have his ability to assimilate and accomodate new ideas impaired. The impaired ability can take the form of distorting information and an intolerance for ambiguity. Similarly, opposing, but pertinent parts of information may be falsified or eliminated

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[15]Milton Rokeach, The Open and Closed Mind (New York: Basic Books, Inc., 1960), pp. 31-70.

[16]Bruce R. Joyce, "Developing Open Minds," Strategies for Elementary Social Science Education (Chicago, Illinois: Science Research Associates, Inc., 1965), pp. 83-99.

in order to leave the closed mind intact. Thus, thinking efficiency is lowered or arrested due to premature closure.[17]

Another teacher, said to be open-minded, creates conditions in which the child is aided in understanding himself, searching behavior is rewarded, and the child is valued as an individual in his own right. Further, knowledge is held as tentative, and authority as fallible. Determination of daily procedures and academic standards are accomplished by both teacher and pupils. Thus, reciprocity or interdependence takes the place of teacher dominance.[18] The child in this setting can try alternatives without fear due to lack of dependence on external criterion. He is free to explore and gain experience at various thinking levels.

The conditions emanating from closed-mindedness and open-mindedness of teachers were described respectively as stifling thinking skills or enhancing them. However, there is practically no one-to-one relationship between stimulus and response because of different internal, mediating belief systems in different children.

A closed-minded teacher, then, does not affect all pupils in the same way. A closed-minded child functions better when taught by a closed-minded teacher because the

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[17] C. Gratton Kemp, "Effect of Dogmatism on Critical Thinking," School Science and Mathematics, 30:314-319, April, 1960.

[18] Joyce, loc. cit.

teacher offers a constant highly bounded and ordered environment which is what the closed-minded child needs. The same closed-minded child feels threatened by the open-ended view of the world offered by the open-minded teacher. Yet, the open-minded child taught by an open-minded teacher should have his thinking abilities enhanced.

It becomes axiomatic that different children need different learning conditions, supplied by the teaching style (indicative of the teacher's belief system), in which to function.[19] It also becomes axiomatic that a teacher varies his teaching style to meet the diverse needs in a given classroom. Further, in light of what has been mentioned, the open-minded teacher is more likely than the closed-minded teacher to vary his behavior to meet diverse pupil needs because he can perceive and act on classroom cues unencumbered by irrelevant factors (e.g. unrelated personal beliefs, irrational ego motives, and need for self-aggrandizement).[20]

Basic Assumptions

The basic assumptions underlying this study are that

1. both children and adults have belief systems which tend to vary from person to person;

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[19]William C. Trow, "Role Functions of the Teacher in the Instructional Group," in N. B. Henry (ed.), loc. cit., pp. 30-50.

[20]Rokeach, loc. cit., p. 58.

2. beliefs provide a basis for behavior;

3. children can report degrees of agreement to statements designed to measure beliefs;

4. behavior can be inferred from test scores serving as predictors of overt behavior;

5. knowledge and thinking abilities can be classified and measured.

Definitions of Terms

Several terms used throughout this study refer to variations in teachers' belief systems, variations in pupils' belief systems, and pupils' knowledge and thinking skills. These are defined as follows:

1. Teachers' Belief System.--All ideas, sets, expectations, or hypotheses that one accepts as true of the world.

   a. High Dogmatism (H_{dt}).--Teacher who scores at least one standard deviation above the mean of scores on the Dogmatism E Scale[21] indicating closed-mindedness, or one who holds rigidly to external absolute rules, ignores individual differences, and provides definite structure (see p. 8).

   b. Middle Dogmatism (M_{dt}).--Teacher who scores at the mean or within one standard deviation of the mean of scores on the Dogmatism E Scale.[22]

   c. Low Dogmatism (L_{dt}).--Teacher who scores at least one standard deviation below the mean of scores on the Dogmatism E Scale[23] indicating open-mindedness or one who is flexible, allows for pupil differences, has loose structure, and encourages participation in setting rules (see p. 9).

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[21] Ibid., pp. 73-80.

[22] Ibid.

[23] Ibid.

2. Pupils' Belief System.--Same as for teachers, pupils are categorized according to their scores on Figert's Dogmatism C Scale.[24]

   a. High Dogmatism (H_{dp}).--Child who needs a great deal of structured experience, holds to fixed and few beliefs, and accepts authority uncritically (see pp. 6-10).

   b. Middle Dogmatism (M_{dp}).--Child whose behavior varies somewhere between high and low dogmatic behavior, but closer to high dogmatic psychologically. (Rokeach[25] states that because little theory or empirical research has been done on the middle-scoring subjects, little can be said about them; however, they were more like the closed than the open-minded group in his study.

   c. Low Dogmatism (L_{dp}).--Child who holds alternate beliefs, whose system is open (loose) enough to tolerate ambiguity, to see contradictory ideas from various sources.

3. Cognitive Functioning.--Pupils' scores on STEP[26] which are divided into three classifications based on intellectual skills required of the pupils. Three classifications are

   a. to identify generalizations and values,

   b. to compare and contrast data,

   c. to draw valid conclusions.

Overview

The present study will be divided into the next four chapters. Pertinent literature dealing with the relationship of beliefs and thinking skills in the classroom will

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[24]Russell L. Figert, An Elementary School Form of the Dogmatism Scale:Development of an Instrument for Use in Studies of Belief-Disbelief Systems of Children in Grades 4-6 (unpublished Doctoral dissertation, Indiana, Ball State University, 1965).

[25]Rokeach, loc. cit., pp. 357-365.

[26]Sequential Tests of Educational Progress:Social Studies, Form 4B, Grades 4-6, (Princeton, New Jersey: Cooperative Test Division, Educational Testing Service, 1957).

be reviewed in Chapter II. The sample, instrumentation, statistical hypotheses, and statistical model will be described in Chapter III. In Chapter IV each of the hypotheses will be presented and analyzed in detail. The thesis will conclude in Chapter V with a summary, integration of the findings, and educational implications of the findings.

CHAPTER II

REVIEW OF LITERATURE

The first chapter indicated that any given classroom teacher behavior will influence the functioning of one type of child in one way and influence another type of child in another completely different way. The classroom was described as having both teacher and pupils possessing individual needs and individual ways of perceiving which would affect what is learned by whom. Yet, a lack of experimental research dealing with the differential influence of different teachers on different pupils was indicated.

The following review of related literature consists of studies dealing with teacher influence on pupil thinking and studies pertaining to behavioral consequences of dogmatism. A single study that stands alone in analyzing interaction between the personalities of both teachers and pupils is reviewed last. A summary of the relevant major findings of the studies cited concludes the chapter.

Teacher Influence on Pupil Thinking

Possien's[1] study focused on the manner in which three classes of sixth graders solved map reading problems after having been instructed by one of three methods, viz., inductive, deductive-causal relations, or deductive. The first dealt with guiding the pupil in discovering for himself how to use map legends in order to understand map symbols. The deductive-causal relation group was given detail explanations of causes in the same subject matter while the deductive group was simply told the necessary facts. After 30 minutes a day for three weeks, six pupils from each group were matched on their respective map reading ability pretest score and mental age. The 18 selected pupils were given ten map reading problems to solve while "thinking out loud." The inductive method was found to be effective, significant at the .02 level via Friedman 2-way analysis of variance, more frequently than both deductive-causal relations and deductive method.

Thus, the investigator's major hypothesis that the inductive method is more effective than the deductive method in teaching problem-solving skills was supported. Further, the foregoing study supports the idea that rewarding pupil searching and discovering behavior not only broadens the pupil's conceptual system, but also

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[1]Wilma M. Possien, A Comparison of Effects of Three Teaching Methodologies on Development of Problem Solving Skills of Sixth Grade Children (unpublished Doctoral dissertation, Alabama, University of Alabama, 1964).

enhances the characteristic mode of viewing new problems whereas deductive teaching seems to stifle the trying of alternate solutions to problems.

Possien acknowledges that the conclusion cited above may be open to question due to a couple of confounding variables that were not controlled. The investigator was the teacher for all three class groups and possibility of pupil reaction effects[2] while expressing one's thoughts are two confounding variables. There seems to be no proof given that the same teacher for all three groups held consistently to the appropriate teaching method throughout the various sessions, a common shortcoming of studies of this type. Also, a shy child may find it difficult to think out loud or a child may not say everything he is thinking, thereby giving rise to the problem of how to measure the child's thinking while he is not talking. Nonetheless, this study demonstrates that problem solving skills are said to increase with inductive teaching more so than with deductive teaching.

Aside from rewarding pupil searching and discovering behavior, there are other teacher characteristics related to pupil thinking. Miller[3] assumes that the teaching

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[2]See Donald T. Campbell and Julian C. Stanley, "Experimental and Quasi-Experimental Designs for Research on Teaching," in N. L. Gage (ed.), Handbook of Research on Teaching (Chicago, Illinois: Rand McNally, 1963), pp. 171-246.

[3]G. L. Miller, "Collaborative Teaching and Pupil Thinking," Journal of Teacher Education, 17:337-358, 1966.

role consists mainly of working on content (providing focus, development, information, and evaluation) and maintaining order. Further, teachers vary in carrying out the roles of teaching which can be measured and plotted along a responsive-directive dimension. Some teachers are quite responsive to classroom cues while other teachers, disregard cues, rigidly direct instructional activities. Based on this bipolar view of teaching behavior, Miller hypothesizes that teacher's responsiveness to classroom cues will be positively related to pupils' expressions of complex and high level thinking. (It should be noted that Miller defined thinking as recalling, explaining, hypothesizing, and synthesizing.)

One hundred seventh and eighth graders were divided into two treatment groups (responsive and directive) and eight instructional groups to be taught American economics in ten thirty-minute lessons. From pencil and paper achievement test and observation the researcher found that children taught by responsive teachers expressed more complex and abstract thinking during class discussion than did the children taught by directive teachers. Using chi-square techniques, difference was significant at .001 level.

Other studies show similar findings. For example, one study where 45 lessons were taught to 9 junior high

classes, it was found that teachers who invited divergent thinking generated more student divergent thinking.[4]

In an attempt to relate theory to practice Taba[5] set forth a theory of teaching social studies based on Piaget's theory of intellectual development. Her basic assumption was that if thinking is learned from the child "making his mind" in active transaction via assimilation and accommodation of experiences, then teaching strategies based on structure and sequence of both content and child's thinking ability should enhance its development. The investigation of this assumption involved 20 classes of second to sixth graders for 18 months. From data gathered from administration of Taba's Social Studies Inference Test, and Application of Principles and from tapes revealed that there was an earlier beginning of "formal thinking" due to the teaching strategies, earlier than Piaget had found.

Significant gains in ability to make inferences were made in classes whose teachers used the teaching strategies for which they (the teacher) were trained, but there were no gains in those classes whose teachers did not use the

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[4]B. B. Hudgins and W. Ahlbrand, Jr., "Teachers' Demands and Students' Thinking," Educational Leadership, 25:583-189, March, 1968. Also, see B. O. Smith and M. O. Meux, A Study of the Logic of Teaching (Urbana, Illinois: University of Illinois, United States Office of Education, Health, Education and Welfare, Project No. 258 (7252) 1963).

[5]H. Taba, Thinking in Elementary School Children (San Francisco: San Francisco State College, United States Office of Education, Cooperative Research Project No. 1574, 1964).

strategies. However, pupils in either group did not do equally well. While the strategies may be effective for developing thinking, teaching strategies are used by teachers and teachers vary according to their beliefs. Therefore, lack of focus on the belief system of the teachers may account for a great deal of the variance.

While the foregoing studies did not focus directly on belief systems, there are studies that have this direct focus. A discussion of the pertinent ones follows.

Behavioral Consequences of Dogmatism

Ehrlich[6] assessed the relative difference in long-term effects of dogmatism and learning. He hypothesized in both his studies that dogmatism of students was inversely related to the degree of learning in an introductory sociology course, and that the relation was independent of academic ability. Rokeach's Dogmatism E Scale and Sociology Test (mostly definitions and generalizations constructed by the sociology department) were administered to the original sample of 100 college students at the beginning and at the end of a five-month period. The same two tests were mailed five years later to the same sample of whom Ohio State Psychological Examination (OSPE) scores were available.

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[6]Howard J. Ehrlich, "Dogmatism and Learning: A Five-Year Follow-Up," Psychological Reports, 9: 283-286, 1961.

Based on a 72% return, an intercorrelation among dogmatism scores, point hour ratio, and Sociology Test scores ranged from -.29 to -.043. An intercorrelation with OSPE yielded -.001 which confirmed his hypothesis. The findings indicate that students low in dogmatism learned more and retained more over a period of time.

Kemp[7] tested the hypothesis that open-minded students would solve correctly more critical thinking problems than closed-minded students. Critical thinking was defined as one's score on a 50-item self-constructed test of problem solving.

From a sample of 500 college students tested on the Dogmatism E Scale, 150 who were highest and 150 who were lowest were selected and given a test of critical thinking, especially prepared for this study. He found that those who were relatively low in dogmatism (open-minded) scored higher which was a significant difference at the .01 level. Kemp concluded that open-minded students were more successful than closed-minded students in analyzing and evaluating information. Further, those with a closed system had the most difficulty with test items calling for selection of alternative routes to arrive at a solution.

In order to relate rigidity to the teaching and learning of the scientific method (i.e., application of

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[7]G. Gratton Kemp, "Effect of Dogmatism on Critical Thinking," School Science and Mathematics, 30: 314-319, April, 1960.

logic to test opinion as opposed to use of authority or *a priori*), Solomon[8] compared 146 college freshmen classified as rigid and non-rigid via Rokeach's *Dogmatism D Scale* in a biological science course. Several different tests were used in testing the hypotheses that the rigid person would react differently to the scientific method, that the non-rigid person would exhibit more comprehensive thinking than the rigid person, and that both cognitive patterns can be found in the classroom.

First, the groups had to measure a volume of water by manipulating jars. Secondly, they had to define biological terms. And thirdly, they were to respond in written essay form to several questions related to an experiment in zoology which they had seen.

It was found that the rigid-thinking student differed significantly from his non-rigid peer on each of the tasks at the 1% level. Because those who were rigid showed an inability to use the scientific method whereas those who were non-rigid demonstrated an ability to overthrow preconceived ideas on the basis of evidence, Solomon concluded that,

> Perhaps the most important results appear to indicate that the effectiveness of the teaching of the scientific method is possibly, at least partially,

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[8]Marvin D. Solomon, The Personality Factor of Rigidity as an Element in the Teaching of the Scientific Method (unpublished Doctoral dissertation, East Lansing, Michigan: Michigan State University, 1951).

> determined by the rigidity--non-rigidity and the comprehensiveness--non-comprehensiveness of the student.[9]

Further,

> It can be hypothesized that the traditional, idealistic approach with its formalistic and paternalistic attitude to subject matter, in which the mind develops and is dependent only upon the material presented, might lead to a rigid personality.[10]

The studies cited above have several basic limitations which tend to limit their applicability to the study undertaken by the present researcher. None of these studies dealt with variables resulting from the congruency of belief systems. That is, while the first set of studies focused on pupil thinking abilities resulting from contrasting teacher behavior, the second set focused on the congruency of both learner and teacher's belief system as antecedant to pupil thinking abilities. Yet, Solomon[11] did admit that the effectiveness of teaching is partly determined by the learner's "openness to experience" which would imply that the subsequent learning is also partly determined by the openness of the teacher.[12]

In a similar vein, Gross[13] postulated concerning the congruency between role behavior and role expectation that,

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[9] Ibid., p. 130. [10] Ibid., p. 146. [11] Ibid., p. 130.

[12] Fair and Shaftel, loc. cit., pp. 77-122. Also see Herbert A. Thelen, "Matching Teachers and Pupils," NEA Journal, 56:18-20, April, 1967.

[13] Neal Gross, "The Sociology of Education," in R. K. Merton, L. Broom, and L. S. Cottrell, Jr. (eds.), Sociology Today (New York: Harper, Row Publishers, Volume 1, 1959), p. 141.

> If we assume that subordinates work most effectively in a social climate in which their superordinate conforms to their expectations for his behavior, then we can assume that students who hold an 'authoritarian' role definition for the behavior of their teacher will work harder in an 'authoritarian' environment and that students who hold a 'democratic' role definition for their teacher's behavior will work harder in a democratic environment.

Interaction of Teacher-Pupil Types

The only study that was directly concerned with teacher and pupil personality types and their effects on pupil learning was reported by Heil, Powell, and Feifer.[14] Their study was based on the assumption that teacher behavior will evoke one kind of achievement for a part of the class, another kind of achievement for another part, while a third part may be unaffected. Both teachers and children were categorized to determine the kinds of effects on types of children taught by various types of teachers. The study included 55 fourth, fifth, and sixth grade teachers and their pupils representing different socio-economic levels in 9 different elementary schools.

On the basis of the teachers' scores on the Teacher Observation Scale (17 polar categories from various sources by the researchers) and the Manifold Interest Schedule (activity statements to which teacher responds like,

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[14] L. M. Heil, M. Powell, and I. Feifer, Characteristics of Teacher Behavior and Competency Related to the Achievement of Different Kinds of Children in Several Elementary Grades (United States Department of Health, Education, and Welfare, Cooperative Research Project No. 7285, 1960).

dislike, indifferent), the teachers were classified as "turbulent" (unconventional, defensive intellectual), "self-controlling" (methodic, well-integrated), and "fearful" (weakly-integrated, authoritarian). According to the children's similarity of profiles on the Assessing Children Feelings (designed especially for this study), they were classified as "conformers," "opposers," "waverers," and "strivers." The children were given the Stanford Elementary Achievement Test at the beginning and end of the school year.

Investigators found that the "self-controlling" teachers were equally effective with all four pupil types which was not true of the other two teacher types. The "turbulent" teachers were just as successful as "self-controlling" teachers with "conformers" and "strivers," but were ineffective with "opposers" and "waverers." The "fearful" teachers, in contrast, had low achievement for all except the "strivers." In turn, the "strivers" had greater achievement compared to the other pupil types; however, the "strivers" appeared to achieve independent of the teacher types whereas the "waverers" had very little achievement with all teacher types.

Although this study clearly supports its basic assumption that the differential effects of the teachers upon the children is a function of the personalities of both teacher and children, there is no other corroborating evidence.

Summary

The major finding pervading the first section of the foregoing review were that inductive teaching, responsiveness to classroom cues, and the use of instructional strategies enhance the thinking abilities of the child.

In the second section on the behavioral correlates of dogmatism, the major findings were that,

1. dogmatism is inversely related to learning;[15]

2. low dogmatism is related to success in critical thinking (analyzing and evaluating information);[16]

3. dogmatism is independent of I.Q.[17]

The last section of the review indicated that learning and/or thinking in class was a function of both teacher and pupil personalities.

While the studies cited were related to the study undertaken here, the last study reviewed was most germane in that it gave clear evidenee of a teacher-pupil interaction resulting in differential effects in achievement. But, since the researchers did not focus on thinking abilities, one can only assume that they too would be influenced differentially depending on the teacher and pupil types involved.

Procedures for this study for investigating the ways in which pupil thinking abilities are related by both teachers and pupils are described in the next chapter.

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[15]Ehrlich, loc. cit. [16]Kemp, loc. cit.

[17]Ehrlich, loc. cit. and Kemp, loc. cit.

CHAPTER III

DESIGN

Procedures to investigate the ways in which pupil thinking abilities are related to teacher types and pupil types are presented in this chapter. First, the population and sample are specified and described. This is followed by a complete description of the instruments used to collect data. Next, the statistical hypotheses and methods of testing the hypotheses are presented. Last, a summary of the design is presented.

Procedures

The sample in the present study was drawn from a Midwestern city of approximately 150,000 people. The city is partly industrial as well as the state capital. Thus, about half of the working adults are factory employed while another large portion is state employed. Many of the city's teachers are married to a factory employee, state employee, or someone associated with the large university in the adjacent town. This industrial state capital has 50 elementary, 5 junior, and 3 senior high schools.

First the approval of the school system's Curriculum Committee, Research Department, and Director of

Elementary Education was secured in order to begin the research. Then, Rokeach's Dogmatism E Scale[1] along with a letter introducing the present study were mailed in the spring of 1968 to all fourth, fifth, and sixth grade, teachers assigned to self-contained classrooms.

The selection of grades 4-6 was that the pupils were assumed to be mature enough to respond adequately to the type of instruments used. Also, pupils having one teacher throughout the day and year would be subjected to many more hours of influence from the teacher whereas pupils exposed to several teachers daily may be influenced less from any one of the several teachers.

Teachers who completed and returned the Dogmatism E Scale[2] via a stamped, self-addressed envelope also supplied demographic data concerning their age, years of teaching, sex, grade now teaching, and school. Code numbers were used for teachers to insure their feeling of anonymity. Also, it was hoped that this procedure would increase the likelihood of obtaining truthful responses to the opinionaire. Location of schools for various socio-economic classes and geographic areas were ascertained from Chamber of Commerce supplied information concerning economic status

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[1] M. Rokeach, The Open and Closed Mind (New York: Basic Books, Inc., 1960), pp. 71-80.

[2] Ibid.

of geographic areas throughout the city. School administrator supplied city school maps.

Nature of the Sample

Teachers were selected on the basis of their scores on the Dogmatism E. Scale.[3] Three teachers who scored the lowest were selected and classified as low in dogmatism (open-minded, L_{dt}) whereas three teachers who scored the highest were selected and classified as high in dogmatism (closed-minded, H_{dt}). Finally, three teachers were randomly selected from those whose scores clustered around the mean and classified as middle (average) in dogmatism (M_{dt}). Consequently, nine teachers and their respective pupils were involved in the present study.

The demographic data, for the teacher sample of 9 were described. Range and mean of teachers' dogmatism scores were given.

The nine teachers were contacted personally by the researcher a week after they had received the initial letter and instrument. The study was explained in general terms, and the teachers were given copies of the STEP[4] with directions for administering to their respective class. Within another week the STEP was collected at the

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[3] Ibid.

[4] Sequential Tests of Educational Progress: Social Studies, Form 4B (Princeton, New Jersey: Cooperative Test Division, Educational Testing Service, 1957).

different schools by the researcher and, in turn, teachers were given copies of Figert's Dogmatism C Scale[5] with directions to administer. This too was collected a few days later.

Sex, age, grade level, intelligence quotient, and socio-economic class were ascertained for the pupil sample partly from them and partly from their school records. Determination of pupil's socio-economic class was based on father's occupation as defined by Havighurst.[6] Thus, socio-economic class (SEC) I consisted of professionals and business managers; SEC II were white collar workers; SEC III included blue collar workers; and SEC IV was for unskilled laborers.

Pupils were classified, similar to the teachers, on the basis of their collective dogmatism scores. Those who scored minus one standard deviation or lower were classified as low in dogmatism (L_{dp}), or average in dogmatism (M_{dp}) if they scored one standard deviation within the mean, or high in dogmatism (H_{dp}) if they scored plus one standard deviation or higher.

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[5]R. L. Figert, An Elementary School Form of the Dogmatism Scale:Development of an Instrument for Use in Studies of Belief-Disbelief Systems of Children in Grades 4-6 (unpublished Doctoral dissertation, Indiana, Ball State University, 1965), pp. 106-109.

[6]Robert Havighurst, Growing up in River City (University of Chicago: John Wiley and Sons, Inc., 1962), pp. 7-14.

Instrumentation

Three different instruments were used in this study, as stated above, viz., Dogmatism E Scale[7], Dogmatism C Scale,[8] and STEP.[9] These instruments are discussed presently in the order given here.

Dogmatism E Scale

Rokeach postulated that there is a characteristic way that people respond to the world about them. This characteristic way of responding is based on one's acceptance and rejection of ideas, of people, and of authority which, in turn, involve the phenomena of cognition, intolerance, and authoritarianism respectively. From infancy one learns, consciously or unconsciously, to accept beliefs, sets, expectations, or hypotheses as true about the world in which he lives. One's total configuration of these Rokeach called the belief-disbelief system.[10] One's system is open or closed to the extent that he accepts or rejects information uncritically.[11]

Consequently, Rokeach constructed a series of items to measure one's cognitive aspects along an open-closed continuum. The original samples were college students in

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[7]Rokeach, loc. cit.

[8]Figert, loc. cit.

[9]STEP, loc. cit.

[10]Rokeach, loc. cit., pp. 31-53.

[11]Ibid., p. 57.

Midwestern universities, Eastern universities, and English students and laborers in England. The test yielded reliability coefficients (odd-even method by Spearman-Brown formula) ranging from .68 to .93. Studies comparing diverse political gropus[12] and studies involving the "Doodle-bug Problem"[13] attest to its validity.

The test has 40 items to which the subject indicates disagreement or agreement with each item ranging from -3 to +3 which is converted to a 1 to 7 scale by adding a constant of 4 to each item. Then to place each subject on the 7-point scale, the total score is divided by 40.[14]

Figert's Dogmatism C Scale

Figert[15] adapted Rokeach's Dogmatism E Scale[16] for use with children based on 3 samples in 3 different towns in central Indiana. There were 675 children in grades 4-6 who were white, mostly protestant, middle socio-economic class, and had a typical classroom range in intelligence. Figert reworded the Rokeach's test items in order to be understood by children. The readability level of the items was grade 3.0 via Spache formula and

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[12] M. Rokeach, "Political and Religious Dogmatism: An Alternative to the Authoritarian Personality," Psychological Monograph, Whole No. 425, 1956.

[13] Rokeach, The Open and Closed Mind (New York: Basic Books, Inc., 1960), pp. 182-195.

[14] Ibid., pp. 88-89. [15] Figert, loc. cit.

[16] Rokeach, loc. cit., pp. 71-80.

item discrimination of p .05 was yielded when comparing the responses of the upper 27% (closed-minded) and lower 27% (open-minded) of the distribution of scores.

Split-half reliability coefficients via odd-even pearson r technique were .73 for the 4th, .60 for the 5th, and .70 for the 6th graders. Content validity was established by consensus of judges in psychology and education, including Rokeach.

The test in its final form consisted of 50 items to which the child responds by circling +, 0, or - to represent agreement, indifference, or disagreement. The responses are given weights of 3, 2, 1 respectively. The total score is the sum of subscores obtained on all items which indicate the higher the score, the more closed-mindedness. Figert found that the instrument can identify children on bases other than that which can be predicted through analysis of age, sex, schoolgrade level, intelligence, and socio-economic class.

STEP: Social Studies

A committee of educators and test specialists constructed test items based on the basic assumption that education focuses on ability to apply school-learned skills rather than isolated, specific facts. According to the consensus of this committee, the test items require the child to identify generalizations and values, to compare and contrast data, and to draw valid generalizations

conclusions. Further, understandings as "social change," "geographic environment," "forces of nature," democratic society," "economic wants," "interdependence," and "explanation of environment" pervade subject matter areas of history, geography, economics, government, and social anthropology. Maps, photographs, tables, and diagrams are some of the types of materials that are used in the test.[17]

The test consists of 70 items divided into two parts, each half of 35 items require a time limit of 50 minutes. Each item has a multiple choice of 4 possible answers to which the child blackens the appropriate space on the answer sheet having the same letter as the answer he would choose in the test booklet. The test has reported reliability coefficient of .93 via Kuder-Richardson formula 20.

General reasoning is an important factor explaining the total score. Further, and somewhat ironically, while social studies are generally thought of as technical ideas, this technical aspect is subordinated to general problem solving. However, according to the most recent Mental Measurement Yearbook, STEP is without a peer.[18]

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[17] Sequential Tests of Educational Progress: Technical Report (Princeton, New Jersey: Cooperative Test Division, Educational Testing Service, 1957).

[18] Oscar K. Buros, The Sixth Mental Measurement Yearbook (Highland Park, New Jersey: The Gryphon Press, 1965), pp. 1224-1226.

Statistical Hypotheses

Chapter I revealed that the number of open- and closed-minded pupils will vary with the open- and closed-mindedness of the teachers. Further, evidence indicates that pupils taught by open-minded teachers will show greater cognitive ability when compared with pupils taught by middle-scoring teachers and closed-minded teachers.

The null hypotheses under investigation and their alternates follow.

1. Null Hypothesis: No difference will be found in number of open- and closed-minded pupils taught by three teacher types.

   Alternate Hypothesis: Number of open- and closed-minded pupils will differ among teacher types.

2. Null Hypothesis: Disregarding pupil type, no difference will be found in cognitive functioning as measured by average test performance among pupils taught by teachers low, middle, and high in dogmatism.

   Alternate Hypothesis: Disregarding pupil type, cognitive functioning as measured by average test performance among pupils taught by teachers low, middle, and high in dogmatism will show an inverse relationship.

3. Null Hypothesis: Disregarding teacher type, no difference will be found in cognitive functioning as measured by average test performance among pupils low, middle, and high in dogmatism.

   Alternate Hypothesis: Disregarding teacher type, cognitive functioning as measured by average test performance among pupils low, middle, and high in dogmatism will show an inverse relationship.

4. Null Hypothesis: No difference will be found in mean scores of cognitive functioning among pupils low, middle, and high in dogmatism with each of the nine teachers.

   Alternate Hypothesis: Mean scores of cognitive functioning among pupils low, middle, and high in dogmatism with each of the nine teachers will tend to differ.

5. Null Hypothesis: No difference will be found in three classifications (subscales of cognitive functioning) for all pupils.

   Alternate Hypothesis: Mean scores for subscales of cognitive functioning for all pupils will tend to vary from subscale to subscale.

6. Null Hypothesis: Disregarding pupil type, no difference will be found from subscale to subscale among pupils taught by three teacher types.

   Alternate Hypothesis: Disregarding pupil type, mean scores will from subscale to subscale vary among pupils taught by three teacher types.

7. Null Hypothesis: Disregarding teacher type, no difference will be found from subscale to subscale among three pupil types.

   Alternate Hypothesis: Disregarding teacher type, mean scores will vary from subscale to subscale among three pupil types.

8. Null Hypothesis: No difference will be found among 27 combinations of mean subscale scores for teacher types and pupil types.

   Alternate Hypothesis: Twenty-seven mean subscale scores will vary with teacher and pupil types.

Analysis

Two major kinds of evidence were obtained in this exploratory study; evidence regarding belief systems of

teachers and pupils, and evidence regarding cognitive functioning of pupils.

Evidence Regarding Belief Systems

Number of pupils classified as low, middle, and high in dogmatism for as many classifications of teachers were analyzed via chi-square technique. The significance level was set at .05 and the results were given. Because the groups under study were thought of as nine independent samples and the data were in discrete categories, the chi-square was the appropriate statistic.[19]

Evidence Regarding Cognitive Functioning

A mixed model of analysis of variance was used to obtained information from the data on cognitive functioning.[20] The assumptions of normality and homogeneity of variance underlying the F-test were assumed rather than tested. According to Lindquist,[21] analysis of variance should be neither abused nor be considered so sacred that it is not used when its assumptions are not met and yet

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[19]N. M. Downie and R. W. Heath, Basic Statistical Methods (New York: Harper and Row, Publishers, 1965), pp. 160-175.

[20]See both Jason Millman and Gene V. Glass, "Rules of Thumb for Writing the ANOVA Table," Journal of Educational Measurement, 4:41-51, Summer, 1967; and William L. Hays, Statistics for Psychologists (New York: Holt, Rinehart and Winston, 1963), pp. 356-458.

[21]E. F. Lindquist, Design and Analysis of Experiments in Psychology and Education (Boston: Houghton Mifflin Co., 1953), pp. 72-90.

be applicable. In this regard Hays states, ". . . the real concern of the experimenter must always be for the logic of the experiment and the interpretability of the data."[22]

The design for this study is diagrammatically represented on the next page. The statistical model is used to determine the ways in which cognitive functioning is influenced by the belief systems of teachers and pupils. The model was specifically constructed for this study for which the computation was done by machine.[23]

The model is an analysis of the variance mixed model with teacher type, pupil type, and subscale fixed and classroom nested within type of teacher as random. Three teachers classified as low in dogmatism are symbolized in the design on the following page as L_{dt}; M_{dt} refers to three teachers classified as middle dogmatism; and H_{dt} refers to three teachers classified as high in dogmatism. The second column refers to collectivities of pupils categorized as low, middle, and high in dogmatism for each of the three types of teachers. Thus, L_{dpl} are three groups of pupils each low in dogmatism and taught by one of L_{dt}. Subdivision of each of 9 classrooms into low, middle, and high dogmatism is represented in the third column. The last three columns refer to the

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[22]Hays, loc. cit., p. 456.

[23]Glass, loc. cit. and Hays, loc. cit.

Teacher Type	Pupil Type	Classroom	Cognitive Functioning		
			Identify	Compare	Conclude
	L_{dp1}	C_1 C_2 C_3			
L_{dt}	M_{dp2}	C_1 C_2 C_3			
	H_{dp3}	C_1 C_2 C_3			
	L_{dp1}	C_4 C_5 C_6			
M_{dt}	M_{dp2}	C_4 C_5 C_6			
	H_{dp3}	C_4 C_5 C_6			
	L_{dp1}	C_7 C_8 C_9			
H_{dt}	M_{dp2}	C_7 C_8 C_9			
	H_{dp3}	C_7 C_8 C_9			

classifications of cognitive functioning, viz., identify generalizations and values, compare and contrast data, and draw valid conclusions.

This design can yield the following kinds of information concerning variations in means: Means can vary

between teacher types
between pupil types
teacher x pupil interaction
classroom x pupil nested within teacher;

between subscales
subscales x teacher interaction
subscales x classroom nested within teacher;

subscales x pupil interaction
subscales x pupil x teacher interaction
subscales x classes x pupil nested within teacher.

Control of Extraneous Variables

In carrying out research one has to be concerned with variables confounding internal (difference due to treatments) and external (generalizability) validity. Campbell and Stanley[24] discussed several factors which might jeopardize a study. The factors are reviewed here briefly in the context of this study.

History.--Specific events occurring between first and second measurement.

Maturation.--Changes in respondents due to passage of time.

Testing.--Effects of first test on scores of second test.

Statistical Regression.--Extreme scores tend regress toward mean.

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[24]Donald T. Campbell and Julian C. Stanley, "Experimental and Quasi-Experimental Designs for Research on Teaching," in N. L. Gage (ed.), Handbook of Research on Teaching (Chicago: Rand McNally and Co., 1963), pp. 171-246.

Mortality.--Differential loss of respondents. Because there was no pre-test and there were 9 groups, each serving as a control for the other, history, testing, and maturity were irrelevant. Statistical regression was not entirely applicable because there was no pre-test and the selection based on extreme scores were for independent reasons.[25] Mortality was accounted for via school records.

Instrumentation.--Changes in instrument. Validity in the classification of test items may be questionable due to the difficulty in establishing which thinking abilities are involved and common for all respondents.

Selection.--Unequal respondents before experiment. Because the subjects were volunteered, teachers assigned to teach intact and self-contained classes, selection may account for any difference. In an attempt to control for bias in selection, correlational technique was used for any relationship between demographic factors and cognitive functioning. Also, collective mean scores for cognitive functioning (dependent variable) were used rather than individual pupil scores. The foregoing explanations are also appropriate for any interaction of the variables mentioned (above) jeopardizing representativeness.

Summary

Nine 4-6 grade teachers assigned to self-contained classrooms and their respective pupils were classified as

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[25] Ibid., pp. 181-182.

low, middle, and high in dogmatism determined by their scores on the Dogmatism E Scale[26] for teachers and Dogmatism C Scale[27] for pupils. STEP was administered to pupils and the results were analyzed to determine possible relationships between belief systems and cognitive functioning of pupils. Design was a mixed model of repeated measures.

The findings of this exploration and analysis are presented in the next chapter.

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[26]Rokeach, loc. cit.

[27]Figert, loc. cit.

CHAPTER IV

ANALYSIS OF RESULTS

The two major purposes of this study as described in Chapter I was (1) to explore the relationship between belief systems of teachers and their pupils, and (2) to analyze the ways in which this relationship is related to cognitive functioning in pupils.

The data collected and presented in this chapter are the responses of 9 teachers to Dogmatism E Scale and the responses of their pupils to Dogmatism C Scale and STEP. Following is a description of the subjects after-which the analysis of the data are presented.

Teachers and Pupils

Fifty-seven per cent of 185 teachers completed and returned the Dogmatism E Scale. The scores ranged from 1.64 to 5.96 with a mean of 3.38. The three most extreme scores at both ends of the 7-point scale were selected and classified as low in dogmatism (low scores) and high in dogmatism. Extreme scores were selected to accentuate differences in behavior. Nature of the study presumed marked differences in behavior inferred from scores on dogmatism test. Three more were selected randomly from the cluster of scores at the mean. Table 4.1 summarizes the demographic information pertaining to the 9 teachers.

Table 4.1 shows that most of the teachers are within the 30-49 age range while one is beyond age 50 and another is within 21-25 age range. The teachers are mostly females and almost equally distributed in grades 4-6. As a whole, the teachers are apparently experienced; however, low dogmatism teachers have taught longer while the high dogmatism teachers have taught the least number of years.

TABLE 4.1.--Summary of Demographic Characteristics of the Nine Sample Teachers.

Teacher		Age	Years of Teaching	Sex	Grade
Low	1	30-39	7	F	4
	2	30-39	10+	F	5
	3	40-49	10+	F	6
Mid	1	40-49	10+	F	4
	2	40-49	3	F	5
	3	26-29	8	F	6
High	1	26-29	1	M	4
	2	50+	10+	F	4
	3	21-25	2	F	5

Pupils' scores on the Dogmatism C Scale[1] ranged from 83 to 147 (possible range is 50-150) with a mean of 106 and standard deviation of 9. Those who scored 97 or lower were classified as low in dogmatism while those who scored 115 or higher were classified as high in dogmatism. The pupils

[1]R. L. Figert, An Elementary School Form of the Dogmatism Scale: Development of an Instrument for Use in Studies of Belief Systems (unpublished Doctoral dissertation, Indiana, Ball State University, 1964).

in between and including scores 98-114 were classified as middle in dogmatism. Pupils' demographic information is presented in Table 4.2.

TABLE 4.2.--Summary of Characteristics of Pupils Low, Middle, and High in Dogmatism.

	Categories of Dogmatism			Total
	Low	Middle	High	
Girls	18	52	17	87
Boys	18	63	28	109
Total	36	115	45	196
Age $\bar{x}$ (in months)	130	131	130	
I.Q. $\bar{x}$ (stanines)	5.0	4.3	4.1	
Grade				
4	15	55	23	93
5	11	45	8	64
6	10	15	14	39
Total	36	115	45	196
SEC*				
I	7	15	7	29
II	9	31	6	46
III	20	53	16	89
Total	36	99	29	144**

*SEC = Socio-Economic Class.
**Numbers vary from total due to unemployment, pupil not sure, or father deceased.

Table 4.2 shows that there were more boys than girls, nearly the same mean age (chronological) for each group, and expected proportions in each grade level and socio-economic class. That is, because the basis for categorizing the pupils was the distribution of scores, obviously

the middle group should have approximately two-thirds of the total number of subjects. A glance at the table will substantiate the foregoing statement. Also, it should be noted that slightly less than half of the pupils are SEC III (blue collar work) and none are SEC IV (unskilled).[2]

Hypothesis 1

Null Hypothesis: No difference will be found in number of open- and closed-minded pupils taught by three teacher types.

Alternate Hypothesis: Number of open- and closed-minded pupils will differ among teacher types.

The alternate (research) hypothesis 1 was based on the assumption that if a teacher were low in dogmatism, for example, then his pupils would be low in dogmatism by the end of the school year. Or, if the teacher were high in dogmatism, then his pupils would be high in dogmatism by the end of the school year.

However, Table 4.3 shows that the proportions of pupils low, middle, and high in dogmatism for each of the three teacher groups are nearly the same for each cell. Inasmuch as the difference ($X^2 = 1.11$)* did not reach the critical value (9.49), the null hypothesis is accepted.

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[2]Pupils' socio-economic class was determined by the father's occupation, (see page 29).

*Chi square formula used was $X^2 = \frac{(O-E)^2}{E}$.

TABLE 4.3.--Frequency of Pupils Classified as Low, Middle, and High in Dogmatism for Each of Three Teacher Types.

Pupils		Teachers			Total
		Low	Middle	High	
Low	Exp.	9.7	13.2	13.0	36
	Obs.	12	13	11	
Middle	Exp.	31.9	43.3	47.8	118
	Obs.	33	40	45	
High	Exp.	11.4	15.4	15.2	42
	Obs.	8	19	15	
TOTAL		53	72	71	196

$X^2 = 1.11$ d.f. = 4 $X^2_{.05} = 9.49$

An analysis of variance mixed model was used to test hypotheses 2 through 8. Summary table showing a 4-way analysis of variance of cognitive functioning, teacher types, and pupil types is given in Table 4.4.

Hypothesis 2

Null Hypothesis: Disregarding pupil type, no difference will be found in cognitive functioning as measured by average test performance among pupils taught by teachers low, middle, and high in dogmatism (L_{dt}, M_{dt}, H_{dt}).

Alternate Hypothesis: Disregarding pupil type, cognitive functioning as measured by average test performance among L_{dt}, M_{dt}, and H_{dt} will tend to show an inverse relationship.

TABLE 4.4.--Summary Table Showing a 4-way Analysis of Variance of Cognitive Functioning, Teacher Types, and Pupil Types.

Source of Variation	d.f.	Sum of Squares	Mean Square	F
Teachers	2	154.77	77.38	7.63*
Classrooms	6	240.15	40.02	3.95**
Pupils	2	7.51	3.75	.37
Tea x Pup Interaction	4	21.53	5.38	.54
CS:T (w)	12	121.63	10.14	
Subscales	2	106.99	53.49	36.66*
Sub x Tea Interaction	4	.49	.12	.08
RC:T (w)	12	17.85	1.49	
Sub x Pup	4	5.53	1.38	1.09
Sub x Pup x Tea	8	5.43	.68	.54
RCS:T (w)	24	30.37	1.26	
TOTAL	80	712.25	8.90	

*Statistically significant beyond .01 level.
**Statistically significant at the .05 level.
CS:T refers to classroom and pupils nested within teacher.
RC:T refers to subscales x classroom nested within teacher.
RCS:T refers to subscales x classrooms x pupils nested within teachers.

With pupil type held constant for testing hypothesis 2, there was a substantial difference (7.63) which was significant beyond the .01 level. Thus, the null was rejected in favor of the alternate. Results indicated pupils taught by one type of teacher scored significantly different from pupils taught by another or other type(s) of teacher(s). To discover which teacher was different, another test was used.

Scheffe's multiple-comparison technique[3] was used to examine further the means for teacher types. Their means were as follows:

Low = 16.44
Middle = 13.63
High = 13.40.

Results were that low (open-minded) dogmatic teachers were significantly different from both middle dogmatic and high (closed-minded) dogmatic teachers at the .05 level. But, the middle teachers were not significantly different from closed-minded teachers. Nonetheless, it should be noted that the mean values do tend toward the inverse relationship.

Hypothesis 3

Null Hypothesis: Disregarding teacher types, no difference will be found in cognitive functioning among three types of pupils.

Alternate Hypothesis: Disregarding teacher types, cognitive functioning among three types of pupils will tend to show an inverse relationship, i.e. open-minded pupils will score higher than middle and closed-minded pupils.

To test Hypothesis 3 all of the scores of pupils categorized as low were summed and averaged. Scores for

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[3]William L. Hays, Statistics for Psychologists (New York: Holt, Rinehart and Winston, 1963), pp. 483-489; Scheffe's formula is $\hat{\Psi}_s - S\sqrt{V(\hat{\Psi}_s)} \leq \Psi_s \leq \hat{\Psi}_s + S\sqrt{V(\hat{\Psi}_s)}$ where $\hat{\Psi}$ = combination of sample means, $S = \sqrt{(J-1)F_\alpha}$, and $\sqrt{V(\hat{\Psi}_s)} = \sqrt{(MS_{error})W_s}$.

the other two groups were treated similarly. Their mean scores were:

Low = 14.89
Middle = 14.15
High = 14.44.

As the reader can see, the means vary slightly. However, mean score of open-minded (low) pupils is greater than the other two while middle pupils' mean score is the lowest. The data given above and presented in Table 4.4 do not give evidence which justify rejecting the null at the significance level of .05. Thus, the research hypothesis is not supported, although the mean differences are partly in the direction predicted.

Hypothesis 4

Null Hypothesis: No difference will be found in mean scores of cognitive functioning among three types of pupils with each of the nine teachers.

Alternate Hypothesis: Mean scores of cognitive functioning among three types of pupils with each of nine teachers will tend to differ.

To test Hypothesis 4, the three means for open-minded pupils taught by open-minded teachers are combined and averaged. Similarly, the three means for middle-scoring pupils for each of the open-minded teachers are combined and averaged. This procedure is repeated until there are 9 means, i.e., low, middle, and high for each category of teachers. The 9 means are given on the following page.

	Teachers		
Pupils	Low	Middle	High
Low	17.11	14.44	13.11
Middle	16.44	13.22	12.78
High	15.78	13.22	14.33

That the mean scores of cognitive functioning among three types of pupils for each of nine teachers will vary is not supported by the over-all F-test at the significance level of .05. Again, however, the tendency for the low dogmatic pupils to score higher (first row and first column) than the middle dogmatic and high dogmatic pupils is quite apparent. Also, it is interesting to note that high dogmatic pupils scored higher with high dogmatic teachers than either pupil type with high dogmatic teachers.

Hypothesis 5

Null Hypothesis: No difference will be found in three subscales of cognitive functioning, for all pupils, holding teacher and pupil types constant.

Alternate Hypothesis: Mean scores for subscales of cognitive functioning for all pupils will tend to vary from subscale to subscale.

The reader should recall that the test items for cognitive functioning were classified on the basis of the thinking abilities that were required of the pupil to respond correctly to the items. The three different types of items required the pupil to identify generalizations and values (24 items), to compare and contrast data (21 items), and to draw valid generalizations and

conclusions (25 items). The three mean scores for each subscale is presented below:

To identify = 15.89 (subscale 1)
To compare = 13.07 (subscale 2)
To conclude = 14.52 (subscale 3)

Pupils collectively responded correctly to 66% of subscale 1, 62% of subscale 2, and 60% of subscale 3. The over-all F-test set at the significance level of .05 yields a significant difference beyond the .01 level. The null is rejected in favor of the research hypothesis that the subscale scores tend to vary.

Hypothesis 6

Null Hypothesis: Disregarding pupil type, no difference will be found from subscale to subscale among three teacher types.

Alternate Hypothesis: Disregarding pupil type, mean scores will vary among three teacher types from subscale to subscale.

The mean scores for three subscales by teacher type are given below:

Subscales	Teachers		
	Low	Middle	High
To identify	17.89	15.11	14.67
To compare	15.00	12.11	12.11
To conclude	16.44	13.67	13.44

Mean difference among the subscales is not significant at the .05 level. The Null Hypothesis 6 is accepted. But, the subscale mean scores do indicate that low teachers did better (scored higher) than middle and high teachers whereas

middle teachers scored higher than high teachers. Although not significant, the direction indicated should be noted.

Hypothesis 7

Null Hypothesis: Disregarding teacher type, no difference will be found among subscales by pupil type.

Alternate Hypothesis: Disregarding teacher type, mean scores among subscales by pupil type will vary.

	Teachers		
Subscales	Low	Middle	High
To identify	16.56	15.22	15.89
To compare	13.00	13.11	13.11
To conclude	15.11	14.11	14.33

Null Hypothesis 7 was accepted because mean difference among subscales by pupil type was not significant at the .05 level. The subscale means are presented above.

Hypothesis 8

Null Hypothesis: No difference will be found in mean scores among subscales by pupil type and by teacher type.

Alternate Hypothesis: Mean scores among subscales by pupil type and by teacher type will vary.

The 27 combinations of subscale mean scores are presented on the following page. The difference is not significant. The null was accepted at the .05 level.

Teachers	Pupils	Subscales		
		Identify	Compare	Conclude
Low	Low	19.33	14.67	17.33
	Middle	17.33	15.67	16.33
	High	17.00	14.67	15.67
Middle	Low	15.67	13.00	14.67
	Middle	14.67	11.67	13.33
	High	15.00	11.67	13.00
High	Low	14.67	11.33	13.33
	Middle	13.67	12.00	12.67
	High	15.67	13.00	14.33

Summary

This study was based on the hypothesis that the number of open- and closed-minded pupils will vary with the open- and closed-mindedness of the teachers. Further, evidence indicates that pupils taught by open-minded teachers will show greater cognitive ability when compared with pupils taught by middle-scoring teachers and closed-minded teachers.

The following hypotheses were supported:

> Hypothesis 2: Disregarding pupil type, cognitive functioning among pupils taught by three teacher types differed significantly at the .01 level. Further, low dogmatic teachers were significantly (.05) greater compared with middle and high dogmatic teachers, and an inverse relationship was indicated but not significantly so;

Hypothesis 5: Mean scores of subscales on cognitive functioning for all pupils differed significantly at the .01 level.

The following hypotheses were rejected at the significance level of .05:

Hypothesis 1: Number of open- and closed-minded pupils will vary with the open- and closed-mindedness of the teacher;

Hypothesis 3: Disregarding teacher type, cognitive functioning among three types of pupils will show an inverse relationship;

Hypothesis 4: Mean scores of cognitive functioning among three types of pupils with each of nine teachers will tend to differ.

Hypothesis 6: Disregarding pupil type, mean scores will vary among pupils taught by three teacher types from subscale to subscale.

Hypothesis 7: Disregarding teacher type, mean scores will vary from subscale to subscale among three pupil types;

Hypothesis 8: Mean scores among subscales by pupil type and by teacher type will vary.

CHAPTER V

SUMMARY AND CONCLUSIONS

This chapter is divided into three parts. The first section summarizes the findings of the study. In the second section the major conclusions are presented. Discussion of the findings and implications for future investigation appear in the final section.

Summary

In recent years researchers have focused upon the development of thinking abilities in children. It would appear that the more complex society becomes, the more intense the need for development of thinking abilities. Because there is a dearth of experimental research dealing with differential influence of different teachers on different pupils, little is actually known about the antecedents influencing thinking abilities in the classroom.

Indeed, prior studies have assumed that all children in a given class react to the teacher in the same way. The assumption of this researcher is that no one-to-one relationship exists due to the diverse belief systems within a given classroom.

Both teachers and pupils vary in their respective beliefs and characteristic way of looking at the world.

Further, teachers influence the thinking abilities of children in different ways. Suggested was the idea that if cognitive functioning (thinking) of children is related to their belief system and the belief system of the teacher by whom they are taught, then the focus of study should be on the configuration of belief systems held by the classroom members, teacher and pupils. It was the purpose of this study to explore the relationship between belief systems of teachers and pupils and how the relationship influences cognitive functioning in children.

Hypotheses.--The major hypothesis under investigation was that the number of open- and closed-minded pupils will vary with the open- and closed-mindedness of the teachers. Further, evidence indicates that pupils taught by open-minded teachers will show greater cognitive ability when compared with pupils taught by middle-scoring teachers and closed-minded teachers. Subhypotheses used to structure the investigation were as follows:

1. Number of open- and closed-minded pupils will vary with the open- and closed-mindedness of the teacher;

2. Cognitive functioning will show an inverse relation among pupils taught by three teacher types, holding pupil type constant;

3. Cognitive functioning will show an inverse relation among three pupil types, holding teacher type constant;

4. Cognitive functioning will vary among three pupil types with each of nine teachers;

5. Mean scores of cognitive functioning will vary among three subscales, holding pupil and teacher type constant;

6. Mean scores of cognitive functioning by teacher type will vary;

7. Mean scores of subscales by pupil types will vary, holding teacher type constant;

8. Mean scores of subscales will vary among all teacher types and all pupil types.

Procedure.--Nine teachers and their respective pupils (N = 196) in grades 4-6 in six different schools located in a Midwestern city volunteered to participate in the study. Teachers were classified as low, middle, and high in dogmatism determined by their scores on Rokeach's Dogmatism E Scale.[1] Similarly, pupils were classified low, middle, and high in dogmatism determined by their scores on Figert's Dogmatism C Scale.[2] Cognitive functioning was determined by pupils' scores on STEP.[3] The test items of the latter had 3 classifications, viz., identification of generalizations and values, comparison of data, and drawing of valid conclusions.

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[1]M. Rokeach, The Open and Closed Mind (New York: Basic Books, Inc., 1960), pp. 71-80.

[2]R. L. Figert, An Elementary School Form of the Dogmatism Scale: Development of an Instrument for Use in Studies of Belief-Disbelief Systems of Children in Grades 4-6 (unpublished Doctoral dissertation, Indiana, Ball State University, 1965), pp. 106-109.

[3]Sequential Tests of Educational Progress: Social Studies, Form 4B, Grades 4-6 (Princeton, New Jersey: Cooperative Test Division, Educational Testing Service, 1957).

Analysis.--The chi-square statistical technique was employed to test differences in the number of pupils who were classified low, middle, and high in dogmatism when taught by the three teacher types. The analysis of variance (mixed model) was used to analyze mean difference in pupils' cognitive functioning as it related to teacher dogmatism and pupil dogmatism. Significant mean differences obtained via over-all F-test were further analyzed using Scheffe's multiple-comparison technique.[4]

Conclusions

Hypotheses that were supported are presented below.

> Hypothesis 2: Disregarding pupil type, cognitive functioning among three teacher types differed significantly at the .01 level. Further, low dogmatic teachers were significantly (.05) different from middle and high dogmatic teachers, and an inverse relationship was indicated but not significantly so;
>
> Hypothesis 5: Mean scores for subscales of cognitive functioning for all pupils differed significantly at the .01 level.

The following hypotheses were rejected at the significance level of .05.

> Hypothesis 1: Number of open- and closed-minded pupils will vary with the open- and mindedness of the teacher;
>
> Hypothesis 3: Disregarding teacher type, cognitive functioning among three types of pupils will show an inverse relationship;

---

[4]William L. Hays, Statistics for Psychologists (New York: Holt, Rinehart and Winston, 1963), pp. 483-489.

Hypothesis 4: Mean scores of cognitive functioning among three types of pupils with each of nine teachers will tend to differ;

Hypothesis 6: Disregarding pupil types, mean scores will vary among pupils taught by three teacher types from subscale to subscale;

Hypothesis 7: Disregarding teacher types, mean scores will vary from subscale to subscale among three pupil types;

Hypothesis 8: Mean scores among subscales by pupil type and by teacher type will vary.

Discussion

Number of pupils low, middle, and high in dogmatism from class to class yielded but chance differences in spite of teacher type. One interpretation of this finding is that pupils in the different classes may have changed from one point to another on the open-closed scale. However, this study was designed to give the dogmatism test to children at one point in time. Had there been a pre-test at the beginning of the school year and post-test at the end, change could have been detected.

Evidence that different teacher types influence different children in different ways is reported by Heil, Powell, and Feifer.[5] In their study of three teacher

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[5]L. M. Heil, M. Powell, and I. Feifer, Characteristics of Teacher Behavior and Competency Related to the Achievement of Different Children in Several Elementary Grades (United States Department of Health, Education, and Welfare, Office of Education, No. 7285, 1960).

types and four pupil types, they found significant mean gain scores in friendliness for different pupils. For example, children under a "turbulent" teacher (lack of structure, warmth, and order) revealed more feelings of active resistance and hostility compared to children under a "self-controlling" teacher (warm, orderly, and strict).[6]

Another possibility for the non-significant difference in number of open- and closed-minded pupils with three teacher types is the difference in amount of time teachers typically spent with children in class compared to the length of children's life time spent learning their respective beliefs.

Hypotheses 2-4: While Hypothesis 2 was statistically significant and Hypotheses 3 and 4 were not, mean scores did maintain the relative positions predicted (see pages 48-50). This finding is consistent with the major hypothesis that cognitive functioning would vary with belief systems of teacher and pupils involved. Open-minded pupils scored consistently higher than middle-scoring and closed-minded pupils. Yet, open-minded pupils did not score equally high under all three teacher types. In contrast closed-minded pupils consistently scored lowest. But, closed-minded pupils scored highest under open-minded teachers compared to closed-minded pupils under middle and closed-minded teachers.

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[6] Ibid., pp. 60-61.

The findings indicate that even though pupil type makes a difference in cognitive functioning, a greater difference is attributed to the teacher type involved. The influence of the teacher on the cognitive functioning of children seems to be overwhelming.

Subscales.--Pupils collectively did better with test items requiring identification of generalizations than they did with test items requiring comparisons and drawing of conclusions. Pupils scored lowest consistently on items requiring skills in drawing valid conclusions. This might suggest that the teachers in this study spent more time providing experiences in identifying generalizations and values. Or drawing conclusions may be more difficult than identifying generalizations. The latter requires recognition of statements, an intellectual skill akin to Bloom's knowledge[7] and Guildford's memory[8] which are considered as low cognitive levels. To compare data requires skill of relating similarities and dissimilarities in wholes and drawing conclusions involves weighing alternatives. Both skills seem much more complex.

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

[8]J. P. Guildford, Personality (New York: McGraw-Hill, 1959).

The implication of the finding described on the preceeding page is related to the findings of Ford's study[9] of 499 children in alternate grades three to eleven. From his investigation of pupils' perceptions of classroom experiences related to Guildford's classification of intellectual abilities, Ford found that the higher the grade level, the fewer experiences were related to higher levels of thinking abilities.

Implications for Future Research

The results of this study should serve as a stimulus for future research in studying learning (or thinking abilities) in relation to personality variables of both teachers and pupils. Suggestions are given below.

1. Repetition of this study beginning in the autumn and ending in the spring. A pre-test and post-test of dogmatism test to both pupil and teacher. The study could focus on the direction of change for teacher and pupil types. The change could be studied in relation to cognitive functioning.

2. Repitition of this study to investigate belief systems of teachers and pupils in relation to feelings and perception of school work, peers, teacher, and how these change over time.

3. Construct a test of belief system for primary school children in order to study influence of belief systems on cognitive functioning through the elementary grades. Probably, the lower the grade level, the more critical the teacher's beliefs.

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[9]John Ford, An Exploration and Analysis of Pupils' Perceptions of Classroom Experiences Related to Intellectual Factors (unpublished Master thesis, Ann Arbor, University of Michigan, 1963).

4. Repetition of the design of the study using a different sample, a sample from "middle class" suburb and a sample from "culturally disadvantaged." There are probably more closed-minded teachers in a slum area than in the suburbs. What would happen to children's cognitive functioning if the teachers in the slum area were open-minded?

5. Construct a test that measures the various thinking skills, perhaps as defined by Bloom.

6. Clearly this study indicates that children's cognitive functioning varies with teacher type. This suggests a different type of teacher training program in which focus is upon prospective teacher's consistent examination of what goes on between himself and the child as a result of interaction of personalities. An experiment could be set to compare this group with the graduate of the traditional program.

7. Repetition of the study using tape recordings in the classroom. Analyze the tape with respect to relationship between frequency of level of thinking in class and collectivity of teacher-pupil types. How does the verbal behavior of open-minded teachers differ from closed-minded teachers?

8. In a given classroom the child is influenced by both teacher and peers. Also, a classroom has a range of beliefs. In some schools matching children with teachers of similar belief systems might be possible and warranted.

9. Finally, compatibility and relationship of belief systems among teachers, children, and parents needs exploring.

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APPENDICES

APPENDIX A

SEQUENTIAL TEST OF EDUCATIONAL PROGRESS: SOCIAL STUDIES

Form 4 B

Cooperative

Sequential Tests of Educational Progress

Social Studies

Cooperative Test Division · Educational Testing Service · Princeton, N.J. · Berkeley 4, Calif.

General Directions

This is a test of some of the understandings, skills, and abilities you have been developing ever since you first entered school. You should take the test in the same way that you would work on any new and interesting assignment. Here are a few suggestions which will help you to earn your best score:

1. Make sure you understand the test directions before you begin working. You may ask questions about any part of the directions you do not understand.
2. You will make your best score by answering *every* question because your score is the number of correct answers you mark. Therefore, you should work carefully but not spend too much time on any one question. If a question seems to be too difficult, make the most careful guess you can, rather than waste time puzzling over it.
3. If you finish before time is called, go back and spend more time on those questions about which you were most doubtful.

DIRECTIONS FOR ADMINISTERING

Note: Instructions which are to be read aloud to students are printed in **bold** type. Instructions printed in regular type are intended *only* for the examiner.

In these Directions and in the test booklets the students are instructed to make their marks heavy and black. This is desirable for IBM 805 answer sheets or for hand-scoring. It may not be advisable, however, with other types of scoring machine. It is suggested, therefore, that you consult the person responsible for scoring (or the manufacturer of your machine), and modify this instruction if necessary.

When the students are assembled in the examination room and seated, say:

The testing period has begun. There should be no talking among you until after you have been dismissed.

We shall now pass out test materials. Do not open your booklet or turn it over until you are told to do so.

Distribute booklets, scratch paper (if Mathematics is being administered), answer sheets, and pencils (if they are to be supplied).

Have students fill in the necessary identification information on their answer sheets: name, form of test, date, school, etc. If you are using a two-sided answer sheet check that each student is working on the correct side.

Then say:

Open your test booklet to the GENERAL DIRECTIONS, on the inside of the front cover. Read these directions silently while I read them aloud.

GENERAL DIRECTIONS

This is a test of some of the understandings, skills, and abilities you have been developing ever since you first entered school. You should take the test in the same way that you would work on any new and interesting assignment. Here are a few suggestions which will help you to earn your best score:

1. **Make sure you understand the test directions before you begin working. You may ask questions about any part of the directions you do not understand.**
2. **You will make your best score by answering every question because your score is the number of correct answers you mark. Therefore, you should work carefully but not spend too much time on any one question. If a question seems to be too difficult, make the most careful guess you can, rather than waste time puzzling over it.**
3. **If you finish before time is called, go back and spend more time on those questions about which you were most doubtful.**

Are there any questions?

Answer any legitimate questions. Stay within the meaning and, as far as possible, use the vocabulary of the printed directions.

On p. 1 you will find DIRECTIONS FOR PART ONE of the test. Look at page 1 and read these directions silently while I read them aloud.

DIRECTIONS FOR PART ONE

Each of the questions or incomplete statements in this test is followed by four suggested answers. You are to decide which one of these answers you should choose. You must mark all of your answers on the separate answer sheet you

have been given; this test booklet should not be marked in any way. You must mark your answer sheet by blackening the space having the same letter as the answer you have chosen.

For example:

O Which one of the following is an animal?

A Bed B Dog C Chair D Box

Since a dog is an animal, you should choose the answer lettered B. On your answer sheet, you would first find the row of spaces numbered the same as the question—in the example above, it is O. Then you would blacken the space in this row which has the same letter as the answer you have chosen. See how the example has been marked on your answer sheet.

Make your answer marks heavy and black. Mark only one answer for each question. If you change your mind about an answer, be sure to erase the first mark completely.

The example on p. 1 has been given to you so that you will know how to mark your answer sheets. The questions on the inside of the test are not just like the example; but each one does present four choices, and you must choose your answer from among them.

Are there any questions?

Answer any legitimate questions. Stay within the meaning and, as far as possible, use the vocabulary of the printed directions.

When I say "Begin," turn to Part One on p. 2 and start working. Ready? Begin!

Examiner and proctors (if any) should move quietly about the room to see that each student is working on the proper pages of his test booklet and that he is marking his answers correctly in the proper section of the answer sheet. Make certain that students do not go on to Part Two of the test.

At the end of *exactly* 35 min., say:

STOP! Even if you have not finished Part One you must stop and lay down your pencil.

If both parts of the test are being given in one session, allow a short break at this time.

If the test is being administered in two sessions, collect answer sheets, test booklets, and other test materials and then dismiss the students.

When the students are ready to begin Part Two, say:

Turn to Part Two of your test booklet. Part Two contains the same kind of material as Part One. Mark your answers in the same way. If you finish before time is called, you may check your work on Part Two. Do not go back to Part One.

If there has been a considerable time lapse between administration of Parts One and Two, review the General Directions and the Directions for Part One before giving the instructions above.

When I say "Begin," start working on Part Two. Ready? Begin!

Again the examiner and proctors should move quietly about the room to make sure that every student is working in the proper part of both test booklet and answer sheet.

At the end of *exactly* 35 min., say:

STOP! Even if you have not finished Part Two you must stop and lay down your pencil.

Collect answer sheets, test booklets, and other test materials.

At this time you should write down for the record a description of any unexpected variation from the normal testing procedure that may have occurred. Such incidents need to be in the record and considered when scores are interpreted.

DIRECTIONS FOR PART ONE

Each of the questions or incomplete statements in this test is followed by four suggested answers. You are to decide which one of these answers you should choose.

You must mark all of your answers on the separate answer sheet you have been given; this test booklet should not be marked in any way. You must mark your answer sheet by blackening the space having the same letter as the answer you have chosen. For example:

0 Which one of the following is an animal?
- A Bed
- B Dog
- C Chair
- D Box

Since a dog is an animal, you should choose the answer lettered B. On your answer sheet, you would first find the row of spaces numbered the same as the question—in the example above, it is 0. Then you would blacken the space in this row which has the same letter as the answer you have chosen. See how the example has been marked on your answer sheet.

Make your answer marks heavy and black. Mark only one answer for each question. If you change your mind about an answer, be sure to erase the first mark completely.

Do not turn this page until you are told to do so.

PART ONE

Mrs. Jones has just returned from shopping. She is putting away the foods she bought.

1 Which of these foods did NOT come from farms in our own country?

A Eggs
B Lettuce
C Bananas
D Ham

2 Which of these foods probably came from a farm NOT far from where Mrs. Jones bought it?

E Milk
F Bananas
G Cereal
H Frozen orange juice

3 Which of these foods did NOT have to be prepared for use before Mrs. Jones bought it?

A Milk
B Lettuce
C Cereal
D Salmon

4 If Mrs. Jones lives in Chicago which of these foods traveled farthest to reach the store where she bought it?

E Butter
F Lemons
G Milk
H Eggs

5 Which of these foods may have come from packing houses in Chicago, Kansas City, or St. Louis?

A Meat
B Citrus fruits
C Canned salmon
D Frozen orange juice

Go on to the next page.

Here are descriptions of the way four boys live.

HENRY traveled west with his mother and father in a covered wagon. His father has a blacksmith shop near a mining camp.

BEN lives on a farm where his father raises wheat and keeps a few cows and chickens. He also has a small vegetable garden.

TOM lives in an apartment house in a large city where his father is a bus driver. His mother shops in a nearby market and business section.

AG lives in a cave. Men have not yet learned to plant and harvest crops. His father fishes and hunts.

Below are some questions about the parents of these boys. Pick the correct boy or boys for each question.

6 Which boy's mother might say, "You'll have to walk. The elevator isn't working today"?

E Henry's
F Ben's
G Tom's
H Ag's

7 Which boy's mother might say, "It is cold. Roll the stone in front of the door"?

A Henry's
B Ben's
C Tom's
D Ag's

8 Which boy's father might say, "Better put some gasoline in the tractor"?

E Henry's
F Ben's
G Tom's
H Ag's

9 The work of which boys' fathers depends LEAST on the weather and the seasons?

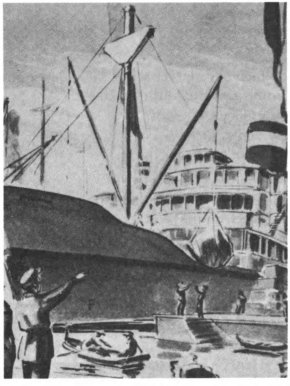
A Henry's and Ben's
B Henry's and Tom's
C Ben's and Ag's
D Tom's and Ag's

10 Which boys' fathers provide most of the family's food?

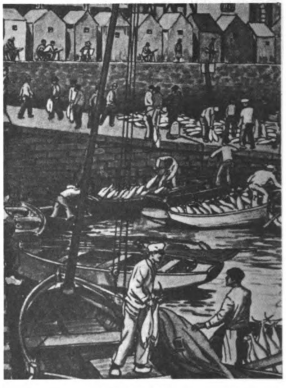
E Henry's and Ben's
F Henry's and Tom's
G Ben's and Tom's
H Ben's and Ag's

Go on to the next page.

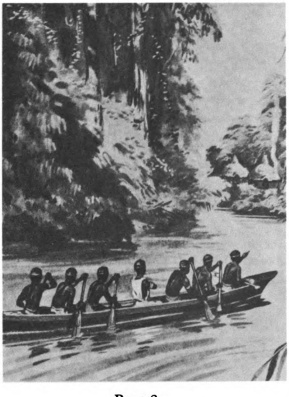
These pictures show some of the kinds of boats used in the world today.



Boat 1



Boat 2



Boat 3

Boat 4

Go on to the next page.

11 Which boat would most likely be used in traveling from New York City to the Congo?

A Boat 1 B Boat 2
C Boat 3 D Boat 4

12 Which boat looks most like the flatboats used by pioneer families to float down the Mississippi and Ohio Rivers?

E Boat 1 F Boat 2
G Boat 3 H Boat 4

13 Which boats were most likely made from materials found near the river or ocean where they were to be used?

A Boats 1 and 2 B Boats 1 and 3
C Boats 2 and 4 D Boats 3 and 4

14 Which boat looks like one used by the people who lived in America before white men came?

E Boat 1 F Boat 2
G Boat 3 H Boat 4

15 In what part of the world would you be most likely to see Boat 1?

A In New York City harbor only
B In countries like the United States only
C In European countries only
D In almost any seaport in the world

16 What do these pictures tell us about water transportation in various parts of the world?

E All people of the world would find steamships better than the kind of boats they now use.
F Although the kinds of boats used are different, most people need and use water transportation.
G Most people of the world like their own kinds of water transportation and are not interested in anything better.
H The kinds of water transportation people use are the same everywhere in the world.

Joe usually walked to school, but today, because he had stayed in bed too long, he was riding with his father. "Hurry, Dad, you're driving too slow. I'll be late, and that's against the rules."

"Sorry, son," said his father. "Twenty-five miles an hour is the speed limit, whether you are on time at school or not."

17 When must Joe's father observe the speed limit?

A Whenever he is driving a car
B When many people are crossing the street
C When traffic is heavy
D When there is a policeman on duty

18 What is the best reason why Joe's father should obey the speed limit?

E There is less danger of accidents when speed limits are observed.
F He may be punished if he does not observe the law.
G The policeman may see him driving too fast.
H The law says that speed limits should be observed.

19 Who makes the laws about speed limits?

A The drivers of cars
B The city policemen
C The city and state governments
D All of these

20 Who should be interested in whether speed limits are observed?

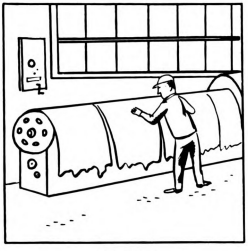
E The city policemen
F The drivers of cars
G The state policemen
H All of these

Go on to the next page.

These pictures tell the story of shoes. They are not in the right order.

Shoe store

Stockyard



Tannery

Shoe factory

Pasture

Shoes in use

Go on to the next page.

21 Which picture should come first?

A The stockyard
B The tannery
C The shoe factory
D The pasture

22 Which picture should come next after the tannery?

E The stockyard
F The shoe factory
G The pasture
H The shoe store

23 In which of the pictures does electricity play the most important part?

A The shoe store
B The stockyard
C The shoe factory
D The pasture

24 Which of the pictures about shoes could also be shown in the story of meat?

E The stockyard and the tannery
F The tannery and the pasture
G The shoe factory and the pasture
H The stockyard and the pasture

25 Which of the pictures shows something that most people see most often?

A The shoe store
B The stockyard
C The tannery
D The shoe factory

In each of the following questions there are four sentences. ONE sentence does not belong with the others. Find the sentence that should come out because it does not belong with the other three.

26 Grandmother is talking about her early days in the West.

E Once we met Buffalo Bill.
F One day we saw an old Model T Ford come chugging along after us.
G The hardest part of the journey was through the mountains.
H We traveled in a covered wagon.

27 John was giving a talk about "Why I'm Glad I Live in America."

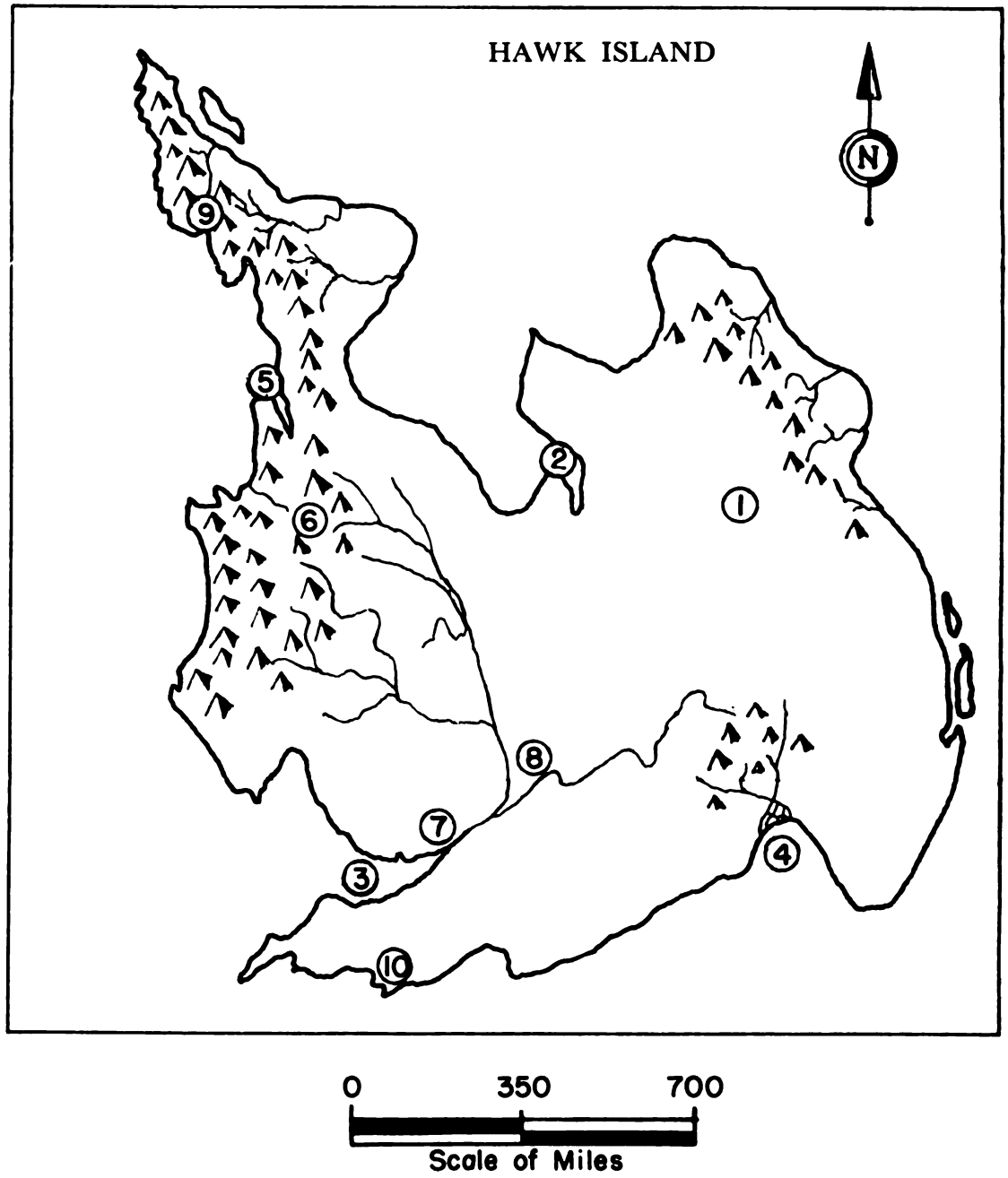
A It doesn't cost anyone any money for my education.
B People can go to whatever church they choose.
C A man can change his job whenever he wants to.
D We can travel from one state to another without asking anyone.

28 Henry is writing a description of life along the Amazon.

E The natives live in small villages along the river.
F They live in grass huts.
G They ride on camels.
H They shoot small animals with blow guns.

Go on to the next page.

Here is a map of a make-believe island called Hawk Island. It does not look much like any of the lands you may have studied about in school, but you will see some of the same things you have seen on other maps. If you know what these things mean on other maps, you will be able to answer the questions about Hawk Island.



29 About how far is it across Hawk Island from place 1 to the mouth of the river directly south of it?

A 200 miles
B 700 miles
C 1400 miles
D 2200 miles

30 Which of these places is on a peninsula?

E 4 F 6 G 7 H 9

31 If explorers came by ship to Hawk Island, at what place would they find the safest harbor?

A 2 B 4 C 9 D 10

Go on to the next page.

The GAMAS worshipped Rabu, the god of rain. When Rabu was unhappy no rain fell and the crops died. To make the rain god happy again the Gamas would sacrifice one of their finest animals.

The RATAS raised cattle on plains where rainfall was light. When no rain fell the hot sun burned the grass. Then the medicine man would dance and sprinkle water on the brown grass. He hoped to drive back into the earth the demon who caused the dryness.

The LEDOS, to get a sure supply of water, dug a tunnel through a nearby mountain range. They put a dam across the river so that the water would flow through the tunnel. The Ledos believed in one god. They thanked him for rich crops from the land which they had watered.

The MONT people lived 300 miles from the ocean, on the far side of a high range of mountains where there was too little rain for good crops. On the seaward slope of the mountains the winds blowing over the ocean caused heavy rains to fall. When the Mont people learned this, they crossed the mountains and settled where the rainfall was plentiful.

32 Which people believed that demons caused bad luck?

E Gamas
F Ratas
G Ledos
H Mont

33 Which people had a religion most like that of many Americans?

A Gamas
B Ratas
C Ledos
D Mont

34 Which people were probably the best builders?

E Gamas
F Ratas
G Ledos
H Mont

35 The Gamas probably worshipped a rain god because

A they had killed all the missionaries
B they didn't know any better
C rain was very important to them
D all people worshipped a rain god at that time

Stop. If you finish before time is called, check your work on this part. Do *not* go on to Part Two until you are told to do so.

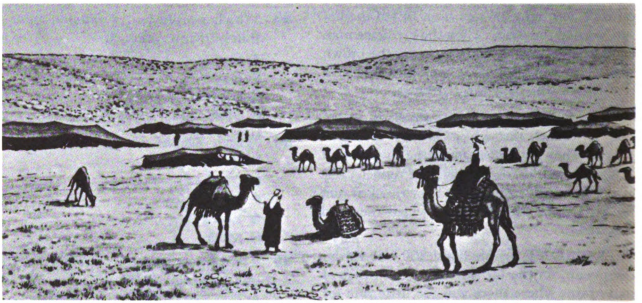
DIRECTIONS FOR PART TWO

Part Two contains the same kind of material as Part One. Mark your answers in the same way.

Do not turn this page until you are told to do so.

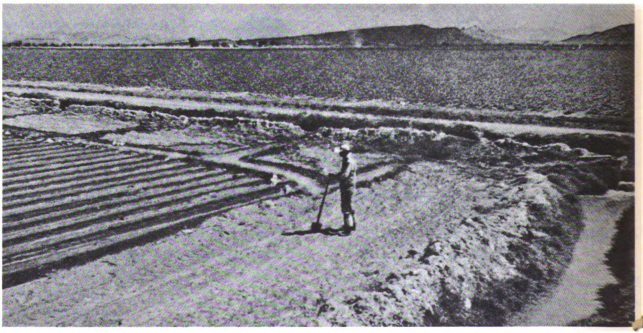
PART TWO

Faria is a girl who lives in the Arabian Desert. Picture 1 shows where Faria lives.



PICTURE 1

Helen lives in Arizona where it is also hot and dry. Picture 2 shows where Helen lives.



PICTURE 2

Go on to the next page

1 Why does Faria's family move from place to place?

A Faria's people have to move in search of water and grass for their herds.
B Faria's father cannot find work.
C Faria's father believes that there will be better houses in the next town.
D Faria's family likes to move.

2 In what way are the people on the Arabian Desert and the people in Arizona most alike?

E They use electricity to cool their homes.
F They depend on the inventions and work of many people to supply their needs.
G They eat the same kinds of food since they have electric refrigerators.
H They cannot control the out-of-door climate.

3 Faria and her family bow toward a religious center called Mecca several times a day. Helen and her family go to church each week. This shows that

A Faria and her family are more religious
B people worship God in different ways
C Helen's religion is a better one
D people must go to a church when they worship God

4 Which of these is the best reason for the difference in the way Faria and Helen live?

E They live in different climates.
F The people in the Arabian Desert have a different religion.
G Helen's people have irrigated their land.
H Faria's family doesn't work as hard as Helen's.

Many people have done much for our country during the 300 years since the first colonists made permanent settlements on the eastern shore of North America. Here are four ways in which people have helped our country.

1. Some have helped to open up *new regions.*
2. Some have worked to set up and *improve our government.*
3. Some have given us better ways of living through their work in *science and invention.*
4. Some have added to our *enjoyment of living* through their writings, or their music, or through their efforts to help people.

5 In which of the four ways did Thomas Edison and Alexander Bell help our country?

A 1 **B** 2 **C** 3 **D** 4

6 In which of the four ways did Abraham Lincoln and Theodore Roosevelt help our country?

E 1 **F** 2 **G** 3 **H** 4

7 In which of the four ways did Kit Carson and Brigham Young help our country?

A 1 **B** 2 **C** 3 **D** 4

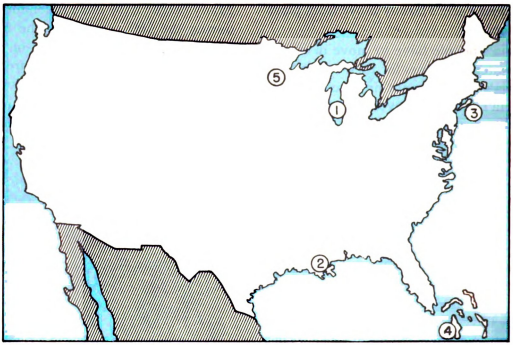
8 In which of the four ways did Cyrus McCormick and Orville Wright help our country?

E 1 **F** 2 **G** 3 **H** 4

9 In which of the four ways did Carl Sandburg and Booker T. Washington help our country?

A 1 **B** 2 **C** 3 **D** 4

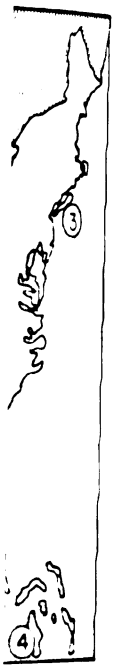
Go on to the next page.



MAP A

MAP B

Go on to the next page.



Questions 10–13 are based on the maps on p. 12.

0 A country shown on both maps is
- E Italy
- F England
- G the United States
- H Spain

11 What region on Map B has a hot, wet climate?

A 6 B 7 C 9 D 10

12 Find 8 on Map B. How is the same place numbered on Map A?

E 1 F 2 G 4 H 5

13 If you traveled from 3 on Map A to 7 on Map B, you would be traveling mainly from
- A west to east
- B east to west
- C north to south
- D south to north

Here are some sentences which children wrote about Norway.

SUSAN: Norway is a country of harbors, mountains, and swift streams.

JACK: Every little patch of good land in Norway is farmed.

PATTY: Norway has some iron, but almost no coal and oil.

BILL: Norway sends fish, paper, and paper products to other countries.

HARRY: Hay, an important crop in Norway, must be spread out on racks to dry.

ANNE: Norway is the "Land of the Midnight Sun."

14 Whose sentence shows that Norway probably uses water power?
- E Susan's
- F Jack's
- G Bill's
- H Anne's

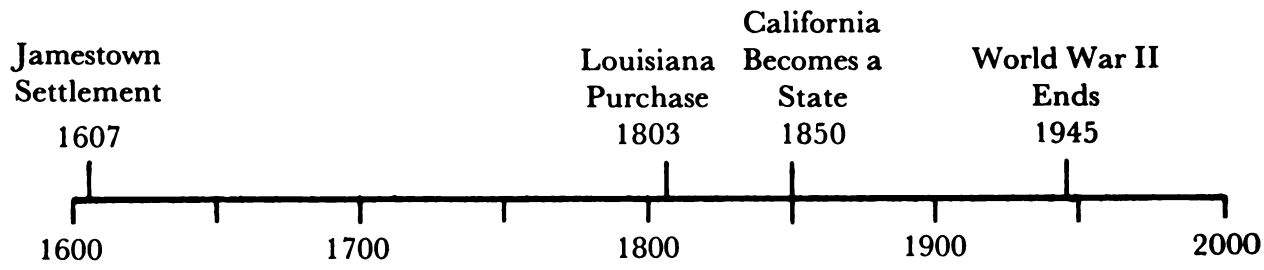
15 Whose sentence helps us to know that Norway is a country far from the equator?
- A Susan's
- B Patty's
- C Harry's
- D Anne's

16 Whose sentence tells us that Norway has a difficult time raising enough food for its people?
- E Susan's
- F Jack's
- G Bill's
- H Harry's

17 Whose sentence helps us to know that Norway has many forests?
- A Patty's
- B Bill's
- C Harry's
- D Anne's

18 Whose sentence leads us to believe that dairying may be an important industry in Norway?
- E Susan's
- F Patty's
- G Bill's
- H Harry's

This is a time line which shows some important events in American history.



19 Which of the events on the time line shows when the United States first owned all of the Mississippi Valley?

A Jamestown Settlement
B Louisiana Purchase
C California Becomes a State
D World War II Ends

20 Between which two events did Texas join the United States?

E Jamestown Settlement and Louisiana Purchase
F Louisiana Purchase and California Becomes a State
G California Becomes a State and World War II Ends
H Texas has not yet become a state

21 How many centuries are shown between the Jamestown Settlement (1607) and California Becomes a State (1850)?

A 1
B About $2\frac{1}{2}$
C 4
D About $5\frac{1}{2}$

22 If the Civil War were put on the time line, it would fall closest to which of the events?

E Jamestown Settlement
F Louisiana Purchase
G California Becomes a State
H World War II Ends

A shy, dark-haired girl from another country began school several weeks late. On the first day she was in school, Miss Jones introduced her to her classmates saying, "Try to help our new classmate feel at home. She doesn't speak our language very well, but I am sure that you can help her learn what she needs to know very quickly."

At playtime some of the children who usually played together wondered about the new girl. Here is what they said.

RUTH: She's awfully pretty. Shall we ask her to play with us?

ANNE: We don't want her with us. She won't be able to understand a thing we tell her.

JACK: My mother says there are far too many people like her in our town already. But she's the first one I've *had* to play with.

BILL: We don't know that she wouldn't be able to understand our games. Let's treat her like any other girl and see how much we can help her with her English. We'll probably find that we really like her, once we get to know her.

23 Which of these is probably the reason the teacher asked the children to help the new girl?

- **A** She was too busy to take care of the girl during playtime.
- **B** She couldn't understand very well what the girl was saying.
- **C** She had other new children to worry about.
- **D** She hoped the children could show the girl what to do at school.

24 Which of the children seemed to understand and believe in "fair play"?

- **E** Anne
- **F** Jack
- **G** Bill
- **H** There is nothing about fair play in what any of them said.

25 What is one of the chief problems the new girl will have in starting school in the United States?

- **A** Getting the teacher to help her
- **B** Learning to get to school on time
- **C** Making friends with children who are strangers
- **D** Getting the books and school supplies that she will need for her school work

26 Why did Jack say what he did about the new girl?

- **E** He was repeating what he had heard at home.
- **F** He had been hurt once in playing with a strange child.
- **G** He had seen a movie where people like this girl behaved badly.
- **H** There was no special reason; he was just talking.

Go on to the next page.

This chart shows cash farm income for four different years. Each dollar sign ($) equals $1000 received in cash by farmers from the sale of crops or livestock.

For Example: $$$ equals $3000
$$$$$ equals $5000

CASH FARM INCOME IN JONES COUNTY

YEAR		INCOME
1910	Crops	$$$$$ $$$$$
	Livestock	$$$$$
1915	Crops	$$$$$ $$$$$ $$$$$
	Livestock	$$$$$ $$$$$ $$$$$
1920	Crops	$$$$$ $$$
	Livestock	$$$$$ $$$$$ $$
1925	Crops	$$$$$ $$$$$
	Livestock	$$$$$ $$$$$ $$$$$

27 In which year was the total cash farm income the greatest?

A 1910
B 1915
C 1920
D 1925

28 In which year did people who raised cattle probably make the LEAST money?

E 1910
F 1915
G 1920
H 1925

29 What was the *total* cash farm income in 1910?

A $15,000 (15 thousand dollars)
B $20,000 (20 thousand dollars)
C $25,000 (25 thousand dollars)
D $30,000 (30 thousand dollars)

30 Which of the two sources of income brought the farmers the most money during these four years?

E Livestock
F Crops
G The same for both
H You cannot tell from the chart.

31 What does this chart tell us about farming?

A Farmers are prosperous.
B Farmers are poor.
C Farmers make more money every year.
D Farm income is not the same from year to year.

In the Table of Contents of a social studies book we find the following chapter headings:

1. Europe Finds America
2. People Come to Stay
3. America Becomes a Nation
4. America Stretches from Sea to Sea
5. Many Nations Build America
6. America Improves Its Ways of Living
7. America and Other Nations Need Each Other
8. America Looks Ahead

32 In which chapter would you expect to find a description of huge dams built by the government?

E 1 F 3 G 6 H 7

33 In which chapter would you look for a report on peacetime uses of atomic energy?

A 3 B 4 C 5 D 8

34 To find out how California and Oregon became part of the United States you would look in Chapter

E 1 F 2 G 4 H 6

35 Which two chapters might tell how stories of riches brought traders to new settlements?

A 2 and 4
B 4 and 8
C 6 and 7
D 7 and 8

If you finish before time is called, you may check your work on Part Two. Do not go back to Part One.

APPENDIX B

RAW SCORES OF COGNITIVE FUNCTIONING FOR PUPIL AND TEACHER TYPES

RAW SCORES OF COGNITIVE FUNCTIONING FOR PUPIL AND TEACHER TYPES

Teacher Classification	Class	Pupil	Cognitive Functioning Sub 1	Sub 2	Sub 3
Low	1	L	19	12	15
		M	16	15	15
		H	15	13	14
	2	L	18	14	15
		M	17	16	16
		H	17	18	17
	3	L	21	18	22
		M	19	16	18
		H	19	13	16
Middle	1	L	16	14	17
		M	12	10	11
		H	14	11	11
	2	L	15	13	13
		M	15	12	14
		H	18	13	16
	3	L	16	12	14
		M	17	13	15
		H	13	11	12
High	1	L	10	7	7
		M	13	10	12
		H	11	9	10
	2	L	16	14	15
		M	12	12	11
		H	16	15	16
	3	L	18	13	18
		M	16	14	15
		H	20	15	17

A. Formulae for 4-way analysis of variance with repeated measures.

Source	df		
T	2 (t-1)	$\sum_{T=1}^{3}$	$\frac{[2]}{(CSR\ \ X_{CSTR})^2} - \frac{[1]}{(CSTR\ \ X_{CSTR})}$
S	2 (s-1)	$\sum_{S=1}^{3}$	$\frac{[3]}{(CTR\ \ X_{CSTR})^2}$
Cit	6 (c-1)T	$\sum_{CT}$	$\frac{[4]}{(SR\ \ X_{CSTR})^2} - \sum_{T} \frac{(CSR\ \ X_{CSTR})^2}{(CSR\ \ (27)}$
R	2 (R-1)	$\sum_{R=1}^{2}$	$\frac{[5]}{(TSC\ X_{CSTR})^2} - [1]$
TS	4 (t-1)(5-1)	$\sum_{TS}$	$\frac{[6]}{(CR\ \ X_{CSTR})^2} - [2] - [2] + [1]$
CS:T	12 (C-1(s-1(t)	$\sum_{CST}$	$\frac{[7]}{(R\ \ X_{CSTR})^2} - [4] - [6] + [2]$
RT	(R-1)(t-1)	$\sum_{RT}$	$\frac{[8]}{(SC\ \ X_{CSTR})^2} - [2] - [5] + [1]$
RS	$(R-1)^4$(s-1)	$\sum_{RS}$	$\frac{[9]}{(TR\ X_{CSTR})^2} - [3] - [5] + [1]$
RC:T	12 (R-1)(C-1)T	$\sum_{RCT}$	$\frac{[10]}{(S\ \ X_{CSTR})^2} - [4] - [8] + [2]$
TSR	8 (t-1)(S-1)(r-1)	$\sum_{TSR}$	$\frac{[11]}{(C\ \ X_{CSTR})^2} - [6]-[8]-[9]+[2]+[3]+[5]-[1$
RCS:T	24 (r=1)(c-1)(s-1)t	$\sum_{RCST}$	$(X_{CSTR})^2 - [7]-[10]-[11]+[4]+[6]+[8]-[2]$

APPENDIX C

DOGMATISM E SCALE

DOGMATISM E SCALE

WHAT'S YOUR OPINION?

Age (Circle one)

21-25, 26-29, 30-39, 40-49, 50+

Years of Teaching - - 1, 2, 3, 4, 5, 6, 7, 8, 9, 10+

Sex_____ Grade Now Teaching_____ School_____

The following is a study of what elementary school teachers think and feel about a number of important social and personal questions. The best answer to each statement below is your personal opinion. We have tried to cover many different and opposing points of view; you may find yourself agreeing strongly with some of the statements, disagreeing just as strongly with others, and perhaps uncertain about others; whether you agree or disagree with any statement, you can be sure that many people feel the same as you do.

Mark each statement in the left margin according to how much you agree or disagree with it. Please mark every one. Write +1, +2, +3, or -1, -2, -3, depending on how you feel in each case.

+1 = I Agree a Little -1 = I Disagree a Little
+2 = I Agree on the Whole -2 = I Disagree on the Whole
+3 = I Agree Very Much -3 = I Disagree Very Much

_____ 1. The United States and Russia have just about nothing in common.

_____ 2. The highest form of government is a democracy and the highest form of democracy is a government run by those who are most intelligent.

_____ 3. Even though freedom of speech for all groups is a worthwhile goal, it is unfortunately necessary to restrict the freedom of certain political groups.

_____ 4. It is only natural that a person would have a much better acquaintance with ideas he believes in than with ideas he opposes.

_____ 5. Man on his own is a helpless and miserable creature.

_____ 6. Fundamentally, the world we live in is a pretty lonesome place.

_____ 7. Most people just don't give a "damn" for others.

_____ 8. I'd like it if I could find someone who would tell me how to solve my personal problems.

_____ 9. It is only natural for a person to be rather fearful of the future.

____ 10. There is so much to be done and so little time to do it in.

____ 11. Once I get wound up in a heated discussion I just can't stop.

____ 12. In a discussion I often find it necessary to repeat myself several times to make sure I am being understood.

____ 13. In a heated discussion I generally become so absorbed in what I am going to say that I forget to listen to what the others are saying.

____ 14. It is better to be a dead hero than to be a live coward.

____ 15. While I don't like to admit it even to myself, my secret ambition is to become a great man, like Einstein, Beethoven, or Shakespeare.

____ 16. The main thing in life is for a person to want to do something important.

____ 17. If given the chance I would do something of great benefit to the world.

____ 18. In the history of mankind there have probably been just a handful of really great thinkers.

____ 19. There are a number of people I have come to hate because of the things they stand for.

____ 20. A man who does not believe in some great cause has not really lived.

____ 21. It is only when a person devotes himself to an ideal or cause that life becomes meaningful.

____ 22. Of all the different philosophies which exist in this world there is probably only one which is correct.

____ 23. A person who gets enthusiastic about too many causes is likely to be a pretty "wishy-washy" sort of person.

____ 24. To compromise with out political opponents is dangerous because it usually leads to the betrayal of our own side.

____ 25. When it comes to differences of opinion in religion we must be careful not to compromise with those who believe differently from the way we do.

____ 26. In times like these, a person must be pretty selfish if he considers primarily his own happiness.

____ 27. The worst crime a person could commit is to attack publicly the people who believe in the same thing he does.

____ 28. In times like these it is often necessary to be more on guard against ideas put out by people or groups in one's own camp than by those in the opposing camp.

____ 29. A group which tolerates too many differences of opinion among its own members cannot exist for long.

____ 30. There are two kinds of people in this world: those who are for the truth and those who are against the truth.

____ 31. My blood boils whenever a person stubbornly refuses to admit he's wrong.

____ 32. A person who thinks primarily of his own happiness is beneath contempt.

____ 33. Most of the ideas which get printed nowadays aren't worth the paper they are printed on.

____ 34. In this complicated world of ours the only way we can know what's going on is to rely on leaders or experts who can be trusted.

____ 35. It is often desirable to reserve judgment about what's going on until one has had a chance to hear the opinions of those one respects.

____ 36. In the long run the best way to live is to pick friends and associates whose tastes and beliefs are the same as one's own.

____ 37. The present is all too often full of unhappiness. It is only the future that counts.

____ 38. If a man is to accomplish his mission in life it is sometimes necessary to gamble "all or nothing at all."

____ 39. Unfortunately, a good many people with whom I have discussed important social and moral problems don't really understand what's going on.

____ 40. Most people just don't know what's good for them.

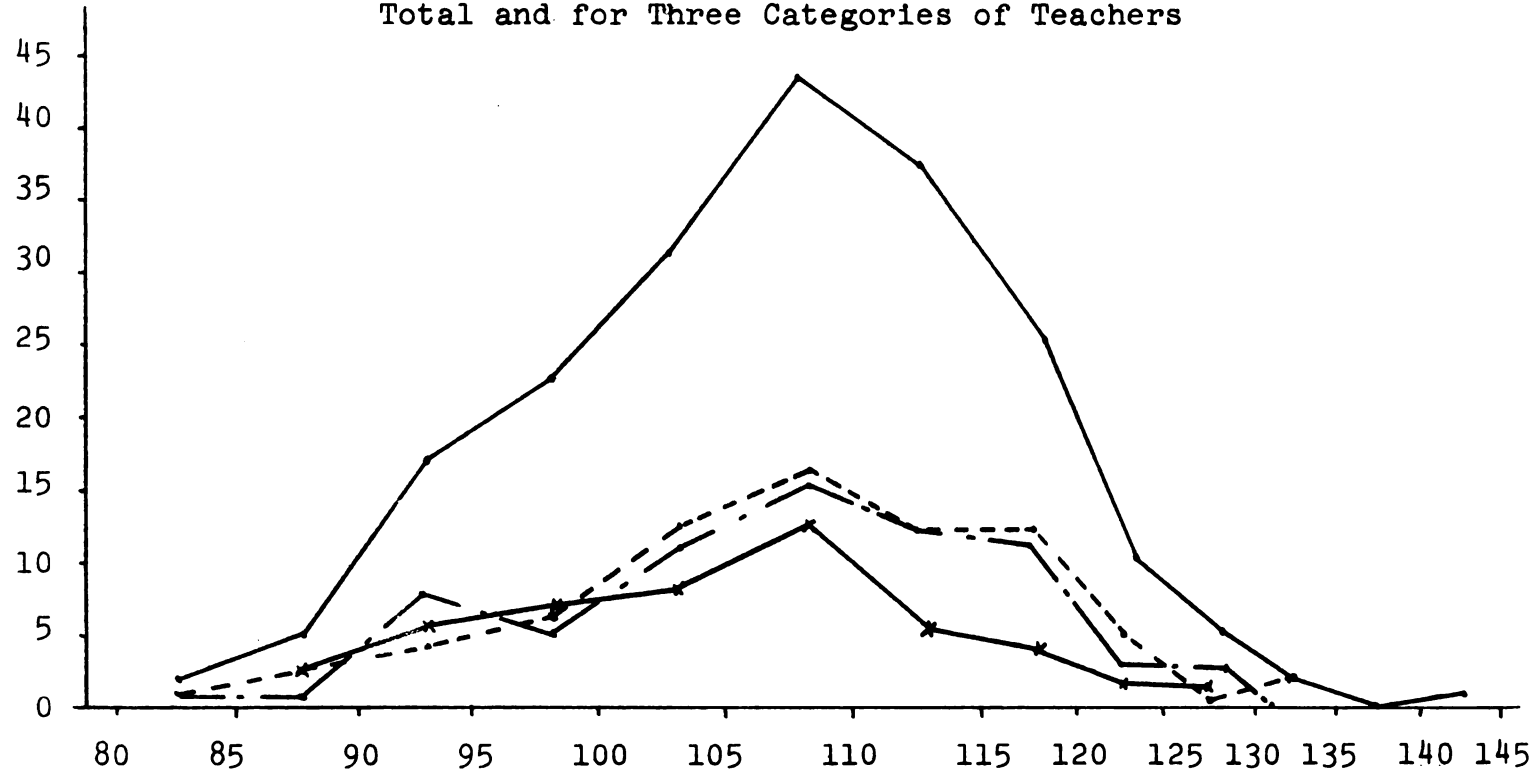
APPENDIX D

DOGMATISM C SCALE

DISTRIBUTION OF PUPILS' SCORES

ON DOGMATISM C SCALE

Distribution of Pupils' Scores on Dogmatism C Scale for Total and for Three Categories of Teachers



$\bar{X}$ = 106, sd = 9, N = 196.

Total ——— Pupils taught by: Low ×———× Middle •—·—• High •– – – –•

APPENDIX E

FORM LETTER SENT TO COOPERATING TEACHERS

APPENDIX F

MAP OF SCHOOL DISTRICT PARTICIPATED IN THE STUDY

Cooperating schools, number of pupils per class and mortality.

School	Class	Enrollment	Number in Study	Mortality
1	1	15	14	1
2 Low	2	23	20	3
3	3	22	19	3
TOTAL		60	53	7
4	1	30	29	1
5 Middle	2	23	23	0
6	3	23	20	3
TOTAL		76	72	4
7	1	26	25	1
8 High	2	26	25	1
9	3	25	21	4
TOTAL		77	71	6
OVERALL TOTAL		213	196	17